USM Vision

Transforming Higher Education for a Sustainable Tomorrow

USM Mission

USM is a pioneering, transdisciplinary research intensive university
that empowers future talents and enables the bottom billions
to transform their socio-economic well-being

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Mobile Phone No. (if applicable)	
School	
Programme of Study	

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ACADEMIC CALENDAR - ACADEMIC SESSION 2017/2018

FOR ALL SCHOOLS (EXCEPT THE SCHOOL OF MEDICAL SCIENCES AND SCHOOL OF DENTAL SCIENCES)

***Registration for New Students (3 September 2017) / Orientation Week 3-10 September 2017**

SEM	WEEK	ACTIVITY	DATE	REMARKS
ONE	1	Teaching & Learning Period (T&LP - 5 Weeks)	Monday, 11.09.2017 - Sunday, 17.09.2017	01.09.2017, Friday - Eid-ul adha 09.09.2017, Saturday – Agong's Birthday
	2		Monday, 18.09.2017 - Sunday, 24.09.2017	16.09.2017, Saturday - Malaysia Day
	3		Monday, 25.09.2017 - Sunday, 01.10.2017	22.09.2017, Friday - Maal Hijrah 1439
	4		Monday, 02.10.2017 - Sunday, 08.10.2017	
	5		Monday, 09.10.2017 - Sunday, 15.10.2017	
	6	Mid Semester Break	Monday, 16.10.2017 - Sunday, 22.10.2017	18.10.2017, Wednesday - Deepavali**
	7	Teaching & Learning Period (T&LP - 9 Weeks)	Monday, 23.10.2017 - Sunday, 29.10.2017	
	8		Monday, 30.10.2017 - Sunday, 05.11.2017	
	9		Monday, 06.11.2017 - Sunday, 12.11.2017	
	10		Monday, 13.11.2017 - Sunday, 19.11.2017	
	11		Monday, 20.11.2017 - Sunday, 26.11.2017	
	12		Monday, 27.11.2017 - Sunday, 03.12.2017	01.12.2017, Friday - Prophet Muhammad's Birthday
	13		Monday, 04.12.2017 - Sunday, 10.12.2017	
	14		Monday, 11.12.2017 - Sunday, 17.12.2017	
	15		Monday, 18.12.2017 - Sunday, 24.12.2017	
	16	Revision Week	Monday, 25.12.2017 - Sunday, 31.12.2017	25.12.2017, Monday-Christmas
	17	Examinations (3 Weeks)	Monday, 01.01.2018 - Sunday, 07.01.2018	01.01.2018, Monday-New Year 2018
	18		Monday, 08.01.2018 - Sunday, 14.01.2018	
	19		Monday, 15.01.2018 - Sunday, 21.01.2018	
	20	Mid Semester Break (3 Weeks)	Monday, 22.01.2018 - Sunday, 28.01.2018	
	21		Monday, 29.01.2018 - Sunday, 04.02.2018	31.01.2018. Wednesday- Thaipusam**
	22		Monday, 05.02.2018 - Sunday, 11.02.2018	
TWO	1/23	Teaching & Learning Period (T&LP - 7 Weeks)	Monday, 12.02.2018 - Sunday, 18.02.2018	16 & 17.02.2018, Friday & Saturday - Chinese New Year
	2/24		Monday, 19.02.2018 - Sunday, 25.02.2018	
	3/25		Monday, 26.02.2018 - Sunday, 04.03.2018	
	4/26		Monday, 05.03.2018 - Sunday, 11.03.2018	
	5/27		Monday, 12.03.2018 - Sunday, 18.03.2018	
	6/28		Monday, 19.03.2018 - Sunday, 25.03.2018	
	7/29		Monday, 26.03.2018 - Sunday, 01.04.2018	
	8/30	Mid Semester Break	Monday, 02.04.2018 - Sunday, 08.04.2018	
	9/31	Teaching & Learning Period (T&LP – 7 Weeks)	Monday, 09.04.2018 - Sunday, 15.04.2018	
	10/32		Monday, 16.04.2018 - Sunday, 22.04.2018	
	11/33		Monday, 23.04.2018 - Sunday, 29.04.2018	
	12/34		Monday, 30.04.2018 - Sunday, 06.05.2018	01.05.2018, Tuesday - Labour Day
	13/35		Monday, 07.05.2018 - Sunday, 13.05.2018	
	14/36		Monday, 14.05.2018 - Sunday, 20.05.2018	
	15/37		Monday, 21.05.2018 - Sunday, 27.05.2018	Examinations start on 23.05.2018 - 13.06.2018
	16/38	Examinations (3 Weeks)	Monday, 28.05.2018 - Sunday, 03.06.2018	29.05.2018, Tuesday - Wesak Day 02.06.2018, Saturday - Nuzul Al-Quran
	17/39		Monday, 04.06.2018 - Sunday, 10.06.2018	
	18/40		Monday, 11.06.2018 - Sunday, 17.06.2018	15 & 16.06.2018, Friday & Saturday - Eid-ul fitr**
*KSCP	19/41	Long Vacation/ Industrial Training/ KSCP* (11 Weeks)	Monday, 18.06.2018 - Sunday, 24.06.2018	
	20/42		Monday, 25.06.2018 - Sunday, 01.07.2018	
	21/43		Monday, 02.07.2018 - Sunday, 08.07.2018	07.07.2018, Saturday - Penang Heritage & Penang Governor's Birthday
	22/44	*T&LP	Monday, 09.07.2018 - Sunday, 15.07.2018	
	23/45		Monday, 16.07.2018 - Sunday, 22.07.2018	
	24/46	*Examination	Monday, 23.07.2018 - Sunday, 29.07.2018	28.07.2018, Saturday - Agong's Birthday
	25/47		Monday, 30.07.2018 - Sunday, 05.08.2018	
	26/48		Monday, 06.08.2018 - Sunday, 12.08.2018	
	27/49		Monday, 13.08.2018 - Sunday, 19.08.2018	
	28/50		Monday, 20.08.2018 - Sunday, 26.08.2018	22.08.2018, Wednesday-Eid-ul-adha**
	29/51		Monday, 27.08.2018 - Sunday, 02.09.2018	31.08.2018, Friday - National Day

*Courses during the Long Vacation (KSCP)

**This Academic Calendar is subject to change

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Dr. Nur Hidayah Kaz Abdul Aziz

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POSTGRADUATE PROGRAMME (COURSEWORK & MIXED MODE)
Dr. Baharudin Ibrahim
Coordinator

1.0 INTRODUCTION

1.1 School of Pharmaceutical Sciences

A pharmacist is a professional scientist who possesses the skills in all aspects relating to the design, development, delivery, supply, control and the usage of drugs. The School is currently using an integrated approach in teaching and learning as pharmacists need to acquire a broad range of scientific education. The Bachelor of Pharmacy degree correlates scientific findings with a strong foundation of core science courses. The students will expand their knowledge in physiology, microbiology, medicinal chemistry (drug chemistry), pharmaceutics (drug formulation to produce safe and effective medication), pharmacology (drug action on the body), clinical pharmacy (covering the knowledge on diseases and how drugs or medicines are chosen to treat and/or prevent certain diseases), and social and administrative pharmacy (economy, behaviour and drug policy).

Established in 1972, the School of Pharmaceutical Sciences, Universiti Sains Malaysia is the first pharmacy school in Malaysia. The School offers Bachelor of Pharmacy and Masters of Pharmacy in Clinical Pharmacy degrees by coursework, and Masters of Science and Doctoral degrees by research. The degree of Bachelor of Pharmacy with Honours is offered through a four-year programme.

The School of Pharmaceutical Sciences started its first intake of 22 students in 1972, 4 years after Universiti Sains Malaysia was established in Penang. During its brief history, the School has undergone many changes and developments, both physical and academic. It moved to the present premise in 1991, and now has modern and well-equipped laboratories for teaching and research. The current staff strength stands at 49 full-time lecturers, 16 administrative staff and 29 technical staff members. A few more academic staffs are currently pursuing their doctorate degrees overseas. In addition, the School is also using the services of part-time lecturers from other schools or centers of the University, besides a number of honorary consultants from Hospital Pulau Pinang, honorary lecturers from Hospital Pulau Pinang, National Poison Centre, USM, Pulau Pinang, USM Health Campus, Kubang Kerian, Kelantan and Pharmacy preceptors from both hospital and community pharmacies for its clinical programme.

To date, the School of Pharmaceutical Sciences has produced over 3320 undergraduate and more than 500 postgraduate students, many of whom are presently holding important positions in the public and corporate sectors. Even with the establishment of four more departments of pharmacy in University of Malaya, Universiti Kebangsaan Malaysia, Universiti Teknologi MARA and International Islamic University Malaysia, entrance requirement into pharmacy remains very competitive.

In addition to teaching the undergraduate programme, which has been the School's priority since its establishment, research activities are also emphasized and enculturated in the School. Since 20 years ago, research activities have increased by

leaps and bounds, some in close collaborations with other local institutions as well as with foreign institutions. Most of the research projects are supported by government or private research grants that are awarded to the academic staff involved. The School offers postgraduate studies by research leading to Master of Science and Doctoral degrees, and by coursework leading to a Master of Pharmacy degree in clinical pharmacy. Currently, there are both local and international students; most of the international students are from Bangladesh, Iran, Indonesia, Thailand, Pakistan, Libya, Ghana, Yemen, Sudan, India, St. Vincent, Jordan, Nigeria, Saudi Arabia, Palestine, Iraq and Nepal.

The School also undertakes many consultation works for the local pharmaceutical industries as well as for some multinational companies. Some of the activities include *in vivo* bioavailability studies, chemical and drug analyses, pyrogen testing, product development and biological assays. In the short period of its existence, the School can be proud of its achievements and its standing as one of the premier schools of pharmacy in this part of the world.

1.2 Mission and Vision of the School of Pharmaceutical Sciences

Mission of the School of Pharmaceutical Sciences:

The School of Pharmaceutical Sciences is committed to produce professional, innovative and competitive graduates to meet the needs of pharmacy profession and enhance consultancy, trans-disciplinary research and global collaboration for sustainable development and empowerment of society.

Vision of the School of Pharmaceutical Sciences:

To become a global centre of excellence for sustainable and innovative pharmaceutical education, research and practice for the wellness of society.

1.3 Bachelor of Pharmacy Programme

The degree of Bachelor of Pharmacy with Honours is awarded after the student has successfully fulfilled all the requirements of a four year pharmacy programme.

The Pharmacy course consists of core, elective, option and university courses. The **core courses** are the main courses whereas **elective courses** are courses that provide advanced knowledge on certain pharmaceutical areas. Students may choose any elective course that is offered. **Option courses**, on the other hand, are courses in other fields such as Humanities, Social Sciences and Management. These courses are intended to equip the students with the skills necessary for interacting constructively with the community and to inculcate a caring and responsible attitude towards society.

1.4 General Educational Goals and Objectives

Objectives:

The Bachelor of Pharmacy Degree offered by the School of Pharmaceutical Sciences, USM aims to:

- produce graduates who are competent, skillful, resourceful, ethical and professional.
- cultivate leadership values and critical thinking in order to produce graduates who are self-reliant.
- produce graduates who are caring, compassionate and show respect and fairness to others.
- nurture graduates for life-long learning and who are adaptable to socio-economic, health and environmental changes.

1.5 Programme Outcomes

The outcomes of a pharmacy programme can be grouped into 8 areas. At the end of the programme the students will be able to:

1. Logistics:
   - order, store and supply medicines in accordance with the law, pharmaceutical knowledge, and codes of professional conduct and practice.
   - apply Good Storage Practice and the practice of cold chain.

2. Prescription Screening and Interpretation:
   - interpret and critically evaluate prescriptions and other orders for medicine.
   - interpret and apply the laws related to prescriptions and other orders for medicine.

3. Pharmaceutical Care:
   - conduct medication history taking and identify pharmaceutical care issues.
   - conduct medication reviews for promoting quality use of medicines.
   - recognize common disease states and make appropriate responses to the presented symptoms and information.
   - apply clinical knowledge and skills to advice patients and other healthcare professionals about medicines and their usages.
   - provide advice on individualized dosing through pharmacokinetic manipulations.
   - interpret biochemical data of patients and make the appropriate recommendations.
   - document clinical pharmacy activities in an accurate manner.
   - recognize the importance of patient and medication safety through detecting, preventing and reporting of adverse drug reactions (ADR) and medication errors.
   - apply concepts of medicine management or pharmaceutical care and to provide such services.

4. Preparation of Pharmaceutical Products:
   - perform pharmaceutical calculation accurately, able to recognize, differentiate and prepare the various types of pharmaceutical dosage forms.
   - prepare extemporaneously any non-sterile medicines for which this will be regarded as the normal means of provision.
   - prepare extemporaneous sterile medicines for which this will be regarded as the normal means provision, including by aseptic techniques.
   - apply the concepts of total parenteral nutrition and its preparations.
   - utilize the concepts of cytotoxic drug reconstitution and the precautions required in its preparation.
   - formulate and manufacture pharmaceutical products.
   - apply the principles of quality and quality assurance mechanisms in all aspects of scientific and professional activities.

5. Communication:
    - communicate clearly, considerately and effectively, both orally and written, with other healthcare professionals.
    - communicate clearly, considerately and sensitively with patients and their caretakers and the general public. This should include the ability to counsel effectively and to provide information in such manner which ensures patients and their caretakers can be truly informed about their medications.
    - communicate effectively with the general public regarding drug therapy, wellness and health promotion.

6. Continuous Professional Development:
    - develop the desire to search for knowledge continuously and take personal responsibility in continuing professional development.
    - use current technologies to search for new information, to adopt and integrate it to improve practice.
    - undertake critical appraisal of information or conjecture in all forms of presentations.
    - determine the research needs in pharmacy practice towards outcome measurement and service improvement.
    - contribute to the improvement and progress of the profession and the welfare of the community.

7. Management and Interpersonal Skills:
    - manage and administer a pharmacy.
    - work effectively as a team and can collaborate well with other healthcare professionals, able to recognize ethical dilemmas in healthcare and sciences.
    - utilise ways to manage it, taking into account the relevant laws and able to optimize resources to achieve benefits.

8. ICT:
    - use common software applications in the pharmacy.
    - recognize and utilize the potential of ICT in pharmacy practice.

1.6 Applications of Softskills

The softskills training have been incorporated throughout the programme.

1.7 Programme Profile

Core courses offered at level 100, 200, 300 and 400 can be divided into 6 disciplines, namely:

Physiology
Pharmacology
Pharmaceutical Chemistry
Pharmaceutical Technology
Clinical Pharmacy
Social and Administrative Pharmacy

These courses are integrated in the curriculum.

Physiology provides knowledge of the function of the human body. It forms the basis for the understanding of the action, uses of drugs and pathophysiology of diseases that are taught in pharmacology and clinical pharmacy.

Pharmacology provides knowledge concerning various types of drugs that are used in the treatment of diseases. Discussion related to absorption, distribution, metabolism, excretion, mechanism of action, uses and adverse effects are the main content of this discipline.

Pharmaceutical Chemistry emphasizes the application of the principles of basic chemistry to the study of drugs, their physico-chemical properties, structures and their relationship to biological activities. Analytical techniques for identification and quality control of drugs and some aspects of natural product chemistry are taught.

Pharmaceutical Technology provides the knowledge in pharmaceutical formulation and preparation in various dosages, new dosage designs, industrial processes, quality control, microbiological control besides biopharmacy and pharmacokinetic aspects.

Clinical Pharmacy introduces the students to disease states and disorders and the rationale of drug choice in the treatment and/or prevention of these illnesses. Clinical Pharmacy emphasizes on the integration of all disciplines in pharmacy.

To enable students to understand and acquire detailed knowledge pertaining to the role of a pharmacist in the clinical situation, students are required to participate in ward rounds at the Hospital Pulau Pinang, Hospital Seberang Jaya and community pharmacy in the Penang area.

Social and Administrative Pharmacy is designed to prepare individuals for responsible, leadership position in pharmacy education, research and/or management in academia, industry or public service. This includes possible careers in governmental agency, pharmaceutical firms, community pharmacies, universities, professional and international bodies and health insurance companies in the future. Along with the increasing importance of medicines and drugs in society, there are increasing complex interactions among government and non-governmental agencies,

providers, consumers and policy-makers thus resulting in a critical need for persons with advanced training in social and administrative pharmacy.

1.8 Programme Requirements

Upon completion of a recognized B.Pharm. degree, a pharmacy graduate is required to undergo a period of housemanship or pupillage for 12 months at any general or private hospital, pharmaceutical industry or at any retail pharmacy recognized by the Pharmacy Board of Malaysia. The objective of the pupillage is for graduates to undergo a planned training programme on aspects of pharmacy practice under the supervision of a registered pharmacist. After passing the Forensic Pharmacy examination and completing one year of pupillage, graduates are eligible to register with the Pharmacy Board of Malaysia and may practice as a registered Pharmacist in Malaysia.

1.9 Type of Courses

Core Courses – Level 100

NO.	CODE/ UNIT	COURSE TITLE	CW (%)	EW (%)	TOTAL LECTURE HOURS	TOTAL PRACTICAL HOURS
(1st SEMESTER)						
1.	FAR 113/3	Organic Chemistry	30	70	33	3x(3)
2.	FAR 121/4	Microbiology for Pharmacy	30	70	44	4x(3)
3.	FAR 131/3	Basic Physiology	30	70	26	4x(3)
4.	FAR 191/4	Research Methodology and Statistics in Pharmacy	40	60	33	-
5.	FAR 192/4	Social and Public Health Pharmacy	60	40	19	-
(2nd SEMESTER)						
6.	FAR 114/3	Pharmaceutical Chemistry	30	70	35	3x(3)
7.	FAR 122/4	Dosage Form I	40	60	37	24
8.	FAR 141/4	Peripheral Nervous System and Therapy	30	70	38	4x(3)
9.	FAR 142/3	Basic Pharmacology and Biochemistry	30	70	25	5x(3)
10.	FAR 153/2	Communication Skill in Pharmacy Practice	60	40	16	-

Core Courses - Level 200

NO.	CODE/ UNIT	COURSE TITLE	CW (%)	EW (%)	TOTAL LECTURE HOURS	TOTAL PRACTICAL HOURS
		(1st SEMESTER)				
11.	FAR 212/2	Principles of Medicinal Chemistry	30	70	23	-
12.	FAR 221/3	Physical Pharmacy I	30	70	28	12
13.	FAR 222/3	Dosage Form II	40	60	27	15
14.	FAR 241/4	Antimicrobial Therapy	30	70	48	-
15.	FAR 246/2	Biopharmaceuticals I	30	70	25	-
16.	FAR 291/4	Pharmaceutical Management and Marketing	60	40	36	-
		(2nd SEMESTER)				
17.	FAR 223/3	Physical Pharmacy II	30	70	25	12
18.	FAR 242/4	Endocrine System and Metabolism	30	70	40	4x(3)
19.	FAR 244/3	Basic Pharmacognosy and Phytochemistry	40	60	37	4x(3)
20.	FAR 247/2	Biopharmaceuticals II	30	70	28	-
21.	FAR 251/2	Pharmacoinformatics	40	60	21	-

Core Courses - Level 300

NO.	CODE/ UNIT	COURSE TITLE	CW (%)	EW (%)	TOTAL LECTURE HOURS	TOTAL PRACTICAL HOURS
		(1st SEMESTER)				
22.	FAR 313/4	Pharmaceutical Analysis	30	70	31	8x(4)
23.	FAR 323/3	Biopharmaceutics and Pharmacokinetics	30	70	28	6
24.	FAR 341/4	Respiratory, Renal, Blood Systems and Therapy	30	70	39	5x(3)
25.	FAR 342/3	Cardiovascular System and Therapy	30	70	27	4x(3)
26.	FAR 352/4	Clinical Pharmacy Practice	40	60	40	-

		(2nd SEMESTER)				
27.	FAR 343/2	Gastrointestinal System and Therapy	30	70	24	-
28.	FAR 344/4	Central Nervous System and Therapy	30	70	48	2x(3)
29.	FAR 346/2	Applied Pharmacognosy	40	60	24	-
30.	FAR 347/2	Oncology Pharmacy	30	70	20	-
31.	FAR 353/2	Applied Pharmacokinetics	40	60	20	-
32.	FAR 381/0	Forensic Pharmacy and Ethic	0	100	24	-
33.	FAR 391/4	Pharmacoepidemiology and Pharmacoeconomics in Developing Countries	60	40	34	-

Core Courses – Level 400

NO.	CODE/ UNIT	COURSE TITLE	CW (%)	EW (%)	TOTAL LECTURE HOURS	TOTAL PRACTICAL HOURS
		(1st SEMESTER)				
34.	FAR 411/2	Advanced Pharmaceutical Analysis	40	60	18	15
35.	FAR 422/2	Advanced Drug Delivery	40	60	24	-
36.	FAR 423/4	Pharmaceutical Processing	40	60	34	18
37.	FAR 424/4	Industrial Pharmacy	40	60	38	15
38.	FAR 453/3	Applied Therapeutics I	40	60	36	-
39.	FAR 457/2	Medication Counselling Practice	60	40	16	-
40.	FAR 459/2	Pharmacogenomics	40	60	20	-
41.	FAR 461/2	Hospital Pharmacy	60	40	20	-
		(2nd SEMESTER)				
42.	FAR 425/6	Industrial Training	100	0	-	-
43.	FAR 454/3	Applied Therapeutics II	40	60	36	-

44.	FAR 458/2	Nuclear Pharmacy	60	40	15	-
45.	FAR 460/2	Traditional and Complementary Medicine	40	60	20	-
46.	FAR 462/2	Community Pharmacy	60	40	12	-

Elective Courses – Level 100

NO.	CODE/ UNIT	COURSE TITLE	CW (%)	EW (%)	TOTAL LECTURE HOURS	TOTAL PRACTICAL HOURS
(1st and 2nd SEMESTER)						
-	-	-	-	-	-	-

Elective Courses – Level 200

NO.	CODE/ UNIT	COURSE TITLE	CW (%)	EW (%)	TOTAL LECTURE HOURS	TOTAL PRACTICAL HOURS
(1st SEMESTER)						
-	-	-	-	-	-	-
(2nd SEMESTER)						
47.	FEL 273/2	Veterinary Pharmacy	30	70	22	-
48.	FEL 274/2	Health Promotion Pharmacy	60	40	11	-

Elective Courses - Level 300

NO.	CODE/ UNIT	COURSE TITLE	CW (%)	EW (%)	TOTAL LECTURE HOURS	TOTAL PRACTICAL HOURS
(1st SEMESTER)						
49.	FEL 375/2	Malay Traditional Medicine	40	60	20	-
(2nd SEMESTER)						
50.	FEL 373/2	Drug Modelling	30	70	18	6
51.	FEL 374/2	Drug and Society	40	60	23	-

Elective Courses - Level 400

NO.	CODE/ UNIT	COURSE TITLE	CW (%)	EW (%)	TOTAL LECTURE HOURS	TOTAL PRACTICAL HOURS
(1st SEMESTER)						
52.	FEL 472/4	Research Exercise	100	-	-	-
53.	FEL 473/2	Geriatric Pharmacy	40	60	19	-
54.	FEL 475/2	Toxicology	30	70	24	6
55.	FEL 476/2	Current Topics in Human Physiology	40	60	21	-
(2nd SEMESTER)						
56.	FEL 472/4	Research Exercise	100	-	-	-
57.	FEL 477/2	Personal Care	40	60	20	6
58.	FEL 478/2	Patient Bed Side Physiology	70	30	20	-

Note: **CW**: Course Work, **EW**: Exam Work

1.10 Graduation Requirements

Students must fulfill the following requirements to graduate:

[a] Fulfill the minimum residential requirements during the course of studies.

[b] Fulfill all credit requirements; i.e. the requirements for each component [Core, Elective, Option and University courses].

[c] Obtained a CGPA of 2.67 and above for the Core components, by achieving a grade of B- and above for each Core course.

[d] Obtained a CGPA of 2.00 and above for the program.

[e] Achieved a minimum grade C or a grade point of 2.00 for Bahasa Malaysia, English Language, Ethnic Relation, TITAS and Core Entrepreneurship courses.

Graduating Unit Structure

NO.	TYPE OF COURSES	UNIT
1.	Core	118
2.	Elective*	12
3.	University/Option**	
	a) Bahasa Malaysia	2
	b) English Language	4
	c) SHE101-Ethnic Relations	2
	d) HTU223-Islamic and Asian Civilisations	2
	e) WUS101-Core Entrepreneurship	2
	f) Co-Curriculum/Option/Skills Courses	3
TOTAL		**145**

* Offered by the School of Pharmaceutical Sciences only.

** Bahasa Malaysia Course / English Language / SHE / HTU / WUS / Co-Curriculum, courses which require Skills / Analytical Technique based on student's interest.

1.11 Course Coding

Core Courses: 118 Units

No.	Course Code	Course Title	Lecturers
1.	FAR113/3	Organic Chemistry	Dr. Ezatul Ezleen Kamarulzaman (C) Assoc. Prof. Dr. Roziahanim Mahmud Dr. Lee Chong Yew
2.	FAR114/3	Pharmaceutical Chemistry	Assoc. Prof. Dr. Roziahanim Mahmud (C) Prof. Dr. Mohd. Nizam Mordi Assoc. Prof. Dr. Nurzalina Abdul Karim Khan Dr. Lee Chong Yew Dr. Ezatul Ezleen Kamarulzaman
3.	FAR121/4	Microbiology for Pharmacy	Dr. Thaigarajan A/L Parumasivam (C) Prof. Dr. Rahmah Noordin Dr. Suriani Mohamad
4.	FAR122/4	Dosage Form I	Dr. Amirah Mohd Gazzali (C) Assoc. Prof. Dr. Nurzalina Abdul Karim Khan Dr. Goh Choon Fu
5.	FAR131/3	Basic Physiology	Dr. Aidiahmad Dewa (C) Assoc. Prof. Mariam Ahmad Dr. Shahriza Shahrudin
6.	FAR141/4	Peripheral Nervous System and Therapy	Dr. Aidiahmad Dewa (C) Dr. Aisyah Saad Abdul Rahim Dr. Shahriza Shahrudin Dr. Aidiahmad Dewa (C)
7.	FAR142/3	Basic Pharmacology and Biochemistry	Dr. Salizawati Muhamad Salhimi (C) Assoc. Prof. Dr. Vikneswaran Murugaiyah
8.	FAR153/2	Communication Skill in Pharmacy Practice	Prof. Dr. Azmi Sarriff (C) Dr. Baharudin Ibrahim
9.	FAR191/4	Research Methodology and Statistics in Pharmacy	Dr. Lim Ching Jou (C) Prof. Dr. Mohamed Azmi Ahmad Hassali Assoc. Prof. Dr. Asrul Akmal Shafie
10.	FAR192/4	Social and Public Health Pharmacy	Prof. Dr. Mohamed Azmi Ahmad Hassali (C) Assoc. Prof. Dr. Asrul Akmal Shafie Assoc. Prof. Dr. Ahmad Tajuddin Othman Dr. Lim Ching Jou

No.	Course Code	Course Title	Lecturers
11.	FAR212/2	Principles of Medicinal Chemistry	Dr. Aisyah Saad Abdul Rahim (C) Dr. Yap Beow Keat
12.	FAR221/3	Physical Pharmacy I	Dr. Chan Siok Yee (C) Prof. Dr. Habibah A. Wahab Prof. Dr. Peh Kok Khiang Assoc. Prof. Dr. Nurzalina Abdul Karim Khan Dr. Toh Seok Ming Dr. Amirah Mohd Gazzali
13.	FAR222/3	Dosage Form II	Dr. Goh Choon Fu (C) Prof. Dr. Habibah A. Wahab Assoc. Prof. Dr. Nurzalina Abdul Karim Khan Dr. Toh Seok Ming Dr. Suriani Mohamad Dr. Amirah Mohd Gazzali
14.	FAR223/3	Physical Pharmacy II	Dr. Toh Seok Ming (C) Prof. Dr. Habibah A. Wahab Prof. Dr. Peh Kok Khiang Dr. Chan Siok Yee
15.	FAR241/4	Antimicrobial Therapy	Dr. Nurhidayah Kaz Abdul Aziz (C) Prof. Dr. Syed Azhar Syed Sulaiman Prof. Dr. Gam Lay Harn Assoc. Prof. Dr. Vikneswaran Murugaiyah Dr. Aisyah Saad Abdul Rahim Dr. Sabariah Noor Harun
16.	FAR242/4	Endocrine System and Metabolism	Dr. Hassaan Anwer Rathore (C) Assoc. Prof. Dr. Zuraidah Mohd. Yusoff Assoc. Prof. Mariam Ahmad Dr. Lee Chong Yew Dr. Baharudin Ibrahim Dr. Zurina Hassan
17.	FAR244/3	Basic Pharmacognosy and Phytochemistry	Assoc. Prof. Dr. Roziahanim Mahmud (C) Prof. Dr. Sabariah Ismail Dr. Lee Chong Yew Dr. Yap Beow Keat
18.	FAR246/2	Biopharmaceuticals I	Dr. Suriani Mohamad (C) Assoc. Prof. Dr. Ahmad Ramli Mohd Yahya Dr. Mohd. Adi Firdaus Tan Abdullah Dr. Hasni Arsad

No.	Course Code	Course Title	Lecturers
19.	FAR247/2	Biopharmaceuticals II	Dr. Thaigarajan Parumasivam(C) Prof. Dr. Habibah A. Wahab Assoc. Prof. Dr. Amin Malik Shah Abdul Majid Dr. Suriani Mohamad
20.	FAR251/2	Pharmacoinformatics	Dr. Dzul Azri Mohamed Noor (C) Prof. Dr. Rahmat Awang Dr. Maizurah Omar Dr. Hadzliana Zainal
21.	FAR291/4	Pharmaceutical Management and Marketing	Dr. Lim Ching Jou (C) Prof. Dr. Mohamed Azmi Ahmad Hassali Assoc. Prof. Dr. Asrul Akmal Shafie
22.	FAR313/4	Pharmaceutical Analysis	Assoc. Prof. Dr. Nornisah Mohamed (C) Prof. Dr. Gam Lay Harn Dr. Salizawati Muhamad Salhimi
23.	FAR323/3	Biopharmaceutics and Pharmacokinetics	Dr. Chan Siok Yee (C) Prof. Dr. Habibah A. Wahab
24.	FAR341/4	Respiratory, Renal, Blood Systems and Therapy	Mrs. Khairul Niza Abdul Razak (C) Assoc. Prof. Dr. Vikneswaran Murugaiyah Dr. Hadzliana Zainal Dr. Yap Beow Keat
25.	FAR342/3	Cardiovascular System and Therapy	Dr. Yap Beow Keat (C) Dr. Hassaan Anwer Rathore Dr. Sabariah Noor Harun Dr. Yam Mun Fei
26.	FAR343/2	Gastrointestinal System and Therapy	Mrs. Khairul Niza Abdul Razak (C) Dr. Dzul Azri Mohamed Noor Dr. Nur Hidayah Kaz Abdul Aziz Dr. Yap Beow Keat
27.	FAR344/4	Central Nervous System and Therapy	Assoc. Prof. Dr. Vikneswaran Murugaiyah (C) Dr. Aidiahmad Dewa Dr. Aisyah Saad Abdul Rahim Dr. Shahriza Shahrudin Dr. Nur Hidayah Kaz Abdul Aziz Dr. Dzul Azri Mohamed Noor
28.	FAR346/2	Applied Pharmacognosy	Dr. Yam Mun Fei (C) Assoc. Prof. Saad Othman

No.	Course Code	Course Title	Lecturers
29.	FAR347/2	Oncology Pharmacy	Assoc. Prof. Dr. Zuraidah Mohd. Yusoff (C) Prof. Dr. Mohd. Nizam Mordi Assoc. Prof. Saad Othman
30.	FAR352/4	Clinical Pharmacy Practice	Prof. Dr. Syed Azhar Syed Sulaiman (C) Prof. Dr. Azmi Sarriff Assoc. Prof. Dr. Zuraidah Mohd Yusoff
31.	FAR353/2	Applied Pharmacokinetics	Dr. Hadzliana Zainal (C) Dr. Chong Chee Ping
32.	FAR381/0	Forensic Pharmacy and Ethics	Prof. Dr. Habibah A. Wahab (C)
33.	FAR391/4	Pharmacoepidemiolog and Pharmacoeconomics in Developing Countries	Assoc. Prof. Dr. Asrul Akmal Shafie (C) Prof. Dr. Mohamed Azmi Ahmad Hassali Dr. Lim Ching Jou
34.	FAR411/2	Advanced Pharmaceutical Analysis	Prof. Dr. Gam Lay Harn (C) Prof. Dr. Mohd. Nizam Mordi Assoc. Prof. Dr. Nornisah Mohamed Dr. Salizawati Muhamad Salhimi
35.	FAR422/2	Advanced Drug Delivery	Dr. Toh Seok Ming (C) Prof. Dr. Peh Kok Khiang Assoc. Prof. Dr. Nurzalina Abdul Karim Khan Dr. Siti Rafidah Yusof
36.	FAR423/4	Pharmaceutical Processing	Prof. Dr. Peh Kok Khiang (C) Prof. Dr. Habibah A. Wahab Dr. Chan Siok Yee Dr. Amirah Mohd Gazzali Dr. Thaigarajan A/L Parumasivam
37.	FAR424/4	Industrial Pharmacy	Prof. Dr. Peh Kok Khiang (C) Prof. Dr. Ahmad Zuhairi Abdullah Dr. Suriani Mohamad Dr. Lim Ching Jou Dr. Leong Chuei Wuei Dr. Ng Bee Hong Dr. Wong Jia Woei
38.	FAR425/6	Industrial Training	Dr. Chan Siok Yee (C)

No.	Course Code	Course Title	Lecturers
39.	FAR453/3	Applied Therapeutics I	Dr. Chong Chee Ping (C) Prof. Dr. Syed Azhar Syed Sulaiman Assoc. Prof. Dr. Zuraidah Mohd. Yusoff Dr. Baharudin Ibrahim Dr. Sabariah Noor Harun Dr. Hadzliana Zainal
40.	FAR454/3	Applied Therapeutics II	Dr. Baharudin Ibrahim (C) Prof. Dr. Syed Azhar Syed Sulaiman Assoc. Prof. Dr. Zuraidah Mohd. Yusoff Dr. Dzul Azri Mohamed Noor Dr. Chong Chee Ping Dr. Sabariah Noor Harun
41.	FAR457/2	Medication Counseling Practice	Prof. Dr. Azmi Sarriff (C) Dr. Siti Maisharah Sheik Ghadzi
42.	FAR458/2	Nuclear Pharmacy	Dr. Amer Hayat Khan (C) Dr. Nur Hidayah Kaz Abdul Aziz
43.	FAR459/2	Pharmacogenomics	Dr. Dzul Azri Mohamed Noor (C) Dr. Baharudin Ibrahim Dr. Nurulhasanah Othman
44.	FAR460/2	Traditional and Complementary Medicine	Assoc. Prof. Dr. Zuraidah Mohd. Yusoff (C) Assoc. Prof. Saad Othman Dr. Balamurugan Tangiisuran Dr. Yam Mun Fei
45.	FAR461/2	Hospital Pharmacy	Dr. Balamurugan Tangiisuran (C) Dr. Siti Maisharah Sheik Ghadzi
46.	FAR462/2	Community Pharmacy	Prof. Dr. Azmi Sarriff (C) Dr. Nur Aizati Athirah Daud Dr. Chong Chee Ping

Elective Courses: 24 Units

No.	Course Code	Course Title	Lecturers
1.	FEL273/2	Veterinary Pharmacy	Dr. Nur Hidayah Kaz Abdul Aziz (C) Prof. Dr. Surash Ramanathan Dr. Yam Mun Fei
2.	FEL274/2	Health Promotion Pharmacy	Prof. Dr. Syed Azhar Syed Sulaiman (C) Dr. Dzul Azri Mohamed Noor Dr. Nur Aizati Athirah Daud
3.	FEL373/2	Drug Modelling	Prof. Dr. Habibah A. Wahab (C) Prof. Dr. Mohd. Nizam Mordi Assoc. Prof. Dr. Nornisah Mohamed Assoc. Prof. Dr. Roziahanim Mahmud Dr. Ezatul Ezleen Kamarulzaman
4.	FEL374/2	Drug and Society	Assoc. Prof. Dr. Zuraidah Mohd. Yusoff (C) Dr. Salizawati Muhamad Salhimi Mrs. Fatimatuzahrra' Abdul Aziz
5.	FEL375/2	Malay Traditional Medicine	Assoc. Prof. Saad Othman (C) Assoc. Prof. Dr. Zuraidah Mohd. Yusoff Assoc. Prof. Dr. Muhammad Azizan Sabjan Mrs. Fatimatuzahrra' Abdul Aziz
6.	FEL472/4	Research Exercise	Dr. Suriani Mohamad (C)
7.	FEL473/2	Geriatric Pharmacy	Dr. Balamurugan Tangiisuran (C) Prof. Dr. Syed Azhar Syed Sulaiman
8.	FEL475/2	Toxicology	Assoc. Prof. Dr. Amin Malik Shah Abdul Majid (C) Dr. Yam Mun Fei Dr. Nur Hidayah Kaz Abdul Aziz
9.	FEL476/2	Current Topics in Human Physiology	Dr. Hassaan Anwer Rathore (C) Dr. Aidiahmad Dewa Dr. Shahriza Shahrudin
10.	FEL477/2	Personal Care	Dr. Chan Siok Yee (C) Prof. Dr. Peh Kok Khiang Assoc. Prof. Dr. Nurzalina Abdul Karim Khan Dr. Toh Seok Ming Dr. Goh Choon Fu Dr. Amirah Mohd Gazzali
11.	FEL478/2	Patient Bed Side Physiology	Dr. Hassaan Anwer Rathore (C) Assoc. Prof. Mariam Ahmad Dr. Aidiahmad Dewa Dr. Shahriza Shahrudin

Guideline For Course/Unit Registration

LEVEL	***100***		***200***		***300***		***400***				***TOTAL UNIT***
YEAR	***1***		***2***		***3***		***4***				
SEMESTER	***I***	***II***	***I***	***II***	***I***	***II***	***I***	***II***	***I***	***II***	
							Clinical Pharmacy		***Industrial Pharmacy***		
CORE	18	16	18	14	18	16	9	9	12	6	**118**
ELECTIVE	-	-	-	FEL 273/2 FEL 274/2	FEL 375/2	FEL 373/2 FEL 374/2	FEL 472/4 FEL 473/2 FEL 475/2 FEL 476/2	FEL 472/4 FEL 478/2	FEL 472/4	FEL 472/4 FEL 477/2	**12**
SKILLED/ ANALYSIS COURSE	-	-	-	-	2	2	-	-			**15**
TITAS/SHE101/2 /WUS101/2	HTU 223/2	WUS 101/2 SHE 101/2	-	-	-	-	-	-			
ENGLISH LANGUAGE	-	-	2^{+}	-	2^{+}	2^{+}	-	-			
BAHASA MALAYSIA	-	-	-	$2^{@}$	$2^{@}$	$2^{@}$	-	-			
COCURRICULUM /OPTION	1	1	1	1	1	1	1	1			
TOTAL	**18-21**	**16-21**	**18-21**	**14-21**	**18-21**	**16-21**	**9-21**	**9-21**	**14-21**	**10-21**	**145**

+English Language (Dependent on the English Language level)

@Bahasa Malaysia IV (Compulsory to register and pass)

2.0 ACADEMIC SYSTEM AND GENERAL INFORMATION

2.1 Course Registration

Registration of courses is an important activity during the period of study at the university. It is the first step for the students to sit for the examination at the end of each semester. Signing up for the right courses each semester will help to facilitate the graduation of each student from the first semester till the final semester.

2.1.1 Course Registration Secretariat for the Bachelor Degree and University's Diploma Students

Student Data and Records Section (SDRP)
Academic Management Division
Registry
(Level 1, Chancellory Building)

Tel. No.	:	04-653 2925/2924/2923
Fax No.	:	04-657 4641
E-Mail	:	sdrp@usm.my
Website	:	http://registry.usm.my/updr

The SDRP office is the Secretariat/Coordinator of course registration for the Bachelor Degree and Diploma Programme of the University.

Further inquiries regarding course registration activities for the first degree and diploma can be made at the office of the Student Data and Records Section. Please refer to the contact number above.

2.1.2 Course Registration Platform

(i) *E-Daftar* (E-Registration)

E-Daftar is a platform for on-line course registration. The registration is done directly through the Campus Online portal **(https://campusonline.usm.my)**.

Registration under *E-Daftar* for Semester 1 usually starts 1-2 days after the release of 'Official' examination results of Semester 2 of the previous academic year. The system closes a day before Semester 1 begins (in September). *E-Daftar* registration for Semester 2 usually starts 1-2 days after the Semester 1 'Provisional' examination results are released until a day before Semester 2 begins (in February).

The actual timing of registration under *E-Daftar* will be announced by the Student Data and Records Section during the Revision Week of every semester and will be displayed on the respective Schools/Centres/Hostels' bulletin boards and in the USM's official website.

Under *E-Daftar*, students can register for any courses offered by USM, except co-curriculum courses. Registration of co-curriculum courses is still placed under the administration of the Director of the Centre for Co-Curriculum Programme at the Main Campus or the Coordinator of the Co-Curriculum Programme at the Engineering Campus and the Coordinator of the Co-Curriculum Programme at the Health Campus.

Co-Curriculum courses will be included in the students' course registration account prior to the *E-Daftar* activity, if their pre-registration application is successful.

(ii) Access to *E-Daftar* System

a. *E-Daftar* System can be accessed through the Campus Online portal **(https://campusonline.usm.my)**.
b. Students need to use the E-Mail ID and password to access their profile page, which includes the *E-Daftar* menu.
c. Students need to click on the *E-Daftar* menu to access and register for the relevant courses.
d. Students are advised to print the course registration confirmation slip upon completion of the registration process or after updating the course registration list (add/ drop) within the *E-Daftar* period.
e. The *E-Daftar* system can only be accessed for a certain period of time.
f. Guidelines to register/gain access to the *E-Daftar* portal are available at the Campus Online portal's main page.

(iii) Online Course Registration (OCR) in Schools/Centres

OCR activities are conducted in the Schools/Centres and are applicable to students who are academically active and under Probation (P1/P2) status. Students who face difficulties registering their courses during the *E-Daftar* period can register their courses during the official period of OCR alternatively. Each school is responsible for scheduling this activity.

The official period for OCR normally starts on the first day of the semester (without the penalty charge of RM50.00). After this

official date, the registration will be considered late (a penalty of RM50.00 will be imposed if no reasonable excuse is given).

During the non-penalty period, OCR will be conducted at each School. After Week Six, all registration, including adding and dropping of courses will be administered by the Examination and Graduation Section Office (Academic Management Division, Registry).

2.1.3 The Frequency of Course Registration in One Academic Session

(i) Normal Study Semester
- 2 times per year (beginning of Semester **1** & Semester **2**)

(ii) Long semester break (about one month after the final examination of Semester **2**)
- Once per year

2.1.4 General Guidelines before Students Register for Courses

(i) Matters/Information/Documents required to be noted/considered/ referred to by students before course registration:

- Refer to the respective School's website to get updated information for courses offered or course registration.
- Decide on courses to be registered according to the semester as stipulated in the Study Programme Guide Book.
- List of courses to be registered and number of units (unit value) for each course.
- Provide Cumulative Statement of Grades (Cangred).
- Construct Teaching and Learning Timetable for the registered courses (to avoid overlapping in timetable).
- Read and comprehend the reminders regarding policies/general requirements for the course registration.

(ii) The number of maximum and minimum units that can be registered in every semester **is** stated below:

Academic Status	Minimum Units	Maximum Units
Active	9	21
P1	9	15
P2	9	13

Determination of academic status in a semester is based on the students' academic performance in the previous semester (Grade Point Average, GPA):

* GPA 2.00 & above = Active Academic Status
* GPA 1.99 & below = Probation Academic Status (P1/P2)

- Students who meet the minimum period of residency (6 semesters for a 3 year programme, 7 semesters for a 3.5 year programme or 8 semesters for a 4 year programme) are allowed to register courses with a total of less than 9 units. The semester in which the student is on leave is not considered for the residency period.

(iii) Type of course codes during registration:

T = Core courses
E = Elective courses
M = Minor courses
U = University courses

} Grade and number of units obtained from these courses are considered for graduation

Two (2) other course codes are:
Y = audit courses
Z = prerequisite courses

Grade and number of units obtained from these courses are not considered for graduation.

(iv) Advice and approval of the Academic Advisor

- Approval from the Academic Advisor is required for students under Probation status before they are allowed to register during the OCR period. Probation students cannot access *E-Daftar* for registration.
- Approval from the Academic Advisor is not required for students under Active Status to register courses through *E-Daftar*.

(v) Students are not allowed to register and repeat any course for which they have achieved a grade 'C' and above.

2.1.5 Information/Document Given To All Students through Campus Online Portal (https://campusonline.usm.my)

(i) The information of Academic Advisor.

(ii) Academic information such as academic status, GPA value, CGPA value and year of study.

(iii) Cangred and Course Registration Form.

(iv) List of courses offered by all Schools/Centres.

(v) Teaching and Learning Timetable for all Schools/Centres/Units from the three campuses.

(vi) List of pre-registered courses which have been added into the students' course registration record (if any).

(vii) Reminders about the University course registration policies/general requisites.

2.1.6 Registration of Language and Co-Curriculum Courses

(a) Registration of Language courses through *E-Daftar* is allowed.

- ❖ However, if any problem arises, registration for language courses can still be carried out/updated during the official period of OCR at the office of the School of Languages, Literacies and Translation.

- ❖ All approval/registration/dropping/adding of language courses is under the responsibility and administration of the School of Languages, Literacies and Translation.

- ❖ Any problems related to the registration of language courses can be referred to the School of Languages, Literacies and Translation. The contact details are as follows:

General Office	: 04-653 4542/ 5243/ 5248	for Main Campus students
Malay Language Programme Chairperson	: 04-6533974	
English Language Programme Chairperson	: 04-6533406	
Foreign Language Programme Chairperson	: 04-6533396	
Engineering Campus Programme Chairperson	: 04-5995407	
	: 04-5996385	
Health Campus Programme Chairperson	: 09-7671252	

(b) Registration for **co-curricular courses through *E-Daftar*** is not allowed.

- ❖ Registration for co-curricular courses is either done through pre-registration before the semester begins or during the first/second week of the semester. Co-curricular courses will be included in the students' course registration account prior to the *E-Daftar* activity, if their pre-registration application is successful.

- ❖ All approval/registration/dropping/adding of co-curricular courses is under the responsibility and administration of:

  Director of the Centre for Co-Curricular Programme, Main Campus (04-653 5242/5243/5248)

  Coordinator of the Centre for Co-Curricular Programme, Engineering Campus (04-599 5097/6385)

  Coordinator of the Centre for Co-Curricular Programme, Health Campus (09-767 7547)

(c) **Dropping of Language and Co-Curriculum courses, if necessary, must be made within the first week**. After the first week, a fine of RM50.00 will be imposed.

2.1.7 Registration of 'Audit' Courses (Y code)

Registration for the 'Audit' course (Y code) **is not allowed in the *E-Daftar***. It can only be done during the official period of OCR in the School or Centre involved. Students who are interested must complete the course registration form which can be printed from the Campus Online Portal or obtained directly from the School. Approval from the lecturers of the courses to be audited and the Dean/ Deputy Dean (Academic) (signed and stamped) in the course registration form is required.

Registration of 'Audit' courses (Y code) is not included in the calculation of the total registered workload units. Grades obtained from 'Audit' course are not considered in the calculation of CGPA and total units for graduation.

2.1.8 Registration of Prerequisite Courses (Z code)

Registration of Prerequisite courses (Z code) is included in the total registered workload (units). Grades obtained from the Prerequisite courses are not considered in the calculation of CGPA and units for graduation.

2.1.9 Late Course Registration/Late Course Addition

Late course registration or addition is not allowed after the official period of the OCR ends unless with valid reasons. General information on this matter is as follows:

(i) **Late course registration and addition are only allowed in the first to the third week** with the approval of the Dean. Students will be fined RM50.00 if the reasons given are not acceptable.

(ii) Application to add a course **after the third week** will not be considered, except for special cases approved by the University.

2.1.10 Dropping of Courses

Dropping of courses is allowed until the **end of the sixth week**.

For this purpose, students must meet the requirements set by the University as follows:

(i) Dropping Course Form must be completed by the student and signed by the lecturer of the course involved and the Dean/Deputy Dean of their respective Schools and submitted to the general office of the School/Centre which is responsible for offering the courses involved.

(ii) Students who wish to drop a language course must obtain the signature and stamp of the Dean of the School of Languages, Literacies and Translation, as well as the signature and stamp of the Dean of their respective schools.

(iii) Students who wish to drop the Co-Curriculum courses must obtain the approval of the Centre for Co-Curriculum Programme and the signature and stamp of the Dean of their respective schools.

(iv) The option for dropping courses cannot be misused. Lecturers have the right not to certify the course that the student wishes to drop if the student is not serious, such as poor attendance record at lectures, tutorials and practical, as well as poor performance in coursework. The student will be barred from sitting for the examination and will be given grade 'X' and is not allowed to repeat the course during the *Courses during the Long Vacation* (KSCP) period.

2.1.11 Course Registration Confirmation Slip

The course registration confirmation slip that has been printed/ obtained after registering the course should be checked carefully to ensure there are no errors, especially the code type of the registered courses. Any data errors for course registration must be corrected immediately whether during the period of *E-Daftar* (for students with active status only) or during the period of OCR at the Schools.

2.1.12 Revising and Updating Data/Information/Students' Personal and Academic Records

Personal and academic information for each student can be checked through the Campus Online portal (https://campusonline.usm.my).

Students are advised to always check all the information displayed on this website.

- The office of the Student Data and Records Section must be notified of any application/notification for correction/updating of personal data such as the spelling of names (names must be spelled as shown on the Identification Card), Identification Card number and address (permanent address and correspondence address).

- The office of the Student Data and Records Section must be notified of any application/ notification for correction of academic data such as information on Major, Minor, MUET result and the course code.

- The office of the Examination and Graduation Section must be notified of any application/notification for correction of the examination/results data.

2.1.13 Academic Advisor

Each School will appoint an Academic Advisor for each student. Academic Advisors comprise academic staff (lecturers) of the school. Normally, the appointment of Academic Advisors will be made known to every student during the first semester in the first year of their studies.

Academic Advisors will advise their students under their responsibility on academic-related matters. **Important advice for the students includes the registration planning for certain courses in each semester during the study period**. Before registering the course, students are advised to consult and discuss with their Academic Advisors to determine the courses to be registered in a semester.

2.2 Interpretation of Unit/Credit/Course

2.2.1 Unit

Each course is given a value, which is called a **UNIT**. The unit is determined by the scope of its syllabus and the workload for the students. In general, a unit is defined as follows:

Type of Course	Definition of Unit
Theory	1 unit is equivalent to 1 contact hour per week for 13 – 14 weeks in one semester
Practical/Laboratory/ Language Proficiency	1 unit is equivalent to 1.5 contact hours per week for 13 – 14 hours in one semester

Industrial Training/ Teaching Practice	1 unit is equivalent to 2 weeks of training

Based on the requirements of Malaysian Qualifications Framework (MQF):

One unit is equivalent to 40 hours of student learning time

[1 unit = 40 hours of Student Learning Time (SLT)]

2.2.2 Accumulated Credit Unit

Units registered and passed are known as credits. To graduate, students must accumulate the total number of credits stipulated for the programme concerned.

2.3 Examination System

Examinations are held at the end of every semester. Students have to sit for the examination of the courses they have registered for. Students are required to settle all due fees and fulfil the standing requirements for lectures/tutorials/practical and other requirements before being allowed to sit for the examination of the courses they have registered for. Course evaluation will be based on the two components of coursework and final examinations. Coursework evaluation includes tests, essays, projects, assignments and participation in tutorials.

2.3.1 Duration of Examination

Evaluated Courses	Examination Duration
2 units	1 hour for coursework of more than 40%
2 units	2 hours for coursework of 40% and below
3 units or more	2 hours for coursework of more than 40%
3 units or more	3 hours for coursework of 40% and below

2.3.2 Barring from Examination

Students will be barred from sitting for the final examination if they do not fulfil the course requirements, such as absence from lectures and tutorials of at least 70%, and have not completed/fulfilled the required components of coursework. Students will also be barred from sitting for the final examination if they have not settled the academic fees. A grade 'X' would be awarded for a course for which a student is barred. Students

will not be allowed to repeat the course during the *Courses during the Long Vacation* (KSCP) period.

2.3.3 Grade Point Average System

Students' academic achievement for registered courses will be graded as follows:

Alphabetic Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
Grade Points	4.00	3.67	3.33	3.00	2.67	2.33	2.00	1.67	1.33	1.00	0.67	0

Students awarded with a grade 'C-' and below for a particular course would be given a chance to improve their grades by repeating the course during the KSCP (see below) or normal semester. Students awarded with a grade 'C' and above for a particular course will not be allowed to repeat the course whether during KSCP or normal semester.

The achievement of students in any semester is based on Grade Point Average (GPA) achieved from all the registered courses in a particular semester. GPA is the indicator to determine the academic performance of students in any semester.

CGPA is the Cumulative Grade Point Average accumulated by a student from one semester to another during the years of study.

The formula to compute GPA and CGPA is as follows:

$$\text{Grade Point Average} = \frac{\sum_{i=1}^{n} U_i M_i}{\sum_{i=1}^{n} U_i}$$

where:

n	=	Number of courses taken
U_i	=	Course units for course i
M_i	=	Grade point for course i

Example of calculation for GPA and CGPA:

	Course	Unit	Grade Point (GP)	Grade (G)	Total GP
Semester I	ABC XX1	4	3.00	B	12.00
	ABC XX2	4	2.33	C+	9.32
	BCD XX3	3	1.67	C-	5.01
	CDE XX4	4	2.00	C	8.00
	EFG XX5	3	1.33	D+	3.99
	EFG XX6	2	2.67	B-	5.34
		20			43.66

$$GPA = \frac{43.66}{20} = 2.18$$

	Course	Unit	Grade Point (GP)	Grade (G)	Total GP
Semester II	ABC XX7	3	1.00	D	3.00
	ABB XX8	4	2.33	C+	9.32
	BBC XX9	4	2.00	C	8.00
	BCB X10	4	2.67	B-	10.68
	XYZ XX1	3	3.33	B+	9.99
		18			40.99

$$GPA = \frac{40.99}{18} = 2.28$$

$$CGPA = \frac{\text{Total Accumulated GP}}{\text{Total Accumulated Unit}} = \frac{43.66 + 40.99}{20 + 18} = \frac{84.65}{38} = 2.23$$

From the above examples, the CGPA is calculated as the total grade point accumulated for all the registered courses and divided by the total number of the registered units.

2.3.4 Courses During the Long Vacation *(Kursus Semasa Cuti Panjang)* (KSCP)

KSCP is offered to students who have taken a course earlier and obtained a grade of 'C-', 'D+', 'D', 'D-', 'F' and 'DK' only. Students who have obtained a grade 'X' or 'F*' are not allowed to take the course during KSCP.

The purpose of KSCP is to:

(i) Give an opportunity to students who are facing time constraints for graduation.

(ii) Assist students who need to accumulate a few more credits for graduation.
(iii) Assist "probationary" students to enhance their academic status.
(iv) Assist students who need to repeat a prerequisite course, which is not offered in the following semester.

However, this opportunity is only given to students who are taking courses that they have attempted before and achieved a grade as stipulated above, provided that the course is being offered. Priority is given to final year students. Usually, formal lectures are not held, and teaching is via tutorials.

The duration of KSCP is 3 weeks, i.e. 2 weeks of tutorial and 1 week of examination, all held during the long vacation. The KSCP schedule is available in the University's Academic Calendar.

The Implementation of KSCP

(i) Students are allowed to register for a maximum of 3 courses and the total number of units registered must not exceed 10.

(ii) Marks/grades for coursework are taken from the highest marks/the best grades obtained in a particular course in the normal semester before KSCP. The final overall grade is determined as follows:

Final Grade = The best coursework marks or grade +
Marks or grade for KSCP examination

(iii) GPA calculation involves the **LATEST** grades (obtained in KSCP) and also involves courses taken in the second semester and those repeated in KSCP. If the GPA during KSCP as calculated above is 2.00 or better, the academic status will be active, even though the academic status for the second semester was probation status. However, if the GPA for KSCP (as calculated above) is 1.99 or below, the academic status will remain as probation status for the second semester.

(iv) Graduating students (those who have fulfilled the graduation requirements) in the second semester are not allowed to register for KSCP.

2.3.5 Academic Status

Active Status: Any student who achieves a GPA of 2.00 and above for any examination in a semester will be recognised as ACTIVE and be allowed to pursue his/her studies for the following semester.

Probation Status: A probation status is given to any student who achieves a GPA of 1.99 and below. A student who is under probation status for three consecutive semesters (P1, P2, FO) will not be allowed to pursue his/her studies at the university. On the other hand, if the CGPA is 2.00 and above, the student concerned will be allowed to pursue his/her studies and will remain at P2 status.

2.3.6 Termination of Candidature

Without any prejudice to the above regulations, **the University Examination Council has the absolute right to terminate any student's studies if his/her academic achievement does not satisfy and fulfil the accumulated minimum credits.**

The University Examination Council has the right to terminate any student's studies due to certain reasons (a student who has not registered for the courses, has not attended the examination without valid reasons), as well as medical reasons can be disqualified from pursuing his/her studies.

2.3.7 Examination Results

A provisional result (pass/fail) through the Campus Online portal (campusonline.usm.my) and short message service (SMS) will usually be released and announced after the School Examination Council meeting and approximately one month after the final examination.

Enquiries regarding full results (grade) can be made through the Campus Online portal and short message service (SMS). The results will be released and announced after the University Examination Council meeting and is usually two weeks after the provisional results are released.

Students can print their official semester results document namely 'SEMGRED' through the portal "*Campus Online*" (campusonline.usm.my) during the second week of the following semester.

2.4 Unit Exemption

2.4.1 Unit Exemption

Unit exemption is defined as the total number of units given to students who are pursuing their studies in USM that are exempted from the graduation requirements. Students only need to accumulate the remaining units for graduation purposes. Only passes or course grades

accumulated or acquired in USM will be included in the calculation of the Cumulative Grade Point Average (CGPA) for graduation purposes.

2.4.2 Regulations and Implementation of Unit Exemption

Diploma holders from recognised Public and Private Institutions of Higher Learning:

(i) Unit exemption can only be given to courses taken at diploma level.

(ii) Courses for unit exemption may be combined (in two or more combinations) in order to obtain exemption of one course at degree level. However if the School would like to approve only one course at the diploma level for unit exemption of one course at degree level, the course at diploma level must be equivalent to the degree course and have the same number of or more units.

(iii) Courses taken during employment (in service) for diploma holders cannot be considered for unit exemption.

(iv) The minimum achievement at diploma level that can be considered for unit exemption is a minimum grade 'C' or 2.0 or equivalent.

(v) The total number of semesters exempted should not exceed two semesters.

(vi) **In order to obtain unit exemption for industrial training**, a student must have continuous work experience for at least two years in the area. If a student has undergone industrial training during the period of diploma level study, the student must have work experience for at least one year. The students are also required to produce a report on the level and type of work performed. Industrial training unit exemption cannot be considered for semester exemption as the industrial training is carried out during the long vacation in USM.

(vii) Unit exemption for university and option courses can only be given for courses such as Bahasa Malaysia (LKM400), English Language, Islamic and Asian Civilisations and as well as co-curriculum.

IPTS (Private Institution of Higher Learning) USM Supervised/ External Diploma Graduates:

❖ Students who are IPTS USM supervised/external diploma graduates are given unit exemption as stipulated by the specific

programme of study. **Normally, unit exemption in this category is given as a block according to the agreement** between USM (through the School that offers the programme) with the IPTS.

Students from recognised local or foreign IPTA (Public Institutions of Higher Learning)/IPTS who are studying at the Bachelor's Degree level may apply to study in this university and if successful, may be considered for unit exemption, subject to the following conditions:

(i) Courses taken in the previous IPT are equivalent (at least 50% of the course must be the same) to the courses offered in USM.

(ii) Students taking courses at Advanced Diploma level in IPT that are recognised to be equivalent to the Bachelor's Degree course in USM may be considered for unit exemption as in Section 2.5.

(iii) The total maximum unit exemption allowed should not exceed one third of the total unit requirement for graduation.

2.4.3 Total Number of Exempted Semesters

Semester exemption is based on the total units exempted as below:

Total Units Exempted	Total Semesters Exempted
8 and below	None
9 – 32	1
33 to 1/3 of the total units for graduation	2

2.4.4 Application Procedure for Unit Exemption

Any student who would like to apply for unit exemption is required to complete the Unit Exemption Application Form which can be obtained from the Examination and Graduation Section or the respective Schools.

The form must be approved by the Dean of the School prior to submission to the Examination and Graduation Section for consideration and approval.

2.5 Credit Transfer

Credit transfer is defined as the recognition of the total number of credits obtained by USM students taking courses in other IPTAs (Public Institution of Higher Learning) within the period of study at USM, and is combined with

credits obtained at USM to fulfil the unit requirements for his/her programme of study. The transferred examination results or grades obtained in courses taken at other IPTAs will be taken into consideration in the Cumulative Grade Point Average (CGPA) calculation.

(a) Category of Students Who Can Be Considered for Credit Transfer

USM full-time Bachelor Degree level students who would like to attend specific Bachelor Degree level courses at other IPTAs.

USM full-time diploma level students who would like to attend specific diploma level courses at other IPTAs.

(b) Specific Conditions

(i) Basic and Core Courses

Credit transfer can only be considered for credits obtained from other courses in other IPTAs that are equivalent (at least 80% of the content is the same) with the courses offered by the programme.

Courses that can be transferred are only courses that have the same number of units or more. For equivalent courses but with less number of units, credit transfers can be approved by combining a few courses. Credits transferred are the same as the course units offered in USM. Average grade of the combined courses will be taken into account in the CGPA calculation.

(ii) Elective or Option Courses

Students may take any appropriate courses in other IPTAs subject to permission from the School as well as the approval of the IPTAs.

The transferred credits are credits obtained from courses at other IPTAs. No course equivalence condition is required.

(iii) Minor Courses

For credit transfer of minor courses, the School should adhere to either conditions (i) or (ii), and take into account the programme requirement.

(c) General Conditions

1) The total maximum units transferred should not exceed one third of the total number of units for the programme.

2) Credit exemption from other IPTAs can be considered only once for each IPTA.

3) The examination results obtained by a student who has taken courses at other IPTAs will be taken into account for graduation purposes. Grades obtained for each course will be combined with the grades obtained at USM for CGPA calculation.

4) Students who have applied and are approved for credit transfer are not allowed to cancel the approval after the examination result is obtained.

5) Students are required to register for courses at other IPTAs with not less than the total minimum units as well as not exceeding the maximum units as stipulated in their programme of study. However, for specific cases (e.g. students on an extended semester and only require a few units for graduation), the Dean may allow such students to register less than the minimum units and the semester will not be considered for the residential requirement. In this case, the CGPA calculation will be similar to that requirement of the KSCP.

6) USM students attending courses at other IPTAs who have failed in any courses will be allowed to re-sit the examinations of the courses if there is such a provision in that IPTA.

7) If the method of calculation of examination marks in the other IPTAs is not the same as in USM, grade conversions will be carried out according to the existing scales.

8) USM students who have registered for courses at other IPTAs but have decided to return to study in USM must adhere to the existing course registration conditions of USM.

2.5.1 Application Procedure for Attending Courses/Credit Transfer

USM students who would like to apply to attend courses/credit transfer at other IPTAs should apply using the Credit Transfer Application Form.

The application form should be submitted for the Dean's approval for the programme of study at least three months before the application is submitted to other IPTAs for consideration.

2.6 Academic Integrity

"Integrity without knowledge is weak and useless. Knowledge without integrity is dangerous and dreadful." - Samuel Johnson

Academic honesty in academic is important because it is the main pillar in ensuring that manners and ethics with regards to high academic integrity are preserved.

Universiti Sains Malaysia encourages its students to be respectful of and to ensure that any matter relating to academic integrity will be well-preserved. Universiti Sains Malaysia always encourages its students to ensure that manners, ethics and integrity would be essential in academics while focusing on their studies in Universiti Sains Malaysia.

These are practices or acts that are considered as conducts which lack integrity in academics:

(a) Cheating

Cheating in the context of academics include copying in examinations, unauthorized use of information or other aids in any academic exercise without authorization or in a non-sincere manner. There are numerous ways and methods of cheating which include:

- Copying answers from others during a test or an exam.
- Any suspicious action that can be described as cheating or an attempt to cheat in an exam.
- Using unauthorized materials or devices without authorization (calculator, PDA, mobile phones, pager, or any smart device, and other unauthorized devices) during a test or an exam.
- Asking or allowing another student to take a test or an exam on behalf and vice-versa.
- Sharing answers or programmes for an assignments or projects.
- Purposely tampering with marked/graded after it has been returned, and then re-submitting it for remarking/regrading.
- Give command, to force, persuade, deceive or blackmail others to conduct research, do writing, programming or any task for personal gain.
- Submitting any identical or similar work in more than one course without consulting or prior permission from the lecturers concerned.

(b) Plagiarism

The reputation of an academic institution depends on the ability to achieve and sustain academic excellence through the exercise of academic integrity. Academic integrity is based on honesty, trust,

fairness, respect, and responsibility, which form the basis of academic work.

One aspect of the loss of academic integrity is due to plagiarism, which is the act of presenting published and unpublished ideas, writings, works or inventions of others in written or other medium, as one's own original intellectual endeavours without any clear acknowledgement of or reference to the author of the source.

A substantial portion of academic work and research are in the written form and the university is committed in the deterrence of plagiarism.

POLICY ON PLAGIARISM OF UNIVERSITI SAINS MALAYSIA

The University Policy on Plagiarism describes USM's strong commitment to uphold academic integrity in relation to plagiarism. It will come into effect when there is an infringement of academic conduct relating to plagiarism.

This policy acts as a guideline that both educates and prevents and can be used as the basis if anyone that is part of the university violates any rules and laws of the University.

The policy applies to all students, former students, staff and former staff which include fellows, post-doctorates, visiting scholars, as well as academic, non-academic, research, contract and temporary staff who study, serving or having served, or have graduated from the University.

Plagiarism is defined as the act of presenting, quoting, copying, paraphrasing or passing off ideas, images, processes, works, data, personal words or those of other people or sources without any proper acknowledgement, reference to or quotation of the original source(s). The acts of plagiarism include, but are not limited to, the following:

- Quoting verbatim (word-for-word replication of) works of other people.
- Paraphrasing another person's work by changing some of the words, or the order of the words, without due acknowledgement of the source(s).
- Submitting another person's work in whole or in part as one's own.
- Auto-plagiarising or self-plagiarism (one's own work or previous work) that has already been submitted previously for assessment, or for any other academic award and admitting it as newly-produced without citing the original content.
- Insufficient or misleading referencing of the source(s) that would enable the reader to check whether any particular work has indeed been cited accurately and/or fairly and thus to identify the original writer's particular contribution in the work submitted.

The University will take action of every report and offences relating to plagiarism and if the student is found guilty, the student can be charged by the university according to the Students Disciplinary Rules.

(c) Fabrication

Fabrication refers to a process of invention, adaptation or copying with the intention of cheating. This is an act of deceiving other people. Fabrication is somewhat related to matters which have been 'created' or altered.

Invention or task outcome or academic work without acknowledgement, alteration, falsification or misleading use of data, information or citation in any academic work constitutes fabrication. Fabricated information neither represent the student's own effort nor the truth concerning a particular investigation or study, and thus violating the principle of truth in knowledge. Some examples are:

- Creating or exchanging data or results, or using someone else's results, in an experiment, assignment or research.
- Citing sources that are not actually used or referred to.
- Listing with intent, incorrect or fictitious references.
- Forging signatures of authorization in any academic record or other university documents.
- Developing a set of false data.

(d) Collusion

Collusion refers to the cooperation in committing or to commit or to do work with negative intentions. Some examples of collusion include:

- Paying, bribing or allowing someone else to do an assignment, test/exam, project or research for you.
- Doing or assisting others in an assignment, test/exam, project or research for something in return.
- Permitting your work to be submitted as the work of others.
- Providing material, information or sources to others knowing that such aids could be used in any dishonest act.

(e) Other violations relating to academic integrity

- Arriving late to lecture, tutorial, class or other forms of teaching relating to their courses.
- Sending or submitting any overdue assignment relating to their courses.
- Hire someone else to do the assignment or thesis.

- Carrying out business by providing service to write assignment or thesis of the students.
- Any other violations that USM considers as violating academic integrity.

2.6.1 Consequences of Violating Academic Integrity

Students are responsible in protecting and upholding academic integrity in USM.

If in any specific event a student or students would encounter any incident that denotes academic dishonesty, the student(s) need to submit a report to the relevant lecturer. The lecturer is then responsible to investigate and substantiate the violation and report the matter to the Dean of the School.

(i) If any violation of academic integrity is considered as not of a serious nature, the Dean of the School can take administrative action on the students.

(ii) However, if the violation is deemed serious by the School, this matter will be brought to the attention of the University Disciplinary Committee for appropriate measures to be taken.

(iii) If a student is caught copying or cheating in an examination, the Investigation Committee on ***Copying/Cheating in Examinations*** will pursue the matter according to the university's procedures. If the investigation found that there is a case, the student(s) will be brought to the Secretariat of University Student Disciplinary Committee (Academic Cases) at Legal Office, Level 2, Building E42, Chancellory II, Universiti Sains Malaysia. Regarding this matter, the Universiti Sains Malaysia (Discipline of Students) Rules will be enforced.

(iv) Measure 48 Measure Universiti Sains Malaysia (Discipline of Students) Rules provides that a student who had committed an inappropriate conduct and is found guilty could be sentenced with either or a combination of or other suitable penalty as listed:

(a) a warning ;
(b) a fine not exceeding two hundred ringgit;
(c) exclusion from any specific part or parts of the University for a specified period;
(d) suspension from being a student of the University for a specified period;
(e) expulsion from the University.

(v) Any student(s) found guilty and is to be suspended from their studies within a given duration by the University Disciplinary Committee (Academic Matters) or the University Disciplinary Committee (General Matters), the maximum suspension period will not be accounted for them in the completion of their studies and while waiting for the verdict to be read.

2.7 USM Mentor Programme

The Mentor Programme acts as a support-aid that involves staff undergoing special training as consultants and guides to the USM community who would like to share their feelings and any psychosocial issues that could affect their social activities. This programme helps individuals to manage psychosocial issues in a more effective manner, which will eventually improve their well-being in order to achieve a better quality of life.

Objectives

(a) To serve as a co-operation and mutual assistance mechanism for dealing with stress, psychosocial problems and many more in order to ensure the well-being of the USM community.

(b) To inculcate the spirit of unity and the concept of helping one another by appointing a well-trained mentor as a social agent who promotes a caring society for USM.

(c) To produce more volunteers to assist those who need help.

(d) To prevent damage in any psychosocial aspect before they reach a critical stage.

2.8 Student Exchange Programme

2.8.1 Study Abroad Scheme

The student exchange programme is an opportunity for USM students to study for one or two semesters abroad at any USM partner institutions. Ideally, students are encouraged to participate in the exchange programme within their third to fifth semester (3 year degree programme) and within the third to seventh semester (4 year degree programme).

USM students who wish to follow the SBLN programme must discuss their academic plans with the Dean or Deputy Dean of their respective Schools and also with the International Mobility & Collaboration Centre (IMCC) (to ensure that credits obtained from the external

higher education institution can be transferred as part of the credit accumulation for graduation).

Any student that follows the SBLN programme and violates any disciplinary act in the external higher education institution, can be penalised in accordance with the University (Discipline of Students) Rules if the matter is referred to USM.

For further information, please visit www.imcc.usm.my or contact the International Mobility and Collaboration Centre (IMCC) at +604 – 653 2777/2774.

2.8.2 Student Exchange Programme in Local Higher Education Institutions (RPPIPT)

This is a programme that allows students of Higher Learning Institutions to do an exchange programme for a semester among the higher institutions themselves. Students can choose any relevant courses and apply for credit transfers.

USM students who want to participate in RPPIPT have to discuss their academic plans with the Dean or Deputy Dean of their respective Schools as well with the Academic Collaboration Unit, Division of Academic and International (to ensure that credits obtained from the higher education institution in Malaysia can be transferred as part of the credit accumulation for graduation).

Any student who participates in RPPIPT and violates any of the institution's displinary rules can be penalised according to the University (Discipline of Students) Rules if the matter is referred to USM.

For further information, please visit http://bheaa.usm.my/index.php/programmes/inter-university-exchange or contact the Academic Collaboration Unit of the Academic and International Division at +604 – 653 2451.

2.9 Ownership of Students' Dissertation/Research Project/Theses and University's Intellectual Property

2.9.1 Ownership of Students' Dissertation/Research Project/Theses and University's Intellectual Property

The copyright of a dissertation/research project/thesis belongs to the student. However, as a condition for the conferment of a degree, the student gives this right unconditionally, directly but not exclusively, and free of royalties to the university to use the contents of the

work/thesis for teaching, research and promotion purposes. In addition, the student gives non-exclusive rights to the University to keep, use, reproduce, display and distribute copies of the original thesis with the rights to publish for future research and the archives.

3.0 UNIVERSITY REQUIREMENTS

3.1 Summary of University Requirements

Students are required to take 15 - 22 units of the following University/Option courses for University requirements:

	University Requirements	Units
1	Bahasa Malaysia	2
2	English Language	4
3	Local Students • Islamic and Asian Civilisations (TITAS) (2 Units) • Ethnic Relations (2 Units) • Core Entrepreneurship* (2 Units) International Students • Malaysian Studies (4 Units) • Option/ Bahasa Malaysia/ English Language (2 Units)	6
4	Co-curricular /Skills Courses/Foreign Language Courses/Options Students have to choose one of the following: • Co-curricular** (1-10 Units) • Skills Courses/ Foreign Language Courses/Options	3 – 12
	Total	**15 – 22**

* Students from Schools which have a similar course as this are exempted from taking this course. The units should be replaced with an option course.

** Students from the School of Educational Studies are required to choose a uniformed body co-curricular package. Registration for co-curricular courses is compulsory for students from the School of Dental Sciences (SDS). The number of co-curricular units that need to be collected is three (3) units. The breakdown is as follows: (i) 2nd year students must register for one (1) unit of the co-curricular course in semester 1. (ii) 3rd year students must register for one (1) unit of co-curricular course in semester 1 AND one (1) unit in semester 2 (further information can be obtained from the SDS Academic Office). Registration for co-curricular courses is compulsory for 1st year students from the School of Medical Sciences (SMS). The number of units that need to be collected for co-curricular courses is two (2) units. The breakdown is as follows: 1st year students must register for one (1) unit of a co-curricular course in semester 1 AND one (1) unit in semester 2 (further information can be obtained from the SMS Academic Office).

Details of the University requirements are given in the following sections.

3.2 Bahasa Malaysia

(a) Local Students

The requirements are as follows:

- LKM400/2 - Bahasa Malaysia IV

All Malaysian students must take LKM400 and pass with the minimum of Grade C in order to graduate.

Entry requirements for Bahasa Malaysia are as follows:

No	Qualification	Grade	Level of Entry	Type	Units	Status
1	(a) SPM/ MCE/ SC (or equivalent qualification) (b) STPM/ HSC (or equivalent qualification)	1 - 6 P/ S	LKM400	U	2	Graduation requirement

Note: To obtain credit units for Bahasa Malaysia courses, a minimum grade of C is required. Students may obtain advice from the School of Languages, Literacies and Translation if they have different Bahasa Malaysia qualifications from the above.

(b) International Students

- International students pursuing Bachelor's degrees in Science, Accounting, Arts (ELLS), Education (TESL), Housing, Building and Planning and English for Professionals.

All international students in this category are required to take the following courses:

Code	Type	Units
LKM100	U	2

- International students (non-Indonesian) pursuing Bachelor's degrees in Arts.

All international students in this category are required to take the following courses:

Code	Type	Units
LKM 100	Z	2
LKM 200	U	2
LKM 300	U	2

- International students (Indonesian) pursuing Bachelor degrees in Arts.

The Bahasa Malaysia graduation requirement for this category of students is as follows:

Code	Type	Units
LKM200	U	2
LKM300	U	2

Note: Students must pass with a minimum grade C for type U courses.

3.3 English Language

All Bachelor degree students must take 4 units of English Language courses to fulfil the University requirement for graduation.

(a) Entry Requirements for English Language Courses

No.	English Language Qualification	Grade	Level of Entry	Status
1	*MUET LSP401/402/403/404 † Discretion of Dean	Band 6 A - C	LHP 451/452/453/454/455/ 456/457/458/459	Compulsory/ Option/Type U (2 Units)
2	*MUET LSP300 † Discretion of Dean	Band 5 A - C	LSP 401/402/403/404	Compulsory/ Type U (2 Units)
3	*MUET LMT100 † Discretion of Dean	Band 4 A - C	LSP300	Compulsory/ Type U (2 Units)
4	*MUET † Discretion of Dean	Band 3/2/1 (Score 0 - 179)	LMT100/ Re-sit MUET	Prerequisite/ Type Z (2 Units)

* MUET: Malaysian University English Test.

† Students may obtain advice from the School of Languages, Literacies and Translation if they have different English Language qualifications from the above.

Note:

- Students are required to accumulate four (4) units of English for graduation.
- In order to obtain units in English Language courses, students have to pass with a minimum grade 'C'.
- Students with a Score of 260 – 300 (Band 6) in MUET must accumulate the 4 units of English from the courses in the post-advanced level (LHP451/452/453/454/455/456/457/ 458/459*). They can also take foreign language courses to replace their English language units but they must first obtain written consent from the Dean of the School of Languages, Literacies and Translation. (Please use the form that can be obtained from the School of Languages, Literacies and Translation).
  [*The number of units for LHP457 is 4 and for LHP451, 452, 453, 454, 455, 456, 458 and 459 is 2].
- Students with a score of 179 and below in MUET are required to re-sit MUET to improve their score to Band 4 or take LMT100 and pass with a minimum grade 'C'.

(b) English Language Courses (Compulsory English Language Units)

The English Language courses offered as University courses are as follows:

No	Code/Unit	Course Title	School (If Applicable)
1	LMT100/2	Preparatory English	Students from all Schools
2	LSP300/2	Academic English	Students from all Schools
3	LSP401/2	General English	Students from: School of Educational Studies (Arts) School of The Arts School of Humanities School of Social Sciences School of Languages, Literacies and Translation
4	LSP402/2	Scientific and Medical English	Students from: School of Biological Sciences School of Physics School of Chemical Sciences School of Mathematical Sciences School of Industrial Technology School of Educational Studies(Science) School of Medical Sciences School of Health and Dental Sciences School of Pharmaceutical Sciences
5	LSP403/2	Business and Communication English	Students from: School of Management School of Communication

No	Code/Unit	Course Title	School (If Applicable)
6	LSP404/2	Technical and Engineering English	Students from: School of Computer Sciences School of Housing, Building and Planning School of Engineering
7	LDN 101/2	English For Nursing I	Students from the School of Health Sciences
8	LDN 201/2	English For Nursing II	Students from the School of Health Sciences

3.4 Local Students - Islamic and Asian Civilisations/Ethnic Relations/Core Entrepreneurship

(a) Islamic and Asian Civilisations (The course is conducted in Bahasa Malaysia)

It is compulsory to pass the following course (with a minimum grade 'C'):

HTU 223 – Islamic and Asian Civilisations (TITAS) (2 units)

This course aims to increase students' knowledge on history, principles, values, main aspects of Malay civilization, Islamic civilization and its culture. With academic exposure to cultural issues and civilization in Malaysia, it is hoped that students will be more aware of issues that can contribute to the cultivation of the culture of respect and harmony among the plural society of Malaysia. Among the topics in this course are Interaction among Various Civilizations, Islamic Civilization, Malay Civilization, Contemporary Challenges faced by the Islamic and Asian Civilizations and Islamic Hadhari Principles.

(b) Ethnic Relations (The course is conducted in Bahasa Malaysia)

It is compulsory to pass the following course (with a minimum grade 'C'):

SHE 101 – Ethnic Relations (2 units)

This course is an introduction to ethnic relations in Malaysia. This course is designed with 3 main objectives: (1) to introduce students to the basic concepts and the practices of social accord in Malaysia, (2) to reinforce basic understanding of challenges and problems in a multi-ethnic society, and (3) to provide an understanding and awareness in managing the complexity of ethnic relations in Malaysia. At the end of this course, it is hoped that students will be able to identify and apply the skills to issues associated with ethnic relations in Malaysia.

(c) Core Entrepreneurship (The course is conducted in Bahasa Malaysia)

It is compulsory to pass the following course (with a minimum grade 'C'):

WUS 101 – Core Entrepreneurship (2 units)

This course aims to provide basic exposure to students in the field of entrepreneurship and business, with emphasis on the implementation of the learning aspects while experiencing the process of executing business projects in campus. The mode of teaching is through interactive lectures, practical, business plan proposals, execution of entrepreneurial projects and report presentations. Practical experiences through hands-on participation of students in business project management will generate interest and provide a clearer picture of the world of entrepreneurship. The main learning outcome is the assimilation of culture and entrepreneurship work ethics in their everyday life. This initiative is made to open the minds and arouse the spirit of entrepreneurship among target groups that possess the potential to become successful entrepreneurs. By exposing all students to entrepreneurial knowledge, it is hoped that it will accelerate the effort to increase the number of middle-class entrepreneurs in the country.

For more information, please refer to the Co-curriculum Programme Reference Book.

3.5 International Students - Malaysian Studies/Option

(a) Malaysian Studies

It is compulsory for all international students to pass the following course (with a minimum grade 'C'):

SEA205E - Malaysian Studies (4 Units)

This course investigates the structure of the Malaysian system of government and the major contemporary trends in Malaysia. Emphasis will be given to the current issues in Malaysian politics and the historical and economic developments and trends of the country. The discussion begins with a review of the independence process. This is followed by an analysis of the formation and workings of the major institutions of government – parliament, judiciary, bureaucracy, and the electoral and party systems. The scope and extent of Malaysian democracy will be considered, especially in the light of the current changes and developments in Malaysian politics. The second part of the course focuses on specific issues: ethnic relations, national unity and the national ideology; development and political change; federal-state relations; the

role of religion in Malaysian politics; politics and business; Malaysia in the modern world system; civil society; law, justice and order; and directions for the future.

(b) Option/Bahasa Malaysia/English Language (2 Units)

International students need to fulfil another 2 units of an option course or an additional Bahasa Malaysia/English Language course.

3.6 Co-Curriculum/Skills Courses/Foreign Language Courses/Options

Students have to choose one of the following (A/B):

(A) Uniformed/Seni Silat Cekak/Jazz Band Co-curricular Package (6 – 10 Units)

Students who choose to take packaged co-curricular courses are required to complete all levels of the package. It is compulsory for students from the School of Education to choose a uniformed body co-curricular package from the list below (excluding Seni Silat Cekak). The co-curricular packages offered are as follows:

- Palapes (Reserve Officers' Training Corps) Co-curricular Package (10 Units) (3 years)

Palapes Army	Palapes Navy	Palapes Air Force
WTD103/3	WTL103/3	WTU103/3
WTD203/3	WTL203/3	WTU203/3
WTD304/4	WTL304/4	WTU304/4

- Co-curricular Package (6 Units) (3 years)

Suksis (Students' Police Volunteers)	Seni Silat Cekak Malaysia	Jazz Band
WPD101/2	WCC123/2	WCC108/2
WPD201/2	WCC223/2	WCC208/2
WPD301/2	WCC323/2	WCC308/2

Kelanasiswa (Rovers)	Bulan Sabit Merah (Red Crescent)	Ambulans St. John (St. John Ambulance)	SISPA (Civil Defence)
WLK102/2	WBM102/2	WJA102/2	WPA103/2
WLK202/2	WBM202/2	WJA202/2	WPA203/2
WLK302/2	WBM302/2	WJA302/2	WPA303/2

(B) Co-curricular/Skills Courses/Options (1 – 6 Units)

All students are encouraged to follow the co-curricular courses and are given a maximum of 6 units for Community Service, Culture, Sports, Innovation and Initiatives and Leadership (Students from the School of Medical Sciences and School of Dentistry are required to register for a specific number of co-curriculum units and at specific times during their academic year (Please refer to subject 3.1 Summary of University Requirements). Students from the School of Education must take the uniformed co-curricular package [excluding Seni Silat Cekak]. Students who do not enrol for any co-curricular courses or who enrol for only a portion of the 3 units need to replace these units with skills/option courses. The co-curricular, skills and option courses offered are as follows:

(i) Community Service, Culture, Sports, Innovation and Initiatives and Leadership Co-curricular Courses

Packaged (Students are required to complete all levels)			
Community Service (2 Years)	**Jazz Band (3 Years)**	**Karate (3 Semesters)**	**Taekwondo (3 Semesters)**
WKM101/2	WCC108/2	WSC108/1	WSC115/1
WKM201/2	WCC208/2	WSC208/1	WSC215/1
	WCC308/2	WSC308/1	WSC315/1
Non-Packaged (1 Semester)			
Culture		**Sports**	
WCC103/1 - Catan (Painting)		WSC105/1 - Bola Tampar (Volley Ball)	
WCC105/1 - Gamelan		WSC106/1 - Golf	
WCC107/1 - Guitar		WSC110/1 - Memanah (Archery)	
WCC109/1 - Koir (Choir)		WSC111/1 - Ping Pong (Table Tennis)	
WCC110/1 - Kraftangan (Handcrafting)		WSC112/1 - Renang (Swimming)	
WCC115/1 - Tarian Moden (Modern Dance)		WSC113/1 - Aerobik (Aerobics)	
WCC116/1 - Tarian Tradisional (Traditional Dance)		WSC114/1 - Skuasy (Squash)	
WCC117/1 - Teater Moden (Modern Theatre)		WSC116/1 - Tenis (Tennis)	
WCC118/1 - Wayang Kulit Melayu (Malay Shadow Play)		WSC119/1 - Badminton	
WCC119/1 - Senaman Qigong Asas (Basic Qigong Exercise)			

Non-Packaged (1 Semester)	
WCC219/1 - Senaman Qigong Pertengahan (Intermediate Qigong Exercise)	WCC124/1 - Sepak Takraw
WCC124/1 - Kompang Berlagu	WSC 125/1 - Futsal
WCC122/1 - Seni Memasak (Culinary Arts)	WSC 126/1 - Bola Jaring (Netball)
WCC127/1 - Kesenian Muzik Nasyid (Nasyid Musical Arts)	WSC 128/1 – Petanque
	WSC 129/1 - Boling Padang (Lawn Bowl)
Innovation & Initiative	WSC 130/1 - Orienteering
WCC103/1 - Catan (Painting)	**Leadership (Kepimpinan)**
WCC110/1 - Kraftangan (Handcrafting)	WSC 127/1 - Pengurusan Acara 1 (Event Management 1)
WCC120/1 - Canting Batik (Batik Painting)	WSC 227/1 - Pengurusan Acara 2 (Event Management 2)
WCC121/1 - Seni Khat (Calligraphic Art)	**Public Speaking**
WCC122/1 - Seni Memasak (Culinary Arts)	WEC 101/1 – Pengucapan Awam
WCC125/1 - Seni Wau Tradisional (Traditional Kite Art)	WEC 101E/1 – Public Speaking
WCC127/1 - Kesenian Muzik Nasyid (Art of Nasheed Music)	WCC 129 – Latin Dance (Cha Cha)
WCC128/1 - Seni Sulaman & Manik Labuci (Embroidery & Beads Sequins Art)	
WCC 130/1 - Seni Fotografi SLR Digital (Digital SLR Photography Art)	
WCC/131/1 - Seni Suntingan Fotografi (Editing Photography Art)	
WCC132/1 – Seni Seramik (The Art of Ceramics)	

(ii) WSU 101/2 - Sustainability: Issues, Challenges & Prospect (2 units)

Course Synopsis

This course introduces and exposes students to the concepts of sustainable development. The course is aimed at ensuring that the ability of the next generation to fulfil their needs in the future will not be jeopardized, especially in an era of globalization that is filled with challenges and rapid advances in information technology.

Sustainable development by definition, involves efforts to maintain the balance among the three important aspects, i.e. competitive economy, balanced ecosystem and social integration. For the economic aspect, it touches on the issues of development, economic growth, economic challenges of population, agriculture and industrial sector contributions, finance sector, and also information and technology. Environmental sustainability, on the other hand, focuses on forest and environmental management, marine resource management, eco-tourism, environmental degradation, natural phenomena, global warming, and also ethics in natural resource management. The social integration aspect emphasizes the role of the communities in practising sustainable development in daily life with health management, security (climate change, epidemics, crime and terrorism) and socio-economic network. Sustainable development models and case studies will be discussed too.

(iii) HTV201/2 - Teknik Berfikir (Thinking Techniques)

(iv) Other options/ skills courses as recommended or required by the respective Schools (if any)

(v) English Language Courses

The following courses may be taken as university courses to fulfil the compulsory English Language requirements (for Band 5 and Band 6 in MUET) or as skills/option courses:

No	Code/Unit	Course Title
1.	LHP451/2	Effective Reading
2.	LHP452/2	Business Writing
3.	LHP453/2	Creative Writing
4.	LHP454/2	Academic Writing
5.	LHP455/2	English Pronunciation Skills
6.	LHP456/2	Spoken English
7.	LHP457/4	Speech Writing and Public Speaking
8.	LHP458/2	English for Translation *(Offered only in Semester II)*
9.	LHP459/2	English for Interpretation *(Offered only in Semester I)*

(vi) Foreign Language Courses

The foreign language courses offered by the School of Languages, Literacies and Translation can be taken by students as an option or compulsory courses to fulfil the number of units required for graduation. Students are not allowed to register for more than one foreign language course per semester. They must complete at least two levels of a foreign language course before they are allowed to register for another foreign language course. However, students are not required to complete all four levels of one particular foreign language course. The foreign language courses offered are as follows:

Arabic	Chinese	Japanese	German	Spanish
LAA100/2	LAC100/2	LAJ100/2	LAG100/2	LAE100/2
LAA200/2	LAC200/2	LAJ200/2	LAG200/2	LAE200/2
LAA300/2	LAC300/2	LAJ300/2	LAG300/2	LAE300/2
LAA400/2	LAC400/2	LAJ400/2	LAG400/2	LAE400/2

French	Thai	Tamil	Korean
LAP100/2	LAS100/2	LAT100/2	LAK100/2
LAP200/2	LAS200/2	LAT200/2	LAK200/2
LAP300/2	LAS300/2	LAT300/2	LAK300/2
LAP400/2	LAS400/2		

4.0 SCHOOL REQUIREMENTS

Experiential Learning

All students are encouraged to carry out practical training at any external organizations that are involved in pharmacy practice. The training is aimed to provide the students with a deeper understanding of the practical aspects of pharmacy. The training is carried out in stages starting from year two of their study.

Level 200

Full academic term training at the Pharmacy Centre, Universiti Sains Malaysia.

Level 300

Two weeks visitation to pharmaceutical industries during the semester break.

Level 400

Two weeks training at any retail pharmacy in the country during the semester break

5.0 FACILITIES

The Teaching and Learning Laboratory in the School is well equipped with necessities like computer and internet access, video recorders, overhead projectors and television. In addition to these facilities, the laboratory also provides books for references. Students who would like to borrow books from the School's collections will have to contact the Dean's office. Besides these, the University's Main Library has an extensive collection of media materials, reference textbooks and journals in all branches of pharmacy.

The School's current facilities include modern lecture halls, computer laboratories and well-equipped teaching and research laboratories. Students also benefit from real world experiences in a variety of clinical settings offered by the Hospital Pulau Pinang and Hospital USM, where the practical component of clinical pharmacy is carried out.

6.0 GENERAL INFORMATION

The Student-Lecturer Committee

The Student-Lecturer Committee is established in order to enhance the relationship between the students and lecturers. The chairperson for this committee is the Deputy Dean (Academic). The committee meets from time to time and it functions as an open forum to discuss issues on academic, welfare and non-academic activities. The Pharmacy students will elect student representatives at the beginning of every academic session.

USM Pharmacy Alumni

USM Pharmacy Alumni Society was formed at the Pharmacy School to provide the space and platform for USM pharmacy graduates to be actively involved and to directly contribute towards academic and non-academic activities in the School. By being involved in the Alumni Society, the USM pharmacy graduates will always be associated with the School and also the University after leaving the campus. The Pharmacy Alumni Society always appreciates bright and innovative ideas from the members to ensure that the School of Pharmaceutical Sciences, USM excels not only at the national level but also internationally. For those who are interested to join as a member or who needs further enquiries regarding the USM Pharmacy Alumni Society, please contact:

The USM Pharmacy Alumni Society
c/o: School of Pharmaceutical Sciences
Universiti Sains Malaysia
11800 USM, Pulau Pinang.

Dean's List

Awarded to students who obtain outstanding academic results (GPA $\geq$ 3.67) in each semester provided that students fulfil co-curriculum requirement.

Pharmacy School Student's Association

USM Pharmacy Students' Association (PSFUSM) is the official association for the students of the School of Pharmaceutical Sciences, USM. PSFUSM acts as the channel for the students to exhibit their creativity and also to interact with one another, with Malaysian Pharmacy Association and also with the society in general. PSFUSM conducts projects throughout the academic term. These projects include community service, promotion of pharmacy profession and get-togethers with other pharmacy students form institutes of higher learning in Malaysia. One of the objectives of the projects is for the pharmacy students to experience and transfer the knowledge gained from their study years into their profession which the students will face in the future.

Postgraduate Studies

Formed in 1972, The School of Pharmaceutical Sciences, USM was the first educational centre that provides pharmaceutical education in Malaysia. Since its formation, it has always been committed to provide excellence in both teaching and research. Besides the undergraduate course, the School also offers Masters degree in Clinical Pharmacy by course work (M.Pharm.), Ph.D in Clinical Pharmacy, Masters in Science degree (M.Sc.) and Ph.D by research.

The higher education programme has attracted many local as well as foreign postgraduate students, including those from Indonesia, Thailand, Pakistan, Libya, Sudan, Bangladesh, Ghana, Jordan, Yemen, St. Vincent, India and China. Research activities have been greatly enhanced. The rapid growth in the research was due to the collaboration with local research centres and with local and foreign universities. For further enquiries regarding the postgraduate programme, please refer to the School of Pharmaceutical Sciences website at:

http://www.pha.usm.my

Enquires

Please direct specific enquiries regarding courses and academic activities related to Pharmaceutical Sciences to:

Dean
School of Pharmaceutical Sciences
Universiti Sains Malaysia
11800 USM
Pulau Pinang

Phone Number: 04-653 2211
Fax Number: 04-657 0017
E-mail: dean_pha@usm.my

For further information on the School of Pharmaceutical Sciences, please surf the website: http://www.pha.usm.my/pharmacy.

7.0 LIST AND DESCRIPTION OF COURSES

Core Courses

FAR113/3: ORGANIC CHEMISTRY

This course provides explanation on stereochemistry, geometrical isomerism and designation of cis, trans, E and Z configurations. Conformation of acyclic and cyclic compounds. Optical isomerism and designation of D,L, erythro, threo, R and S configurations. Reactions and stereochemistry of S_N2,S_N1, and S_Ni nucleophilic substitutions. Reactions and stereochemistry of E2 and E1 eliminations. Benzene and its derivatives, heterocyclic aromatic and non aromatic compounds and related reactions such as electrophilic and nucleophilic substitutions reactions. Free-radicals, reactions, and polymerization involving radicals, and nomenclature of drug molecules.

Learning outcomes

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

- describe geometrical isomerisms, conformations, optical isomerisms, aromaticity of benzene, heterocyclic compouds and its derivatives, free radicals and nomenclature of drug molecules.
- explain nucleophilic substitutions, eliminations, electrophilic and nucleophilic aromatic substitutions, additions, and polymerizations reactions, mechanisms, and stereochemistry (if applicable), mechanisms and reactions resulting in incompatibilities.

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FAR114/3: PHARMACEUTICAL CHEMISTRY

Reaction mechanisms of nucleophillic addition at carbonyl and α-, β-unsaturated carbonyl groups; addition to conjugated diene and carbanion reactions; electrophilic addition reactions to multiple bonds; nucleophilic addition to double bonds and Diels-Alder reaction.

Synthesis methods involving esterification, acylation, hydrolysis, Hinsberg test and Hofmann rearrangement reactions in the preparation of lactones, lactams, sulphonamides, amides and derivatives.

The theories and applications of spectroscopic methods of UV, IR, NMR and MS, particularly in structural elucidation of simple organic compounds / drugs.

The role of organic chemistry that is involved in the pharmaceutic, pharmacokinetic and pharmacodynamic aspects of drug activity and drug metabolism.

Reactions responsible for physicochemical incompatibilities in formulations.

Learning outcomes

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

- discuss and differentiate various important reactions in the class of nucleophilic addition and carbanions, electrophilic addition reaction and important selected reactions such as Diels-Alder.
- understand and perform the synthesis of simple lactones, lactams, sulphonamides, amides and derivatives involving esterification, acylation, hydrolysis, Hinsberg test and Hofmann rearrangement reactions.
- understand the theories of IR, UV, NMR and mass spectroscopy and to use these spectroscopic methods to elucidate the structure of simple organic compounds / drugs.
- explain the role of organic chemistry in the various aspects of pharmaceutics, pharmacokinetics and pharmacodynamics.
- explain the reactions involved in physicochemical incompatibilities.

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FAR121/4: MICROBIOLOGY FOR PHARMACY

This course provides an introduction to microbiology for pharmacy students. It covers topics such as bacterial structure which includes the size and morphology of bacteria, external structures involved with movement of cells and attachment, and the formation of endospores. This course also introduces basic microbiological techniques such as microscopic observation, staining, isolation, culture, maintenance and storage of pure cultures and enumeration of bacteria. Students will also be introduced to topics such as bacterial growth, microbial nutrition and metabolism, bacterial genetics and classification of microorganisms. The principles of infection, and host-pathogen relationship will also be covered. Finally, students will also be taught on fungi, viruses and parasites on the aspects of structure, classification and clinical significance.

Learning outcomes

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

- explain the basic principles and concepts of microbiology.
- identify the different characteristics of microorganisms.
- differentiate the methods of identifying and classifying microorganisms.
- report the experimental results obtained.

References

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David T. John and William A. Petri, Markell and Voge's Medical Parasitology, 9th edition, Saunders, 2006.
Lynne Shore Garcia, Diagnostic Medical Parasitology, 5th edition, ASM Press, 2006.

FAR122/4: DOSAGE FORM I

This course covers the principles relating to the various non-sterile pharmaceutical dosage forms, understanding and interpretation of prescription and Latin abbreviations. The importance of pharmaceutical calculations, method of preparation, dispensing procedures, prescription labelling, packaging of preparations and preservation are also emphasised. In addition, the student learns how to use the patient information and prescription labelling computer software.

Learning outcomes

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

- interpret and understand prescriptions written in Latin abbreviation, English or Bahasa Malaysia.
- calculate and discuss the method of preparation for various pharmaceutical dosage forms.
- prepare, label and package commonly dispensed preparations.
- use the computer software package to record patient information, label prescription and keep drug profile.

References

Marriott JF, Wilson KA, Langley CA and Belcher D, Pharmaceutical Compounding and Dispensing, RPS Publishing, 2010.
Rees JA, Smith I, Smith B, Introduction to Pharmaceutical Calculations, Pharmaceutical Press, 2005.
Allen, LV, Popovich, NG, Ansel HC, Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems. 2010.
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Winfield AJ and Richards RME, Pharmaceutical Practice, Fourth Edition, Churchill Livingstone, 2010.

FAR131/3: BASIC PHYSIOLOGY

This course reviews microscopic structure of various tissues so as to develop an understanding of the relationship between structure and function of the human body. It introduces general concepts and principles that are basic to the function of all body systems and reviews important aspects of cell physiology.

Learning outcomes

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

- describe the structural organization in the body, and general functions of and aging effects on the ten major organ systems of the body.
- describe the microscopic structures and functions of the four basic tissue types; epithelial, connective, muscle and nerve tissues; and the body systems.
- describe important aspects of cell biology including the internal environment of the body, passive and active transports across the plasma membrane, regulation of cell volume, homeostasis and cellular communication.

References

Bern, R.M. and Levy, M.N., Principles of Physiology. 4th ed. Elsevier Mosby, 2006.
Ganong, W.F., Review of Medical Physiology. 23rd ed. The McGraw-Hill Companies, New York, 2010.
Widmaier, E.P., Raff H. and Strang, K.T., Vander's Human Physiology: The Mechanisms of Body Function. 11th ed. The McGraw-Hill Companies, New York, 2008.
Junqueira, L.C. and Carneiro, J., Basic Histology. 12th ed. The McGraw-Hill Companies, New York, 2010.
Green, J.H., Fisiologi Klinikal Asas.3rd ed. Translated into Bahasa Malaysia by Ahmad Pauzi Md. Yusof and Mariam Ahmad. U.S.M/D.B.P, 1989.
Guyton, A.C., Textbook of Medical Physiology. 11th ed. Saunders, Philadelphia, 2006.
Guyton, A.C., Fisiologi Manusia dan Mekanisme Penyakit. 4th ed. (Volume 1, 2, 3) Translated into Bahasa Malaysia by Ahmad Pauzi Md. Yusof, Mariam Ahmad, M. Zaini Asmawi, Munavvar Zubaid and Yusrida Darwis. Penerbit USM, 1999.

Wheater, P.R., Functional Histology. A Text and Colour Atlas. 4th ed. Churchill Livingstone, Edinburgh, 2000.
Tortora, G.J., Principles of Anatomy and Physiology. 12th ed. John Wiley and Sons, New York, 2009.

FAR141/4: PERIPHERAL NERVOUS SYSTEM AND THERAPY

This course briefly reviews the organization of the nervous system into the central and peripheral nervous systems, neurophysiology of excitable tissue (nerve and muscles) – resting and action potential, nerve conductance, sensory receptors, synapses and chemical neurotransmission; muscles – skeletal, smooth and cardiac, physiology of the peripheral nervous system – somatic and autonomic, neuroanatomy, division, transmitters, receptors, effectors and central control of autonomic function, pharmacology and chemistry of drugs acting on somatic and autonomic nervous system; clinical considerations of related disorders – peripheral neuropathy, myasthenia gravis and diarrhoea.

Learning outcomes

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

- describe the electrical properties of excitable tissues, namely nerve and muscle.
- explain the functioning of the peripheral nervous system.
- discuss the physiology of the autonomic and somatic nervous systems, the effects of drugs and the physicochemical properties of the drugs used.

References

Physiology

Ganong, W.F., Review of Medical Physiology. 23rd ed. The McGraw-Hill Companies, New York, 2010.
Widmaier, E.P., Raff H. and Strang, K.T., Vander's Human Physiology: The Mechanisms of Body Function. 12th edition. The McGraw-Hill Companies, New York, 2010.
Tortora, G.J., Principles of Anatomy and Physiology. 12th edition. John Wiley and Sons, New York, 2009.

Pharmacology

Broadley, J.K., Autonomic Pharmacology. Taylor and Francis, 1996.
Hardman, J.G., Limbird, L.E. and Gilman, A.G., The Pharmacological Basis of the Therapeutics, 10th ed. The McGraw-Hill Companies, New York, 2001.
Laurence, D.R., Bennet, P.N. and Brown, M.J., Clinical Pharmacology. 8th ed.Churcill Livingstone, 1997.
Neal, M.J., Medical Pharmacology at A Glance. 3rd ed. Blackwell Scientific Publications, 1997.
Smith, C.M. and Reynard, A.M., Essentials of Pharmacology. W.B. Saunder Company, 1995.

Chemistry

Korolkovas, Essentials of medical chemistry. 2nd ed., John Wiley and Sons Inc., Toronto, 1998.

Stenlake, Foundation of Molecular Pharmacology, The Athlone Press of The University of London, Vol I & II, 1979.

FAR142/3: BASIC PHARMACOLOGY AND BIOCHEMISTRY

This course introduces the students to the fundamentals of biochemistry and principles of pharmacology including drug nomenclature, pharmacokinetic and pharmacodynamic aspects of drug activity.

Learning outcomes

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

- define general structure of biomolecules (amino acid, protein, carbohydrate, lipid, nucleic acid and vitamin) and basic principles of pharmacology.
- differentiate the types of enzyme inhibition.
- explain general properties, characteristics, functions and metabolism of biomolecules as well as classification, nomenclature and factors affecting enzyme activity.
- connect various metabolic pathways involving amino acid, protein, carbohydrate and lipid.
- describe the important aspects concerning drug action towards receptors, factors that influence mode of drug administration, absorption, distribution, metabolism and excretion; the immune system and individual drug response variation.
- discuss methods of drug administration.

References

Campbell, M.K and Farrell, S.O., Biochemistry (7th Edn.), Brooks/Cole, 2010.

Devlin, T.M.: Texbook of Biochemistry with Clinical Correlations, Wiley-Liss, 2010.

H.P. Rang, M.M. Dale & J.M. Ritter. Pharmacology, 4th edition, Churchill Livingstone, UK, 2000.

A.G. Gilman, J.G. Hardman & L.E Limbird (Ed). The Pharmacological Basis of Therapeutics, 10th edition, McGraw-Hill, 2001.

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Kenneth P. Minneman & Lynn Wecker, Brody's Human Pharmacology: Molecular to Clinical, 4th edition, Mosby, 2004.

B.G. Katzung. Basic and Clinical Pharmacology, 8th edition, McGraw-Hill, 2001.

FAR153/2: COMMUNICATION SKILL IN PHARMACY PRACTICE

This course will introduce the concept and model of interpersonal communication in pharmacy practice. The main purpose is to build the ability to communicate effectively verbally and non-verbally in the contexts of pharmacy practice. Techniques for active listening, questioning, responding reflectively, empathetically and assertively, as well as presentation techniques, will be discussed. These techniques will be applied to obtain sustainable healthcare delivery to the public.

Learning outcomes

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

- describe the concept and model of interpersonal communication.
- outline the approach to literature evaluation, drug counselling, patient consultation, provision of drug information, promotion and marketing of pharmaceutical services.
- develop the skills to effectively and efficiently apply the techniques of verbal and non-verbal communications.
- apply the specific communication techniques and approaches in pharmacy practice.

References

Azmi Sarriff. Asas kaunseling drug, Penerbit Universiti Sains Malaysia. Pulau Pinang, 1996.

American Society of Health-System Pharmacist. ASHP guideline on pharmacist-conducted patient education and counseling. Am J Health-Syst Pharm., 54: 431-34, 1997.

Gardner, M., Boyce, R.W., and Herrier, R.N., Pharmacist-patient consultation program unit 1: An interactive approach to very patient understanding. Pfizer Inc, New York, 1991.

Gardner, M., Boyce, R.W., and Herrier, R.N., Pharmacist-patient consultation program unit 2: How to counsel patients in challenging situations. Pfizer Inc, New York, 1993.

Bruce Hugman. Healthcare communication. Pharmaceutical Press, London, 2009.

FAR191/4: RESEARCH METHODOLOGY AND STATISTICS IN PHARMACY

This course introduces students to study designs and the basic concepts of statistics and to show them how these concepts can be used in making inferences from experimental data and from sample surveys. The medical biostatistics sections particularly the vital statistics and epidemiology are also incorporated in the syllabus. In addition, the course emphasizes the understanding of statistical procedures, how to choose correct statistical procedures, identify violations of statistical assumptions and how to interpret statistical results. The methods used to generate statistical output and computer softwares commonly used to generate statistical analysis (e.g. SPSS, Minitab, SAS) will be fully understood. This course is taught through different approaches e.g. lectures, reading materials, case studies, project, presentation and discussion.

Learning outcomes

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

- understand the research process and the various research designs applicable to pharmacy and medical research.
- understand the basic statistical concepts and principles.
- apply the knowledge and skills of research methods on a research topic.
- understand the application of various statistical procedures in pharmacy and medical research.
- apply and use correctly the statistical procedures in research and practice.

References

Beth Dawson, Robert G. Trapp. Basic & Clinical Biostatistics. 4th Edition. Singapore: LANGE Publication, 2004.

P. Armitage, G. Berry. Statistical Methods in Medical Research. 4th Edition. Malden, MA:Blackwell Science, Inc., 2002.

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David L. Streiner,Goeffrey R. Norman. Health Measurement Scales 3rd Edition. Great Britian UK:Oxford University Press, 2003.

Steven M. Teutsch, R. Elliott Churchill. Principles and Practice of Public Health Surveillance. 2nd ed. USA:Oxford University Press, 2000.

Stephen B Hulley, Steven R Cummings, Warren S Browner, Deborah G Grady, Thomas B Newman. Designing Clinical Research: An Epidemiologic Approach. 3rd edition. Lippincott Williams & Wilkins, 2006.

R. Brian Haynes, David L Sackett, Gordon H Guyatt, Peter Tugwell. Clinical Epidemiology: How to Do Clinical Practice Research (CLINICAL EPIDEMIOLOGY (SACKETT). 3rd Edition. Lippincott Williams & Wilkins, 2005.

FAR192/4: SOCIAL AND PUBLIC HEALTH PHARMACY

The practice of pharmacy, and consequently, the pharmacy curriculum has undergone significant change over the years in response to a rapidly changing economic, political and social environment. Within this context, the role of the pharmacist now includes more direct interaction with the public in terms of the provision of health information and advice on the safe and rational use of medications. In order to carry out this function effectively within the society, future pharmacists need to be well prepared on how to deal with patients' behavior and psychology. Understanding of patients' behavior and psychology are paramount in order to achieve good outcomes from medication therapy. The concept of behavioural sciences and health psychology are embedded as the fundamental foundation of the field of social and public health pharmacy and it is imperative that this field need to be taught and nurtured to the future pharmacy practitioners. This course will expose students to both public health and health sociology principles and their impact on patient care. The course will include lectures, mini group project, nursing home attachments and basic cardiopulmonary resuscitation (CPR) training. The understanding of these concepts will be crucial in sustainable healthcare provision.

Learning outcomes

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

- understand the contribution of pharmacists in public health and health promotion.
- demonstrate the ability to perform basic cardiopulmonary resuscitation techniques during emergency.
- explain the social and behavioural aspect of patients and consumers of healthcare.
- describe various type of health psychology models and their importance in patient care.
- understand basic concepts used in human epidemiological studies.

References

Turnock, B 2009. Public Health: What it is and how it works, Jones and Bartlett Publishers, Massachusetts.

Levin, BL, Hurd PD, Hanson A 2008. Introduction to Public Health in Pharmacy, Jones and Bartlett Publishers, Massachusset.
Rickles, NM, Wertheimer AI, Smith MC 2009. Social and Behavioral Aspects of Pharmaceutical Care. 2nd Ed, Jones and Bartlett Publishers, Massachusetts.
Egger G, Spark R, Donovan R, 2008, Health Promotion Strategies and Methods 2nd Ed, Mc-Graw Hill, Australia.
Taylor K, Nettleton S, Harding G, 2008, Sociology for Pharmacists 2nd Ed, Taylor & Francis Ltd., New York.
Laverack G, 2009, Health Promotion Practice, SAGE Publication, London.
Kelly W N, 2002, Pharmacy: What It Is and How It Works, CRC Press LLC, Florida.
Bissell, P, & Traulsen J M, 2005, Sociology and Pharmacy Practice, Pharmaceutical Press, London.

FAR212/2: PRINCIPLES IN MEDICINAL CHEMISTRY

This course covers the principles in medicinal chemistry that are being used in modern drug design, discovery and development.

Learning outcomes

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

- identify concepts that are closely related to structure-activity relationship (SAR) of drugs and its quantitative aspects.
- describe definition and objectives in medicinal chemistry, classifications and its related diseases; expression of drug action; the main strategies in drug syntesis and their analogues; concepts and strategies related to chemical synthesis in research and industry.
- explain the source and fundamentals of drug search and discovery; development and design of drugs; stereochemical functions in drug activities.

References

Wermuth C. G. (Ed.), The Practice of Medicinal Chemistry, Wermuth C. G. (Ed.), Academic Press, London, 2003. Call no.: RS420.P895 2003f (HS 1).
Patrick, G. L., An Introduction to Medicinal Chemistry, 4th Ed. Oxford University Press, Oxford, 2009. ISBN: 978-0-19-923447-9.
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Korolkovas, A., Essentials of Medicinal Chemistry, 2nd Ed. Wiley & Sons, New York, 1998.
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Foye's Principles of Medicinal Chemistry, 6th Ed. Lippincott Williams & Wilkins, 2007.
Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry, 12th Ed. Lippincott Williams & Wilkins, 2010.

FAR221/3: PHYSICAL PHARMACY I

Topics discussed include the states of matter and physicochemical properties of each state and the clinical implications, drug solubility and distribution phenomenon, diffusion, dissolution, colligative properties, ideal and real solutions, buffered and isotonic solutions, drug ionization, complexation and interfacial phenomena at liquids and solid surfaces.

Learning outcomes

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

- define the basic physicochemical principles; solubility, dissolution, distribution, ionization, diffusion, complexation, colligative properties, interfacial phenomena and adsorption.
- explain the application of the basic physicochemical principles to the different aspects of drug formulation, drug stability, drug transport and absorption, drug-protein/receptor interaction, drug analysis.
- perform basic calculations; degree of ionization, pH, pK_a, pK_b, buffer concentration and buffer capacity, HLB and CMC.

References

Florence, A.T. and Attwood, D. Physicochemical Principles of Pharmacy, 4th edition, Pharmaceutical Press, 2006.
Sinko, P.J. and Martin, A. Martin's Physical Pharmacy and Pharmaceutical Sciences, 6th edition, Lippincott Williams & Wilkins, 2010.
Amiji, M.M. and Sandmann B.J. Applied Physical Pharmacy, McGraw-Hill Inc. 2002.
Aulton, M.E. Pharmaceutics:The science of Dosage Form Design, 2nd edition, Harcourt Publisher, 2002.

FAR222/3: DOSAGE FORM II

This course introduces students to various pharmaceutical sterile dosage forms, parenteral, ophthalmic, antiserum, human blood and biotechnological preparations. This course also covers topics concerning labelling and packaging for sterile products, sterilization methods and testing methods required for sterile preparations.

Learning outcomes

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

- explain sterile pharmaceutical dosage forms.
- discuss the method of sterilization for pharmaceutical products.
- prepare label and packaging for sterile products.
- describe the uses and importance of antiserum, human blood product and biotechnology preparations.
- explain various testing methods required for sterile products.

References

Marriott JF, Wilson KA, Langley CA and Belcher D, Pharmaceutical Compounding and Dispensing, RPS Publishing, 2010.

Rees JA, Smith I, Smith B, Introduction to Pharmaceutical Calculations, Pharmaceutical Press, 2005.

Allen, LV, Popovich, NG, Ansel HC, Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems. 2010.

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Thompson, J.E., A Practical Guide to Contemporary Pharmacy Practice. Williams & Wilkins, Baltimore, USA, 1998.

Troy, DB., (Ed.) Remington: The Science and Practice of Pharmacy. 20th Edition, Lippincott Williams & Wilkins, Baltimore, USA, 2006.

Winfield AJ and Richards RME, Pharmaceutical Practice, Fourth Edition, Churchill Livingstone, 2010.

FAR223/3: PHYSICAL PHARMACY II

This course covers six topics, namely, polymers, pharmaceutical suspensions, pharmaceutical emulsions, colloids, surfactants and rheology of liquids. The students will be exposed to the terms, definitions, concepts, theories, principles and applications of the above topics.

Learning outcomes

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

- define clearly what colloids, surfactants, polymers, suspensions, emulsions, and rheology are, in relation to pharmacy.
- explain and relate the theory and application of the various topics covered in the course.
- apply the knowledge acquired in the course.

References

Aulton, M.E. Pharmaceutics: The Science of Dosage Form Design, 2nd edition, Harcourt Publisher, 2002.

Florence, A.T. and Attwood, D. Physicochemical Principles of Pharmacy, 4th edition, Pharmaceutical Press, 2006.

Lachman, L., Lieberman, H.A and Kanig, J.L. The Theory and Practice of Industrial Pharmacy. Third edition, Lea & Febiger, 1986.

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Martin, A., Bustamante, P. and Chun, A.H.C. Physical Pharmacy: Physical Chemistry Principles in Pharmaceutical Sciences, 4th edtioin., Lea & Febiger, Philadelphia, USA.

Sinko, P.J. and Martin, A. Martin's Physical Pharmacy and Pharmaceutical Sciences, 6th edition, Lippincott Williams & Wilkins, 2010.

FAR241/4: ANTIMICROBIAL THERAPY

The course introduces students to the normal flora, protozoa, helminth and pathogenic microorganism and the pathology of infectious diseases. Students will be taught the pharmacological and pharmaceutical chemistry aspect of antibacterial, antifungal, antiviral, antiprotozoal and anthelmintic drugs that are being used in the treatment of infectious diseases. Students will also be taught about clinical infections, ways of handling, monitoring as well as management of these drugs in infectious diseases.

Learning outcomes

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

- relate basic medical microbiology with infectious diseases.
- elaborate pharmaceutical chemistry and pharmacological properties of antibacterial, antiviral, antifungal, antiprotozoal and anthelmintic drugs.
- relate knowledge on pharmaceutical chemistry, microbiology, pharmacology and clinical pharmacy in the utilization and management of drugs in infectious diseases.
- to propose mode of use, monitoring and management of antimicrobial drugs in infectious diseases.

References

Pharmacology

H.P. Rang, M.M. Dale, J.M. Ritter and R.Flower. Rang and Dale's Pharmacology. 6th edition, Churchill Livingstone, 2007.

B.G. Katzung, S.B. Masters and A.J. Trevor. Basic and Clinical Pharmacology. 11th edition, McGraw-Hill, 2009.

L.L. Brunton, J.S. Lazo and K.L. Parker (Editors). Goodman and Gilman's Pharmacological Basis of Therapeutics. 11th edition, McGraw-Hill, 2006.

Pharmaceutical Chemistry

Burger's Medicinal Chemistry & Drug Discovery. Burger, A and Wolff, M.E. Wiley New York. 1994.

Wilson & Gisvold's textbook of organic medicinal & pharmaceutical chemistry. JN Delgado, WA Remers. Lippincott-Raven Publishers 1998. 10th edition.

Patrick, G. L., An Introduction to Medicinal Chemistry, Oxford University Press, 4th Ed., Oxford 2009.

Clinical Pharmacy

Applied Therapeutics: The Clinical Use of Drugs LY Young & Koda-Kimble: 9th ed. Applied Therapeutics Inc. San Francisco. 2008.

Pharmacotherapy: A Pathophysiologic Approach. J.T DiPiro et al. 7th ed. Elsevier London – 2008.

Anderson,P.O, Knoben, J.E,and Troutman, W.G. Handbook of Clinical Drug Data. 10th edition. McGraw-Hill Companies, Inc. 2002.

FAR242/4: ENDOCRINE SYSTEM AND METABOLISM

This is an integrated course that discusses the relationship between the endocrine and the nervous systems in maintaining homeostasis. The course aims at introducing the structure, function and regulation of the endocrine system as well as the pathophysiology and treatment of endocrine disorders. The endocrine system has such divergent effects on the human body that it permeates all disciplines of the practice of pharmacy that are physiology, pharmacology, pharmaceutical chemistry, pharmaceutical technology and clinical pharmacy.

Learning outcomes

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

- identify the relationship between the endocrine and the nervous systems in maintaining homeostasis.
- recognize the etiology, pathophysiology, clinical manifestation, signs and symptoms of common endocrine disorders.
- describe the general anatomy and physiology of the endocrine system with a special emphasis on the physiological function of each endocrine gland.
- discuss the pharmacological and chemical aspects of the drugs used in the treatment of these diseases which include the rationale of their usage, their mode of delivery, their mechanisms of action, their adverse effects and the structure-activity relationship.
- demonstrate the ability to integrate knowledge from different disciplines in discussing clinical problems pertaining to the pancreas (PBL sessions).

References

Physiology

Ganong, W.F., Review of Medical Physiology. 23rd ed. Mc Graw Hill, New York, 2010.

Guyton, Arthur C., Textbook of Medical Physiology. 11th ed. Saunders, Philadelphia, 2006.

Pharmacology

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Katzung, B.G., Basic and Clinical Pharmacology. 8th edition. McGraw-Hill, 2001.

Pharmaceutical Chemistry

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Wolff, Burger's Medicinal Chemistry. 5th edition. New York: John Wiley. Volumes I, II and III, 1997.

Clinical Pharmacy
Dipiro, J. T., Talbort, R. L., Yee, G. C., Matzke, G. R., Wells, B.G., Michael Posey, L., Pharmacotherapy. A Pathophysiologic Approach. 5th edition. McGraw Hill. New York, 2002.
Herfindal, E. T. and Gourley, D. R., Textbook of Therapeutics. Drug and Disease Management. 7th edition. William & Wilkins. Baltimore, 2001.

FAR244/3: BASIC PHARMACOGNOSY AND PHYTOCHEMISTRY

This course covers the areas of phytotherapy and pharmacognosy, basic plant biology, natural product chemistry, plant extract derived pharmaceuticals and nutraceuticals. Medicinal plants products in selected healthcare systems are also given together with aspects of evaluation and solving regulatory issues, classification, taxonomy and nomenclature, sources, quality control, standardisation, herbarium, arboretum, extraction, drying, formulation, pilot plant and clinical studies of local medicinal plants.

Learning outcomes

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

- evaluate the terms associated with herbs like phytotherapy, pharmacognosy, natural products, pharmaceuticals and nutraceuticals.
- initiate evaluation of herbal raw materials and extracts and various herbal preparations.
- describe aspects relating to source, types, characteristics, standardization, quality control, safety, efficacy and use, herbal literature, arboretum and herbarium.

References

Malaysian Herbal Monographs, Vol. 1 and II, Kem. Kesihatan Malaysia, K.Lumpur, 1999, 2009.
Peraturan-peraturan kawalan dadah dan kosmetik. Kementerian Kesihatan Malaysia, Petaling Jaya, 1984.
Quality control methods for medicinal plant materials. World Health Organisation, 1992, 2005.
Harborne J.B., Phytochemical Methods: A guide to modern techniques of plant analysis, Chapman & Hall, 1998.
Heinrich M., Barnes, J., Gibbons S., Williamson E.M., Fundamentals of Pharmacognosy and Phytotherapy, Churchill Livingstone, 2004.
WHO Herbal Monographs, Vols. 1,2,3.
ASEAN Herbal Standards, 1989.
German Commission E Monographs.
Chinese Pharmacopoeia.
Indian Herbal Monographs.

FAR246/2: BIOPHARMACEUTICALS I

This course introduces the students to the fundamentals of pharmaceutical biotechnology and the various biopharmaceutical agents that are available in the market today. The course will also include principles of immunology including drugs that modulates the immune system.

Learning outcomes

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

- explain the fundamentals of medical biopharmaceuticals and fundamentals of the immune system.
- discuss the fundamentals of recombinant DNA techniques and assess its current medical use.

References

Walsh, Gary, Pharmaceutical Biotechnology: Concepts and Applications, John Wiley & Sons Inc, USA, (2007). ISBN 978-0-470-01244-4

Roodney, J.Y and Gibaldi, M., Biotechnology and Biopharmaceuticals: Transforming Proteins and Genes into Drug, John Wiley & Sons Inc, USA, 2003.

Parnham, M.J. and Bruinvels, J., Recombinant Protein Drugs (ed Buckel, P). Birkhauser Verlag, 2001.

FAR247/2: BIOPHARMACEUTICALS II

This course offers a comprehensive introduction to the fast-moving area of biopharmaceuticals, with a particular focus on bio-manufacturing and their various applications. Lecture topics cover biotechnology advancements from a pharmaceutical perspective. Initial lectures offer a broad introduction on the principles of biomanufacturing and continued with the importance of biopharmaceutical products. Subsequent topics cover upstream and downstream processing and product analysis for not only protein-based substances but also nucleic acid and cell-based products. It moves on to explore the science, biotechnology and medical applications of specific biotech products. Finally, the course will cover the legal and ethical implications of their usage in medicine and pharmacy.

Learning outcomes

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

- describe basic principles of biotechnology including molecular biotechnology, animal cell culture technology, fermentation process and recombinant protein production.
- describe the processes and procedures associated with up-streaming and down-streaming of biopharmaceuticals for therapeutic purposes.
- discuss the new techniques/methods of production for biopharmaceutical products.
- describe the role of pharmacist in dispensing and monitoring the quality of biopharmaceuticals.
- discuss the ethics, law and economical aspects of usage of biopharmaceutical products.

References

Desmond S.T, Nicholl, An introduction to Genetic Engineering, 1994.

Crommelin D.J. and Sindelar R.D., Pharmaceutical Biotechnology: An Introduction for Pharmacists and Pharmaceutical Scientists. Harwood Academic, 2008.

Scientific American, The molecular basis of communication within the cell , by M. Berridge, Issue: October 1985.

Watson, J.D., Recombinant DNA, 3rd edittion, Scientific American Books, Inc., 2006.

FAR251/2: PHARMACOINFORMATICS

This course introduces the students to drug information system. The main focus is to improve their skills and to develop the understanding of their roles in pharmaceutical care practice.

Learning outcomes

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

- explain the role of pharmacist in drug information service, national telemedicine project, and pharmacy information system.
- evaluate with justification information acquired in handling drug information request.
- use various information sources (eg. internet, computerised data base, books, journals etc) relating to health information to evaluate and disseminate health information.

References

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FAR291/4: PHARMACEUTICAL MANAGEMENT AND MARKETING

The ability of pharmacy profession and pharmacist to provide pharmaceutical services which are accessible and affordable by all patients is very important for the sustainance of the profession and the well being to the society. Pharmacists must be able to integrate their knowledge and skills in economy, management and marketing with professional responsibilities and ethics. Therefore, this course has been designed for students to acquire the knowledge and understanding of the current problems, practicies and applications of marketing and management in pharmacy profession whether locally or internationally, as well as the concept of sustainable healthcare consumption.

Learning outcomes

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

- identify the functions of management in pharmacy practice.
- apply management functions in the practice of pharmacy.
- identify the function of marketing in pharmacy practice.
- implement the marketing function in pharmacy practice.

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FAR313/4: PHARMACEUTICAL ANALYSIS

This course emphasizes on the basic techniques and instrumentation for the analysis of drugs in formulation and biological mucus. It covers both fundamental theory and application of analytical methods common in pharmaceutical analysis. Methods such as gravimetry, titration, electrophoresis, extraction, electromagnetic radiation, absorption spectroscopy, spectroflourimetry, flame emission and atomic absorption spectroscopy and chromatography techniques comprises of liquid, plane and gas will be taught.

Learning outcomes

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

- identify the suitable analysis method for a compound.
- conduct gravimetry and titration analyses.

- elaborate the importance of quanlitative and quantitative analysis in drug formulation.
- differentiate various types of analysis in terms of their technical aspect and usage of intruments.

References

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Kinter, M, and Sherman, N.E. Eds. Protein Sequencing and Identification using Tandem Mass Spectrometry, Wiley Interscience, 2000.

FAR323/3: BIOPHARMACEUTICS AND PHARMACOKINETICS

This course covers the factors affecting drug absorption/bioavailability and the mathematical models used to describe the fate of a drug after its administration into the body. It also includes applying biopharmaceutics and pharmacokinetics in design/development of drug dosage regimes. Genetic factors affecting drug pharmacokinetics and pharmacodynamics as well as the concept of personalized drug therapy are also covered.

Learning outcomes

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

- describe the factors which affect drug absorption and how this knowledge can be used in the development of dosage regimen.
- describe the fate of a drug after administration into the body.
- determine the pharmacokinetic parameters necessary to design a dosage regimen.
- understand and determine the genetic factors that influence the pharmacokinetic/pharmacodynamic properties of a drug and also understand the concept of individualised drug therapy.

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Jennifer B Dressman and Christos Reppas, *Oral Drug Absorption: Prediction and assessment, 2nd Edition.* Informa Health Care, USA, Inc, 2010.

FAR341/4: RESPIRATORY, RENAL, BLOOD SYSTEMS AND THERAPY

This course covers the systemic physiology of the respiratory, renal and blood systems. An introduction to the pathophysiology related to these systems is also discussed. Pharmacological and chemical aspects used in the treatment of these disorders include the rationale of drug usage, mechanisms of action, structure-activity relationships and their adverse effects are also discussed.

Learning outcomes

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

- describe the anatomy and physiology of the respiratory, renal and blood systems.
- discuss the chemical names, the physicochemical properties, the SAR relationship, metabolism and pharmacokinetic properties of these drugs.
- discuss the physiological disorders of these systems and the drugs used to treat the disorders.
- discuss the mechanism of action and the adverse effects of these drugs.
- discuss the symptoms, the pathophysiology and information related to the treatment of these disorders including drug choices and their therapeutic complications.

References

Physiology

Ganong, William F., Review of Medical Physiology. 23rd edition. Mc Graw Hill, New York, 2010.

Guyton, Arthur C., Textbook of Medical Physiology. 11th ed. Saunders, Philadelphia, 2006.

Pharmacology

Human Pharmacology: Molecular to Clinical. Edited by Brody, Larner and Minneman, 3rd edition, Mosby St Louis, 1999.

Katzung, B.G., Basic and Clinical Pharmacology. 8th edition. McGraw-Hill, 2001.

Pharmaceutical Chemistry

Foye, Principles of Medicinal Chemistry. 4th edition. Philadelphia: Lea and Febiger, 1995.

Wolff, Burger's Medicinal Chemistry. 5th edition. New York: John Wiley. Volumes I, II and III, 1997.

Clinical Pharmacy

Joseph T. Dipiro, Robert L. Talbort, Gary C. Yee, Gary R. Matzke, Barbara G. Wells, L. Michael Posey, Pharmacotherapy. A Pathophysiologic Approach. 5th edition. McGraw Hill. New York, 2002.

Eric T. Herfindal, Dick R. Gourley, Textbook of Therapeutics. Drug and Disease Management. 7th edition. William & Wilkins. Baltimore, 2001.

FAR342/3: CARDIOVASCULAR SYSTEM AND THERAPY

Structure and function of the cardiovascular system. Heart sounds and electrocardiogram. Regulation of blood pressure. Pathophysiological and clinical manifestation of the cardiovascular system disorders: hypertension, angina pectoris, congestive heart failure, cardiac arrhythmias and hyperlipidemia. Pharmacological and chemical aspects of drugs used for the cardiovascular disorders including therapeutic indication, mechanism of action, adverse effects, choice and rational of drugs used and their structure-activity relationship.

Learning outcomes

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

- identify the anatomy and physiology of the human cardiovascular system and the disorders.
- differentiate and describe the drugs used to treat each cardiovascular disorder.
- explain the mechanism of action and adverse effects of cardiovascular drugs.
- differentiate and show the chemical names, the physiochemical properties, the structure-activity relationship, metabolism and pharmacokinetic properties of the cardiovascular drugs.

- connect the risk factors, symptoms and information related to the treatment of the cardiovascular diseases including drug choices and their therapeutic complications.

References

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Page, C.P., Curtis, M.J., Sutter, M.c., Walker, M.J.A., and Hoffman, B.B., Integrated Pharmacology, Mosby, London, 2002.

FAR343/2: GASTROINTESTINAL SYSTEM AND THERAPY

This course covers the systemic physiology of the gastrointestinal system. An introduction to the pathophysiology related to this system is also discussed. Pharmacological and chemical aspects used in the treatment of these disorders include the rationale of drug usage, mechanisn of action, structure-activity relationships and their adverse effects are also discussed.

Learning outcomes

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

- describe the anatomy and physiology of the gastrointestinal system.
- discuss the chemical names, the physiochemical properties, the SAR relationship, metabolism and pharmacokinetic properties of these drugs.
- discuss the physiological disorders of this system and the drugs used to treat the disorders.
- discuss the mechanism of action and the adverse effects of these drugs
- discuss the symptoms, the pathophysiology and information related to the treatment of these disorders including drug chioces and their therapeutic complications.

References

<u>Physiology</u>

Ganong, William F., Review of Medical Physiology. 23rd ed. Mc Graw Hill, New York, 2010.

Guyton, Arthur C., Textbook of Medical Physiology. 11th ed. Saunders, Philadelphia, 2006.

Pharmacology

Human Pharmacology: Molecular to Clinical. Edited by Brody, Larner and Minneman, 3rd edition. Mosby St Louis, 1999.

B.G. Katzung., Basic and Clinical Pharmacology. 8th edition. McGraw-Hill, 2001.

Pharmaceutical Chemistry

Foye, Principles of Medicinal Chemistry. 4th edition. Philadelphia: Lea and Febiger, 1995.

Wolff, Burger's Medicinal Chemistry. 5th edition. New York: John Wiley. Volumes I, II and III. 1997.

Clinical Pharmacy

Joseph T.Dipiro, Robert L.Talbort, Gary C. Yee, Gary R. Matzke, Barbara G. Wells, L. Michael Posey, Pharmacotherapy. A Pathophysiologic Approach. 5th edition, McGraw Hill. New York, 2002.

Joseph T.Dipiro, Robert L.Talbort, Gary C. Yee, Gary R. Matzke, Barbara G. Wells, L. Michael Posey. (2002) Pharmacotherapy. A Pathophysiologic Approach. 5th edition. McGraw Hill. New York. 2. Eric T. Herfindal, Dick R. Gourley, Textbook of Therapeutics. Drug and Disease Management. 7th edition. William & Wilkins. Baltimore, 2001.

FAR344/4: CENTRAL NERVOUS SYSTEM AND THERAPY

The course aims to provide students an introduction to the organization of the central nervous system; the structure, integrative functions and regulation of the central nervous system and the pathophysiology of common central nervous system disorders. Subsequently, students will be taught the pharmacological and chemical aspects of drugs acting at the central nervous system. Emphasis is placed on mechanisms of action of the major groups of drugs and important aspects of drugs pharmacokinetics, adverse effects, drug-drug interactions and structure-activity relationships. The clinical component of this course will cover on therapeutic aspects of drugs focusing on drug selection, dosing regimen and monitoring of drug therapy.

Learning outcomes

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

- describe the role of central nervous system in coordinating the human body's function and behaviour and the pathophysiology of common central nervous system disorders.
- describe the chemical and pharmacological properties of drugs which act at central nervous system including commonly abused drugs.
- correlate the pharmacological effects and chemical properties of drugs with their clinical uses in common central nervous system disorders.
- choose the drug therapy for common central nervous system disorders.

References

Physiology

Ganong, W.F., *Review of Medical Physiology (22nd edition).* New York: Mc Graw Hill, 2005.

Guyton, A.C., *Textbook of Medical Physiology (11th edition).* Philadelphia: Saunders, 2006.

Widmaier, E.P., Raff H., Strand, K.T., *Vander's Human Physiology: The Mechanisms of Body Function (10th edition).* New York: Mc Graw Hill, 2006.

Pharmacology

Rang H.P., Dale M.M., Ritter J.M. & Flower R.J., *Rang and Dale's Pharmacology (6th edition).* Churchill Livingstone: Elsevier, 2007.

Laurence L.B., John S. L., Keith L. P., *Goodman & Gilman's The Pharmacological Basis of Therapeutics (11th edition).* New York: Mc Graw Hill, 2006.

Bertam G. Katzung, *Basic and Clinical Pharmacology (10th edition).* New York: Mc Graw Hill, 2007.

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Clinical

DiPiro, J.T., Talbert R.L., Yee, G.C., Matzke, G.R., Wells, B.G., Posey, L.M., *Pharmacotherapy: A pathophysiologic approach (3rd edition).* Appelton & Lange, 1997.

FAR346/2: APPLIED PHARMACOGNOSY

The course initially discusses the influence of various civilization on the development of herbal medicines in Malaysia followed by herbal medicines / nutraceuticals for treating cardiovascular, gastrointestinal, liver, respiratory, genitourinary, nervous system diseases, diabetes, cancer, infection, endocrine system and metabolism disorders as well as endurance enhancers. Each herb / nutraceutical is discussed on the aspect of nature of the herb / nutraceutical, chemical constituents, claims made on each herb / nutraceutical, supporting *in vitro* and *in vivo* experiment and clinical trial on human as well as herb-drug interaction. The importance of protecting the ecosystems to maintain biodiversity is also emphasised, as this protects the natural repository of the sources of herbal medicines.

Learning outcomes

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

- appreciate and discuss the role of ethnopharmacology of various civilizations contributed to the development of pharmacognosy and development of modern medicines.
- describe the shape and uses of popular herbs/nutraceuticals.
- discuss the validity of the claims made on popular herbs and nutraceuticals in treating diseases based on *in vitro* (e.g. involving cell culture, isolated tissue of animal preparation) and *in vivo* (involving whole animal) experiments and clinical trial on human that support/disprove its traditional uses.
- name the active chemical ingredients in the popular herbs/nutraceuticals – if known.
- discuss the mechanism of action and side effects popular herbs/nutraceuticals and its active principle – if known.
- discuss the possible interactions between drugs and herbs/nutraceuticals as well as between herbs/nutraceuticals themselves.

References

Heinrich M, Barnes J, Gibbons S. and Williamson EM., Fundamentals of Pharmacognosy and Phytotherapy. Churchill Livingstone, London, 2004.

Barnes J, Anderson LA and Phillipson JD., Herbal Medicine. A Guide for Healthcare Professional. 2nd Edition. Pharmaceutical Press, London, 2007.

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Pinn G., Herbal Medicine – A Practical Guide for Medical Practitioners. Blackwell Publishing, Oxford, 2003.

FAR347/2: ONCOLOGY PHARMACY

This paper introduces the students to cancer as a disease, its etiology and pathophysiology. Also being discussed is the different cancer treatment modalities with emphasis on chemotherapy. Cancer chemotherapy protocols are also discuss so that students could understand the drug combination, the rationale and the advantage of the combinations. The pharmacological and chemical aspects of the major classes of cytotoxic drug will be discussed. The role of oncology pharmacist in cancer management including supportive care and safe handling of cytotoxic drugs are also being discussed.

Learning outcomes

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

- explain the definition, etiology and pathophysiology of cancer
- discuss the cancer treatment modalities with emphasis on chemotherapy.
- explain the mechanism of action, pharmacokinetic, toxicity and its management of the chemotherapy.
- explain the structure-activity relationship of the main group of the cytotoxic drugs.
- discuss supportive care in the management of cancer.
- explain the hazards and safe handling of cytotoxic drug.
- process the chemotherapy prescription and able to predict toxicities and suggest treatment.

References

Young, L.Y. and Koda-Kimble, M.A., Applied Therapeutics. The Clinical use of Drugs. Applied Therapeutics Inc., 2009.

DiPiro, J.T., Talbert, R.L., Yee, G.C., Matzke, G.R., Wells, B.G. and Posey, L.M., Pharmacotherapy. A Pathophysiologic Approach Elsevier Science Pub. Co. Inc., 2008.

Goodman and Gilmans, The Pharmacological Basis of Therapeutics, 12th Ed., McGraw Professionals, 2010.

FAR352/4: CLINICAL PHARMACY PRACTICE

This course provides the exposure to basic principles and philosophy of pharmaceutical care in providing clinical pharmacy services for patients both in institutional and community settings. The main purpose is to build knowledge and skills to identify and solve drug-related and drug-use problems in patients.

Learning outcomes

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

- explain the concept and philosophy of pharmaceutical care in clinical pharmacy practice.
- adopt the basic knowledge to perform clinical pharmacy practice in health institutions and community pharmacy.
- evaluate patients' data based on therapy given to them.
- develop and train basic expertise in identifying and solving drug related problems.

References

Robert Talbert , Gary Yee , Gary Matzke, Barbara Wells, L. Michael Posey, Joseph DiPiro, Pharmacotherapy: A Pathophysiologic Approach, 8th Edition., 2011.

Mary Lee, Basic Skills in Interpreting Laboratory Data, 4th Edition, 2011.

Terry Schwinghammer, and Julia Koehler, Pharmacotherapy Casebook: A Patient-Focused Approach, 1st Edition, 2010,

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Parthasarathi, G., Nyfort-Hansen, K., and Nahata, M. A textbook of clinical pharmacy practice. Essential concepts and skills, Universities Press, India, 2008.
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Gerald Briggs, Roger K. Freeman, Sumner J. Yaffe, Drugs in Pregnancy and Lactation. A guide to fetal and neonatal risk, 9th ed., Lippincott Williams & Wilkins, 2011.
Richard A. Helms, David J. Quan,, Textbook of Therapeutic: Drug and Disease Management, 8th ed., Lippincott Williams & Wilkins, 2006.

FAR353/2: APPLIED PHARMACOKINETICS

This is a basic course that provide an understanding of the concepts and application of clinical pharmacokinetics in therapeutic drug monitoring (TDM). This course aims to enhance TDM skills and knowledge to individualize drug therapy for narrow therapeutic index drugs such as aminoglycosides, vancomycin, chloramphenicol, cyclosporine, digoxin, salicylate, theophylline and methotrexate. Pharmacokinetics in renal and hepatic failure and dialysis will also be discussed to provide more indepth knowledge of therapeutic drug monitoring.

Learning outcomes

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

- describe the concept of therapeutic drug monitoring.
- outline the approach to establish therapeutic drug monitoring service, pharmacokinetic consultation, drug levels interpretation in TDM services.
- develop the skills for designing dosage regimen using pharmacokinetic approaches and calculation for narrow therapeutic index drugs.
- apply the specific pharmacokinetic parameters and population data of aminoglycosides, vancomycin, chloramphenicol, cyclosporine, digoxin, salicylate, theophylline and methotrexate in TDM.
- apply the specific pharmacokinetic parameters and population data to individualize drug therapy in renal and hepatic failure patients.

References

Michael E. Winter's Basic clinical pharmacokinetics. Applied Therapeutics Inc, 5th ed. 2009.
DiPiro J.T, Spruill W.J, Blouin R.A and Pruemer J.M. Concepts in ClinicalPharmacokinetics.
American Society of HealthSystem Pharmacist, Inc. 5th ed 2010.
Geral E. Schumacher. Therapeutic Drug Monitoring. Appleton & Lange Norwalk, Connecticut, 1995.

Larry A Bauer, Applied Clinical Pharmacokinetics Handbook, International Edition, McGraw Hill, 2008.

FAR381/0: FORENSIC PHARMACY AND ETHICS

Students are required to pass the subject on Forensic Pharmacy (Pharmacy Laws on Poisons and Sale of Drugs and Ethics) before they are eligible to be Registered Pharmacists. Students are required to learn Registration of Pharmacists Act 1951(Act 371) and Regulations, Poisons Act 1952 (Act 336) and Regulations, Poisons (Psychotropic Substances) Regulations 1989, Sale of Drugs Act 1952 (Act 368) and Control of Drugs and Cosmetics Regulations 1984, Medicines (Advertisement and Sale) Act 1956 (Act 290) and Regulations, Dangerous Drugs Act 1952 (Act 234) and Regulations. All Acts should include its amendments and revised versions to the most recent year.

Learning outcomes

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

- understand the laws governing pharmacy practice in Malaysia.

References

Malaysian Laws on poisons and sale of drugs ILBS, Latest edition.
Dangerous Drugs Act 1952, ILBS.

FAR391/4: PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMICS IN DEVELOPING COUNTRIES

This course provides an introduction to the basic principles of pharmacoepidemiology and pharmacoeconomics and how they are used in the evaluation of medicines and health care services in developing countries. It begins by introducing basic principles and analysis methods in pharmacoepidemiology and pharmacoeconomics and followed by application of these in practice. This course will include lectures, reading materials, case studies and discussion. Incorporation of sustainable principles in healthcare governance and delivery systems is also discussed.

Learning outcomes

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

- appraise scientific literature using basic theory, concepts and principles of pharmacoepidemiology and pharmacoeconomics.
- conclude findings from pharmacoepidemiology and pharmacoeconomic analysis**.**

- organize enquiry methods to address pharmacoepidemiology and pharmacoeconomic problems.

References

Drummond M, McGuire A, editors. *Economic evaluation in health care*. Oxford: Oxford University Press, 2001.

Drummond MF, O'Brien B, Stoddart GL, Torrance GW. *Methods for the economic evaluation of health care programmes*. 3rd ed. Oxford: Oxford University Press, 2005.

Strom BL, Kimmel SE. Textbook of Pharmacoepidemiology, John Wiley & Sons Ltd, England; 2006.

Szende A, Oppe M, Devlin N, editors. *EQ-5D value sets: inventory, comparity review and user guide*. Dordrecht: Springer, 2007.

Bootman, J. L., Townsend, R. J. & McGhan, W. F. (1996) *Principles of pharmacoeconomics,* Cincinnatti, Harvey Whitney Books Company.

Folland, S., Goodman, A. C. & Stano, M. (2003) *The economics of health and health care,* Upper Sadle River, New Jersey, Prentice Hall.

Mohamed Ibrahim, M. I. (2008) *Farmakoekonomi untuk profesional kesihatan,* Pulau Pinang, Penerbit Universiti Sains Malaysia.

Walley, T., Haycox, A. & Boland, A. (2004) *Pharmacoeconomics,* Oxford, Churchill Livingstone.

FAR411/2: ADVANCED PHARMACEUTICAL ANALYSIS

This course relates advanced techniques and instrumentation for pharmaceutical analysis to the industrial pharmacy field. The separation methods and the quantitative analyses are emphasized. The methods that are covered are the chromatographic methods (gas chromatography (GC): GC-MS, high performance liquid chromatography (HPLC): Chiral HPLC and LC-MS, and supercritical fluid chromatography (SFC)) and the sample preparations for these methods, liquid chromatographic methods for protein analysis and bioanalytical methods (immunoassay methods and the enzymatic assay). The quantitative analysis also focuses on the spectroscopic methods: infrared spectroscopy (IR) and nuclear magnetic resonance spectroscopy (NMR).

Learning outcomes

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

- explain the principles and instrumentation of chromatographic and bioanalysis methods.
- analyse quantitatively using the different methods.
- differentiate the types or techniques of the different analytical methods.
- explain the importance of the processes involved in chromatographic, bioanalysis and spectroscopic methods.

References

Hage, D.S. and Carr, J.D., Analytical Chemistry and Quantitative Analysis, Pearson Prentice Hall, New Jersey, 2011.

Christian, G.D., Analytical Chemistry, 6th Ed., John Wiley & Sons, New York, 2004.

Skoog, D.A., West, D.M. and Holler, F.J., Analytical Chemistry: An Introduction, 6th Ed., Saunders College Publication, Philadelphia, 1994.

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Watson, D.G., Pharmaceutical Analysis, 2nd Ed. , Elsevier, UK, 2005.

Beckett and Stenlake, Practical Pharmaceutical Chemistry, 4th Ed., 2 vols., Athlone Press, London ,1987.

Wilson and Gosvold's, Textbook of Organic Medicinal and Pharmaceutical Chemistry, 10th Ed., edited by Delgado, J.N. and Remers, W.A., Lippincott Williams & Wilkins, Philadelphia, 1998.

Fifield, F.W. and Kealey, D.,Principles and Practice of Analytical Chemistry, Blackie, 1990.

Kinter, M, and Sherman, N.E. Eds.,Protein Sequencing and Identification using Tandem Mass Spectrometry, Wiley Interscience, 2000.

FAR422/2: ADVANCED DRUG DELIVERY

This course will give an overview into the principles of advanced drug delivery and targeting, their current applications and potential future development. Discussions will include cutting-edge technologies used in drug delivery systems such as micelles, nanoparticles and dendrimers, plus the achievements and shortcomings of current drug delivery systems. Strategies adopted to optimize drug delivery to target sites such as controlled/sustained drug release and drug targeting are also discussed. Various drug delivery systems such as transdermal, transmucosal (nasal, pulmonary) and central nervous system (blood-brain barrier) drug delivery will also be included. Acknowledging the enormous potential of protein (biopharmaceuticals products) as novel therapeutics, this course will also cover selected eminent topics on protein drug delivery systems.

Learning outcomes

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

- acquire knowledge of various advanced drug delivery systems.
- understand anatomical and physiological barriers that can affect drug delivery processes.
- acquire information on the applications of new strategies and technologies for maximum efficacy of drug delivery to target sites.

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Leon Shargel, Susanna Wu-Pong & Andrew B.C. Yu. Applied biopharmaceuticals and pharmacokinetics. McGraw Hill. Singapore. 2005.

Rodney, J. Y. Ho & Milo Gibaldi. Biotechnology and biopharmaceuticals: Transforming proteins and genes into drugs. John Wiley & Sons Inc. 2003.

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Dey N. S., Majumdar, S. & MEB Rao. 2008. Multiparticulate particles for controlled release. Trop. J. Pharm. Res. 7(3): 1067-1075.

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Hans Bisgaard, Chris O'Callaghan & Gerald C. Smaldone (eds.). Drug delivery to the lung. M. Dekker. New York. 2002.

Robert O. Williams, III, David R. Taft & Jason T (eds.).Advanced drug formulation design to optimize therapeutic outcomes. 2007.

Deepak Thassu, Michel Deleers & Yashwant Pathak (eds.). Nanoparticulate drug delivery systems. Informa Healthcare. New York. 2007.

Anya M. Hillery, Andrew W. Lloyd & Jain, N.K. (eds). Drug delivery and targeting for pharmacists and pharmaceutical scientists. Taylor & Francis. London. 2001.

Mansour, H. M., S Rhee & X. Wu. 2009. Nanomedicine in pulmonary delivery. Int. j. Nanomed. 4: 299-319.

FAR423/4: PHARMACEUTICAL PROCESSING

This course encompasses the principles regarding pharmaceutical processing. This includes preformulation, powder technology, drying, heat transfer, tablets and capsules, stability of dosage forms and packaging.

Learning outcomes

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

- apply knowledge on the basic principles and information about pharmaceutical processing in preformulation, powder technology, drying and heat transfer.
- discuss the functions and types of packaging.
- explain the views and backgrounds which exist in the design, evaluation and usage of tablets and capsules.

References

Aulton, M. E., Pharmaceutics: The Science of Dosage Form Design, 2nd edition, Churchill Livingston, London, 2002.

Florence, A. T. and Attwood, D.P,hysicochemical Principles of Pharmacy, 4th edition, Pharmaceutical Press, 2006.

Lachmann, L. and Lieberman, H.A., Theory and Practice of Industrial Pharmacy, 3rd edition, Lea & Febiger, Philadelphia, 1986.

Kit L. Yam, The Wiley Encyclopedia of Packaging Technology, 3rd edition, Wiley, USA, 2009.

Bentley's Textbook of Pharmaceutics, 8th edition, E. A. Rawlins, Cassell and Collier Macmillian, London, 1997.

Saringat, Mohd. Isa dan Azmin, Formulasi I, USM Publication, 1995.

Saringat Baie, Tablet, USM Publication, 1987.

Lieberman, H. A. and Lachman, L., Pharmaceutical dosage form (Tablets) in three volumes, Marcel Deker Inc., New York, 1981.

FAR424/4: INDUSTRIAL PHARMACY

This course covers principles pertinent to working in the pharmaceutical industry. It includes Good Manufacturing Practice (GMP), Quality Assurance, guidelines on registration of a product, Clean Room and HEPA filter, control of the manufacturing environment and raw materials, control of pharmaceutical preparations in solid and liquid forms, packaging, storage and distribution, statistical methods for the control of processes and regulatory requirements. The concept of sustainable manufacturing will include reduction of environmentally hazardous chemicals and appropriate treatment of waste products.

Learning outcomes

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

- describe the critical elements that are required in the production of a pharmaceutical product.
- explain the principles of Good Manufacturing Practice and quality assurance.

- explain the procedures to be carried out for the registration of a pharmaceutical product.

References

Laws of Malaysia. The Drugs and Cosmetics Regulation Act 1984.

WHO Technical Report Series - WHO Expert Committee on specifications for pharmaceutical preparations, 1992.

Good Manufacturing Practice: supplementary guidelines for the manufacture of herbal medicinal products, Annex 8, WHO Technical Report Series, No. 863, 1996.

WHO Guidelines for Drinking Water Quality, 3rd Edition, WHO, 2003.

Latest USP and BP.

Aseptic Pharmaceutical Manufacturing - Technology for the 1990s. Edited by Wayne P. Olson & Michael J. Groves. Interpharm Press, USA. 1987.

Pharmaceutical Production Facilities - Design & Applications. By Graham Cole , Ellis Horwood, New York, 1998.

Aulton, M. E., Pharmaceutics: The science of dosage form design. Churchill Livingstone, 2nd Edition, 2001.

Good Manufacturing Practices for Pharmaceuticals -6th Edition, Joseph D. Nally, Informa Healthcare, NY, USA, 2006.

Pharmaceutical Microbiology, 6th edition. Editors W. B Hugo and A. D. Russell, Blackwell Science Ltd, Oxford, 1998.

Guidance for Industry: PAT — A Framework for Innovative Pharmaceutical Development, Manufacturing, and Quality Assurance. Food & Drug Administration (FDA) United States of America, from http://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM070305.pdf. Accessed 25/11/2010.

FAR425/6: INDUSTRIAL TRAINING

This training period is complementary to FAR424 (Industrial Pharmacy) course which covers principles pertinent to working in the pharmaceutical industry. During this time, the student will experience how Good Manufacturing Practice (GMP), quality management, guidelines on registration of a product, control of the manufacturing environment and raw materials, control of pharmaceutical preparations and related products, packaging, storage and distribution, process optimisation and regulatory requirements are put into place in the day-to-day running of pharmaceutical manufacturing or production company.

Learning outcomes

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

- describe and apply the critical elements that are required in the production of a pharmaceutical product.

- explain and apply the principles of Good Manufacturing Practice and quality assurance.
- explain and apply the procedures to be carried out for the registration of a pharmaceutical product.

References

Laws of Malaysia. The Drugs and Cosmetics Regulation Act, 1984.

WHO Technical Report Series - WHO Expert Committee on specifications for pharmaceutical preparations, 1992.

Good Manufacturing Practice: supplementary guidelines for the manufacture of herbal medicinal products, Annex 8, WHO Technical Report Series, No. 863, 1996.

WHO Guidelines for Drinking Water Quality, 3rd Edition, WHO, 2003.

Latest USP and BP. Aseptic Pharmaceutical Manufacturing - Technology for the 1990s. Edited by Wayne P. Olson & Michael J. Groves. Interpharm Press, USA,1987.

Pharmaceutical Production Facilities - Design & Applications, 2nd Edition, By Graham Cole, Informa Healthcare, NY, USA, 1998.

Good Manufacturing Practices for Pharmaceuticals -6th Edition, Joseph D. Nally, Informa Healthcare, NY, USA, 2006.

Pharmaceutics: The science of dosage form design. Edited by Michael E. Aulton, Churchill Livingstone, 2nd Edition, 2002.

Pharmaceutical Microbiology, 6th edition. Editors W. B Hugo and A. D. Russell, Blackwell Science Ltd, Oxford,1998.

Guidance for Industry: PAT — A Framework for Innovative Pharmaceutical Development, Manufacturing, and Quality Assurance. Food & Drug Administration (FDA) United States of America, http://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM070305.pdf. Accessed 25/11/2010.

FAR453/3: APPLIED THERAPEUTICS I

This course introduces students to practice drug therapy assessment through pharmaceutical care approach based on case orientation. The diseases involved are the common diseases of neurology, cardiovascular, pulmonary, renal, gastrointestinal, endocrinology and hematology. The scope of knowledge include pathophysiology, sign and symptoms, diagnosis and review of organ systems, laboratory values, medicinal chemistry, pharmaceutics and pharmacotherapeutics.

The students are assisted to use patient's clinical informations to evaluate the therapeutic outcomes, to identify drug related problems and give therapeutic recommendation, monitoring and counselling. The students are encouraged to use

the latest treatment guidelines and references (articles) to provide evidence based treatment.

Learning outcomes

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

- understand the basic principles of drug therapy.
- assess various clinical aspects (pathology, diagnosis, clinical manifestation and laboratory values) of the given case.
- solve drug related problem and provide drug information, non-pharmacological information and counselling that are related with the case given.

References

Lloyd Y. Young, Koda Kimble, Applied Therapeutic: The Clinical Use of Drugs 9th ed., Lippincott Williams & Wilkins, 2008.

Joseph T. Dipiro et al. Pharmacotherapy. A Pathophysiology Approach, 8th ed., Elsevier, London, 2011.

Textbook of Therapeutic: Drug and Disease Management , 8th ed., Lippincott Williams & Wilkins, 2006.

Mary Lee, Basic Skill in Interpreting laboratory Data, 4th ed., ASHP, 2009.

Drug Information Handbook International , Lexi-Comp, 2010.

FAR454/3: APPLIED THERAPEUTICS II

This course introduces students to drug therapy assessment with pharmaceutical care approach based on case studies. The diseases involved in this course are the common infectious diseases, psychiatric disorders, women's health, immunization and drug-induced skin disorders. The scope of knowledge involved are pathophysiology, sign and symptoms, diagnosis, review of systems, laboratory values medicinal chemistry, pharmacology and pharmacotherapeutics. The students are assisted to use patient's informations on clinical status to evaluate the therapeutic outcomes, be able to identify drug related problems and give recommendation, monitoring and counselling. The students are encouraged to use the latest treatment guideliness and references (articles) to provide evidence based treatment.

Learning outcomes

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

- understand the principles of drug therapy.
- assess various clinical aspects (pathology, diagnosis, clinical manifestation and laboratory values) of the given case.
- solve drug related problem and provide drug information, non-pharmacological information and counselling that are related with the case given.

References

Lloyd Y. Young, Koda Kimble, Applied Therapeutic: The Clinical Use of Drugs 9th ed., Lippincott Williams & Wilkins, 2008.

Joseph T. Dipiro et al. Pharmacotherapy. A Pathophysiology Approach, 8th ed., Elsevier, London, 2011.

Textbook of Therapeutic: Drug and Disease Management , 8th ed., Lippincott Williams & Wilkins, 2006.

Mary Lee, Basic Skill in Interpreting laboratory Data, 4th ed., ASHP, 2009.

Drug Information Handbook International , Lexi-Comp, 2010.

FAR457/2: MEDICATION COUNSELING PRACTICE

The emphasis of this course is on the application of pharmaceutical care principles in drug counseling service, consultation and health promotion to patients with chronic diseases. The main focus is to build talent and clinical skill to identify and solve drug use and drug taking problems. Technique for clinical medication review (CMR) for patients with chronic diseases will be discussed.

Learning outcomes

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

- explain the concept and philosophy of counseling for drug use.
- respond to request from patient on drug therapy for chronic diseases.
- develop effective clinical skills and talents to perform patient assessment, physical examination, patient consultation, and medication counseling.
- show the leadership skill for personnel and patient management in medication counseling practice.

References

Cipolle, RJ., Strand, LM., and Morley, PC. Pharmaceutical care practice. The clinician's guide. 2nd Ed., The McGraw-Hill Companies, Inc. New York, 2004.

Rantucci, MJ. Pharmacists talking with patients. A Guide to patient counseling, Williams & Wilkins. London,2006.

Myerscough, PR, Ford, MJ. Talking with patients. Keys to good communication. 3rd Ed., Oxford University Press, London, 2001.

Tindall, W. Beardsley, RS, Kimberlin, CL. Communication skills in pharmacy practice. A practical guide for students and practitioners.5th Ed., Williams & Wilkins, London, 2008.

Hugman Bruce. Healthcare Communication, Pharmaceutical Press. London, 2009.

FAR458/2: NUCLEAR PHARMACY

The course exposes students to basic principles of radiopharmaceuticals (radiation physics and pharmacokinetics), radiation safety and regulation, Good Manufacturing Practice (GMP), generator, cyclotron or PET, personnel and area monitoring (types of monitoring equipment used). The scope of knowledge also includes designing of nuclear pharmacy, nuclear pharmacist's responsibilities in service (including daily activity) and research. The current practice in nuclear pharmacy relating to radiopharmaceuticals, indication in diagnosis and treatment, dose, preparation, quality control, patient monitoring, counseling and documentation/record is included. Research related to radiopharmaceuticals is also discussed.

Learning outcomes

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

- explain basic principles and clinical aspects of radiopharmaceuticals as diagnostic and therapeutic agents.
- identify the need and roles of pharmacist in the use of radiopharmaceuticals.
- identify the safety issues of radiation, procedures and monitoring of rays.

References

Loyd V. Allen, Nicholas G. Popovich, Howard C., Ansel's pharmaceutical dosage forms and drug delivery systems - Ansel – Medical, 2005.

Peter F. Sharp, H. G. Gemmell, Alison D. Murray, Practical nuclear medicine, Birkhäuser, 2005.

Gopal B. Saha, Fundamentals of nuclear pharmacy, 6th ed. 2010.

WHO Expert Committee on Specifications for Pharmaceutical Preparations - WHO Technical Report Series, No. 908 - Thirty-seventh Report, 2003.

FAR459/2: PHARMACOGENOMICS

Introduction to the role of pharmacogenomics in clinical pharmacy practice. The main focus is in the aspect of polymorphism and variability in drug responses.

Learning outcomes

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

- explain basic principles and clinical aspects of pharmacogenomics in the assessment of effective and adverse effects of drugs.
- identify the types of drugs possessing the genomic effects on drug action.
- recommend an appropriate treatment that is based on genomic information.

References

Martin M. Zdanowicz, Concepts in Pharmacogenomics, ASHP, 2010.
Federico Innocenti, Pharmacogenomics: Methods and Protocols , Humana Press, 2010.
Howard L McLeod, Pharmacogenomics: Applications to Patient Care, American College of Clinical Pharmacy, 2009.
Alan H. B. Wu, Kiang-Teck J. Yeo, Pharmacogenomic Testing in Current Clinical Practice: Implementation in the Clinical Laboratory, Springer, 2011.
Qing Yan, Pharmacogenomics in drug discovery and development, Humana Press, 2008.

FAR460/2: TRADITIONAL AND COMPLEMENTARY MEDICINE

With this course a pharmacy student will be exposed to the basic concept of Traditional and Complementary Medicine (T&CM) and the different types of T&CM services available in Malaysia. Students will also be exposed to the National T&CM Policy and T&CM Act which covers the expectation and the enforcement that come with them. Special focus would be given to the four main medical system as mentioned in the National T&CM Policy, ie. Traditional Malay Medicine, Traditional Chinese Medicine, Traditional Indian Medicine (Ayurvedic) and Homeopathic Medicine.

Some attention would also be given to other common Complementary Medicines, which are deemed reliable and safe. To improve students' comprehension, this course also scheduled some fieldwork to T&CM practice sites available in Pulau Pinang, Kedah and Perlis. These include T&CM Services at T&CM Units in various hospital in Ministry of Health Malaysia as well as Malay Traditional Medicine, Chinese Traditional Medicine, Indian Traditional Medicine and Homeopathic Medicine services, which are registered with T&CM Division of Ministry of Health Malaysia. To increase the effectiveness of the lecture delivery, in the early stage, some of the lectures would be delivered by T&CM Practitioners with specific expertise.

Learning outcomes

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

- explain the basic concept of T&CM, types of T&CM services available in Malaysia, and the national policy and Act on T&CM.
- explain the services available at the T&CM unit in the hospitals of Ministry of Health, Malaysia.
- discuss the varieties of Malays, Chinese, and Indian traditional medicine system, homeopathy medicine, and complementary medicine such as aromatherapy, chiropractic, flower therapy and reflexology.
- manage and integrate the roles of pharmacist in T&CM services.

References

Bodeker, G. and Ong, C. K. WHO global atlas of traditional, complementary and alternative medicine. Kobe, Japan: WHO Centre for Health Development, 2005.

Ahmad Abdul Rahman. *Perubatan Tradisional Melayu dan Islam*. Times Books International, 1995.

Lu Yubin, Liu Chengcai .*Concepts and theories of traditional Chinese medicine.* Science Press, 1998.

Lakshmi Chandra Mishra (editor) *Scientific basis for Ayurvedic therapies*. Boca Raton: CRC Press, 2004.

Mullen, Jose Miguel .*Understanding homeopathy and integrative medicine.* 1st Books Library, 2002.

Guidelines on developing consumer information on proper use of traditional, complementary and alternative medicine/World Heal. Geneva: World Health Organization, 2004.

Novey, Donald W. *Clinician's complete reference to complementary/alternative medicine*. St. Louis: Mosby, 2000.

Crellin, John K. *Professionalism and ethics in complementary and alternative medicine.* New York: Haworth Integrative Healing Press, 2001.

Muhammad Sani Harun. *Petua dan perubatan tradisional Melayu: amalan turun temurun*. Citakhidmat, Ampang, 1995.

Arif Kamal. *Perubatan Melayu tradisional & tumbuh-tumbuhan herba.* Petaling Jaya: Edu Tech, 2006.

Xie Zongwan, Zhao Zhongzhen, Huang Yiping. *Medicinal plants in China a selection of 150 commonly used species.* Manila: World Health Organization, Regional Office for the Western Pacific, 1989.

Beijing College of Traditional Chinese Medicine. *Essentials of Chinese acupuncture*. Sebastopol, CA: Foreign Language Press, 1993.

Harish Johari. *Ayurvedic massage traditional Indian techniques for balancing body and mind*. Rochester: Healing Arts Press, 1996.

M.S. Premila. *Ayurvedic herbs: a clinical guide to the healing plants of traditional Indian medicine*. New York, N.Y.: Haworth Press, 2006.

David Owen (editor). *Principles and practice of homeopathy: the therapeutic and healing process.* London: Churchill Livingstone, 2007.

Abdur Rehman (editor). *Encyclopedia of remedy relationships in homeopathy.* Germany: Thieme, 2005.

FAR461/2: HOSPITAL PHARMACY

This course provides students with broad perspective of pharmacy profession and hospital pharmacy practice. It provides students with knowledge and develops students' skill in the field of hospital pharmacy management, budgeting, inventory

control, the role of pharmacist in various hospital pharmacy committee, outpatient pharmacy service, parenteral nutrition service, cytotoxic drug reconstitution service, drug information service, therapeutic drug monitoring service, ward pharmacy service, drug counseling service, clinical pharmacy service and hospital pharmacy research through lectures, clerkships, OSPhE and case studies.

Learning outcomes

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

- know the roles of a pharmacist in a hospital.
- identify drug-related problems and design an alternative therapeutics.
- develop skills in parenteral nutrition, therapeutic drug monitoring, ward pharmacy, outpatient pharmacy, counseling and drug information services.

References

Handbook of Institutional Pharmacy Practice, Thomas R Brown and Micky C. Smith, Willian Wilkins, Baltimore, USA, 2006.

Perkhidmatan Pendispensan Aseptik dan Nutrisi Parenteral; Praktis Farmasi hospital – Panduan untuk Pelajar dan Profesional, Penerbit Universiti Sains Malaysia, Pulau Pinang, 2002.

Trissel, LA , Handbook of Injectable Drug, American Society of Health System Pharmacists, 16th Ed., Bethesda, USA, 2010.

Boh LE and Young, LL , Pharmacy Practice Manual: Guide to the Clinical Experience, Lippincort Williams Wilkins, USA, 2002.

Lipowsky EE, Campbell DE, Brushwood DB, Wilson D, Time Saving Associated with Dispensing Unit-of-use Package. The journal American Pharmaceutical Association 42(4), 577-581, 2002.

FAR462/2: COMMUNITY PHARMACY

This course will emphasize on the application of the principles of pharmaceutical care in community pharmacy practice. The main purpose is to build the ability and clinical skills to identify and solve problems related to minor illnesses and non-prescription therapeutics. Techniques to perform appropriate examination and patient assessment, as well as monitoring on non-prescription therapy will be discussed.

Learning outcomes

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

- apply the principles of pharmaceutical care in community pharmacy practice.
- develop effective clinical skills and talents to perform patient assessment, physical examination, patient consultation, and recommend non-prescription therapy.

- organize health screening and promotion program in community pharmacy services.
- show leadership skill in personnel, patient and management of pharmacy services.

References

Jones, R.M., dan Rospond, R.M. Patient assessment in pharmacy practice, Lippincott Williams & Wilkins, Philadelphia, 2003.

Tietze, K.J. Clinical skills for pharmacists. A patient-focused approach. 2nd ed., Mosby, Inc. Missouri, 2004.

Longe, R.L dan Calvert, J.C. Physical assessment. A guide for evaluating drug therapy, Applied Therapeutic, Inc. Washington, 1994.

Parthasarathi, G., Nyfort-Hansen, K., and Nahata, M. A textbook of clinical pharmacy practice. Essential concepts and skills, Universities Press, India, 2008.

Steven Pray W. Nonprescription product therapeutics, Lippincott Williams & Wilkins, 2006.

Elective Courses

FEL273/2: VETERINARY PHARMACY

The course aims at introducing students to etiology, sign and symptoms and treatment of common diseases in farm animals and pets using chemicals. Antibiotics that are used to control bacterial and coccidial infections, anthelmintics to control worm infection, antiseptics for cleaning wounds, vaccines as prophylaxis and treatment of viral/bacterial infection, insecticides to control insects from spreading diseases, minerals and vitamins for prophylaxis and treatment of metabolic and deficiency disorders are discussed. Besides that the mechanism of action of antibiotics, antibacterials and growth promoters to increase growth rate of farm animals, action of disinfectants to prevent an outbreak of a disease, special formulation and delivery system for intensive animal farming are also included.

Learning outcomes

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

- understand how infectious disease spread, pathophysiology, clinical signs, and treatment of common diseases of animals.
- describe the types of helminth found in animals, pathological effects of helminthes on their host and control of helminth using anthelmintics.
- explain and discuss the type of pest that invades farm animals, type of pesticides used in pest control programmes and method of application of the pesticides.
- explain and discuss the mechanism how antibiotics, antibacterials and anabolic agents acts as growth promoters.

- rationalise the economic advantages and problems that come with intensive farming.

References

Craig, R.A., Common disease of farm animals, General Books LLC, 2010.
Rivlere, J.E., Popich, M.g., Veterinary Pharmacy and Therapeutics, John Wiley and sons, 2009.
Kayne, S.B., Jepson, M.H., Veterinary Pharmacy, 1st Edition, Pharmaceutical Pr., 2004.
G.C. Brander, Chemicals for Animal Health Control, Taylor Francis, London, 1986.
Mohd Zamri Saad, Penyakit Kambing dan Bebiri, Dewan Bahasa dan Pustaka, 1991.
Ogilvie, T.H., Large animal Internal Medicine, Williams & Wilkins, London, 1998.

FEL274/2: HEALTH PROMOTION PHARMACY

This course provides students with the basic knowledge of health promotion, effective communication technique with professional and publics and to evaluate the need and outcome of a health promotion activity. In addition students will also developed the skill to select the best medium, plan, conduct and evaluate a health promotion activity.

Learning outcomes

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

- understand the needs and barrers in health promotion.
- plan for the health promotion activities.
- provide an effective health information to professionals and general public.
- evaluate the need and effect of a particular health promotion.

References

The Guide to Clinical Preventive Services 2009 Recommendations of the US Preventative Services Task Force, by Agency for Healthcare research and quality and advancing excellence in health care, USA, 2009.
Health Promotion Capacity Checklist: A Workbook for Individual, Organizational and Environmental Assessment, Prairie Region Health Promotion Research Centre University of Saskatchewan, Saskatoon, Saskatchewan, Canada,2004.
Health Promotion or Disease Prevention: A Real Difference for Public Health Practice? By Per-Anders Tengland, Health Care Anal, 23 September 2009.
Developing Internet-Based Health Promotion Programs: The Spiral Technology Action Research (STAR) Model, Harvey A Skinner, PhD.Oonagh Maley, MISt. Cameron D. Norman, Ph.D Health Promotion Practice, October 2006, Vol. 7, No. 4, 406-417.

Health Promotion in Community Pharmacy Country Report – Austria by Mag. Petra Plunger, MPH, Österreichische Apothekerkammer March 2001, WHO Collaborating Centre for Hospital and Health Promotion, Vienna Austria.
Handbook of Institutional Pharmacy, by TR Brown, American Society Health System Pharmacists, USA., 2006.
Textbook of Family Medicine, R.E. Rakel, WB Saunders, USA, 2007,

FEL373/2: DRUG MODELLING

This course is intended to expose the students to the drug development pipeline from laboratory to commercialisation with particular emphasis on drug discovery processes. It also covers the techniques used in rational drug design where molecular modelling and computational sciences methodologies are employed. Theories such as atomic, quantum and molecular mechanics, QSAR and bioinformatics will also be introduced.

Learning outcomes

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

- explain the use of *in silico* techniques to obtain new drug processes.
- perform the different techniques in designing drug rationally.
- explain the information required to perform modelling processes.

References

Jensen, J.H., Molecular Modeling Basics, CRC Press, 2010.
Gareth, T. Medicinal Chemistry: An Introduction. John Wiley & Sons, 2009.
Abraham, D.J., Burger's Medicinal Chemistry, Drug Discovery and Development, 6th Ed., Vol.2, Drug Discovery and Development, John Wiley & Sons, 2003.
Cohen, C. Guidebook on Molecular Modeling in Drug Design Ed. Academic Press, 1996.
Leach, A.R. Molecular Modelling: Principles and Applications, 2nd Ed. Longman, Singapore, 2001.
Hinchiffe, A., Molecular Modeling for Beginners, John Wiley & Sons, 2008.
Kubinyi, H.L., Drug Design, Theory,methods and Applications. ESCOM Publishers, 1993.
David, B. Troy, The Science and Practice of Pharmacy, 21st Ed., Remington, Lippincott Williams & Wilkins, 2005.

FEL374/2: DRUG AND SOCIETY

This course provides students with knowledge about common abusable drug, sign and symptoms of various type of drug abuse, couses the lead an individual becoms a drug addict, treatment of addiction of various drugs, and the effect of drug abuse to the society and country.

Learning outcomes

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

- appraise the role of pharmacist in the management of drug use in society.
- relates the sign and symptoms of drug addiction with the type of drugs to recognize individuals practicing irrational drug use or abuse.
- relate the effect of drug abuse to the society and recommends appropriate management drug abuse of various drugs.

References

Community Action on Drug Abuse Prevention, Alberta Alcohol and Drug Abuse Commission an Agency of the Government of Alberta, 2004.

Guide to Drug Abuse Epidemiology, Department Of Mental Health And Substance Dependence Noncommunicable Diseases And Mental Health Cluster World Health Organization, 2000.

Preventing Drug Use Among Children and Adolescents, A research Based guide for Parents, Educators and Community Leaders, 2nd Ed., US Department of Health and Human Services, National Institute of Health and National Institute of Drug Abuse, Bethesda, USA, 2003.

Principles of Drug Addiction Treatment – A Research Based Guide, October, National Institute of Health and National Institute of Drug Abuse, Bethesda, USA, 1999.

Waddington DR (ed). Sport, Health and Drugs – a critical sociological perspective London, E & FN Spoon, 2000.

ABC of Sport Medicine 2nd ed., Harris M, McLatchie G, Williams C and King J,:BMJ Books. UK, 2000.

FEL375/2: MALAY TRADITIONAL MEDICINE

This course will expose students to the history of Malay Traditional Medicine, basic concept of disease, diagnosis and treatment, and also the influence of Islam and other cultures into the system. This course would also exposed students to different categories of Malay Medicine practitioners, their different expertise and various services offered, lik Rukyah, massage service as wll as bone and joint setting, obstetric (pre and postnatal care), women health, men health, pediatric diseases, asthetis and circumcision. Also the treatment of some common diseases like: hipertension, diabetis, cancer, skin disease, parasitic infection, sinus, heamorrhoid and poisoning. Most important is the medicinal product (materia medica) used,

FEL472/4: RESEARCH EXERCISE

This course provides an exposure to the research and development field. Students are able to pursue their research in the subject of their interest with a supervisor of their choice.

Learning outcomes

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

- gather necessary literature and information to conduct their research project.
- organise and plan the data collecting as well as the report writing in the time available.
- execute the plan in a systemic, scientific and ethical manner.

FEL473/2: GERIATRIC PHARMACY

This course is an approach to learn varieties of disease and therapy among geriatric patients. The changes in pharmacokinetics and pharmacodynamics needs a proper monitoring parameter of rational drug used among geriatrics and to avoid complications that may occur. This course will expose pharmacy students towards problems in therapeutic care among geriatrics and the ways to avoid any complications.

Learning outcomes

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

- discuss the general concepts and principles behind the use of drugs and therapy in various geriatric diseases.
- recognize geriatric etiologies and their specific therapies.
- recognize the pharmacokinetic and pharmacodynamic changes in geriatrics and ways to overcome them.

References

Robert Kane, Joseph Ouslander, Itamar Abrass, Barbara Resnick, Essentials of Clinical Geriatrics: Sixth Edition, McGraw-Hill Professional; 6 edition, by (November 13, 2008).

Todd P. Semla, Judith L. Beizer, Martin D. Higbee Geriatric Dosage Handbook: Including Clinical Recommendations and Monitoring Guidelines; Lexi-Comp; 16 edition (October 2010).

Lisa C. Hutchison, Fundamentals of Geriatric Pharmacotherapy: An Evidence-Based Approach, American Society of Health-Systems Pharmacists; 1 edition (January 1, 2010).

The Washington Manual of Medical Therapeutics, 33rd Edition by Washington University School of Medicine Department of Medicine; Lippincott Williams & Wilkins; Thirty-Third edition (April 8, 2010).
Kathleen Flethcer, Handbook of geriatric drug therapy, Springhouse Publishing, 2009.
Jodi L. Teitelmen and Iris A. Parham. Fundamentals of geriatric for health professionals.Greenwood Publishing, 2009.
Lexi-Comp's Geriatric Dosage Handbook: Including Monitoring, Clinical Recommendations, and OBRA Guidelines, 11th Edition, 2006.
Cynthia G. Olsen, William N. Tindall, and Mark E. Clasen. Geriatric Pharmacotherapy: A Guide For The Helping Professional, Pharmaceutical Products Press; 2006.
Cassel CK, et. al., Geriatric medicines. eds. New York, Springer-Verlag, 1997.

FEL475/2: TOXICOLOGY

The course aims to provide students an introduction to principles of toxicology, toxicity mechanism, xenobiotic biotransformation and toxicokinetics. Subsequently, students will be taught aspects of organ directed and non-organ directed toxicities. Emphasis is placed on response of selected organs against toxic agents including genetic toxicology, developmental toxicology and carcinogen. Effects of common toxic agents on human body will also be discussed. Environmental toxicology and toxicology application will cover aspects of food, analytic/forensic, clinical, occupational and regulatory toxicology.

Learning outcomes

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

- describe principles of toxicology, mechanisms of toxicity, biotransformation of xenobiotics and toxicokinetics.
- explain environmental toxicology.
- correlate response of selected organs against non-organ targeted and organ targeted toxic agents including genetic toxicology, developmental toxicology and carcinogen.
- describe effects of common toxic agents on the human body.
- formulating the application of toxicology including aspects of food toxicology, analytic/ forensic toxicology, clinical toxicology, occupational toxicology and regulatory toxicology.

References

Hoboken, N.J. (2010) A textbook of modern toxicology. John Wiley & Sons.
John H.D., Howard.G.J.W. (2006) Fundamental mToxicology. RSC Publishing, Cambridge, U.K.
Richard C. Dart. (2004) Medical toxicology. Lippincott Williams & Wilkins, Philadelphia.

Gossel, T.A. (1984) Principles of clinical toxicology. Lippincott-Raven.
Timbrell, J.A. (1989) Introduction to toxicology. Routledge.
Hollinger, M.A. (1995) CRC handbook of toxicology. CRC Press.

FEL476/2: CURRENT TOPICS IN HUMAN PHYSIOLOGY

The course aims at introducing the students to the latest findings and trends in Human Physiology which forms the foundation behind the choices of therapies in disease states. Topics that will be discussed include current trends in gene therapy, stem cells and stem cell-based therapies, the melanocortin system and its role in metabolic diseases particularly in obesity and type 2 diabetes, reproductive health, proteomics and the regulation and roles of peripheral resistance vessels in blood pressure control.

Learning outcomes

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

- discuss current aspects in Human Physiology.
- identify the role of pharmacists in therapy based on recent findings in Human Physiology.
- display the capability to scientifically define and recognise recent findings in Human Physiology.

References

Ganong, William F., Review of Medical Physiology. 23rd edition. Mc Graw Hill, New York, 2010.
Guyton, Arthur C., Textbook of Medical Physiology. 11th edition. Saunders, Philadelphia, 2006.

FEL477/2: PERSONAL CARE

The role of a pharmacist in advising the use of personal care products especially in community pharmacy setting will be touched upon. The following topics will be covered in this course: The selection, importance and quality control of raw materials. The structure and physiology of skin. Skin-care products: skin wash, skin cleanser, skincare, sunblock, sunscreen and suntan products. The structure and physiology of hair. Hair-care products: shampoo, conditioner, perming and hair straightening agents, colours and hair spray. Coloured make-up preparations: for face, eyes, lips and nails. Source of body odour. deodorants and antiperspirants. Baby products. dental products: dental paste, dental powder, mouth wash, dental cleanser and denture adhesive. Perfumery: the origin and history of perfumery, types and classification of perfumes.

Quality assurance: raw materials, final products, packaging and containers, good laboratory practice, good manufacturing practice, protection of the environment for sustainable manufacturing. Regulatory aspects.

Learning outcomes

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

- formulate personal care products.
- explain the process needed for product registration.
- carry out market survey of personal care products.

References

Aulton, M.E., Pharmaceutics: The Science of Dosage Form Design. 2nd ed. Edinburgh: Churchill Livingstone, 2002.

Paye, M., Handbook of Cosmetic Science and Technology, Taylor & Francis Group, NY, USA, 2006.

Florence, A.T. and Attwood, D. Physicochemical Principles of Pharmacy, 4th edition, Pharmaceutical Press, 2006.

Sinko, P.J. and Martin, A. Martin's Physical Pharmacy and Pharmaceutical Sciences, 6th edition, Lippincott Williams & Wilkins, 2010.

Google on Cosmetic. (web site references on cosmetic preparation)

FEL478/2: PATIENT BED SIDE PHYSIOLOGY

This course gives insight into translational physiology to senior year pharmacy students. It consists of student centered learning module that fosters critical thinking and understanding of underlying pathophysiological changes occurring in a diseased state, with a special focus on chronic diseases. The students are trained to explain complex interactions of physiological principles that underlie the diseased states leading towards justification of the prescribed drugs based on these physiological principles.

Learning outcomes

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

- identify the mechanism of disease progression [physiological and pathophysiological changes] and relate them to the presenting symptoms and biochemical test results.
- integrate the physiological principles of various / all systems of the body leading to disease/presenting state of patient.
- present the observations to connect them with the presenting symptoms and biochemical test results and rationalize treatment options based on changes in normal physiology observed.

- review individual cases and research the causes of changes in normal physiology.

References

Physiology Case studies in Pharmacy (1st Edition) by Laurie Kelly McCorry, PhD.

8.0 INDEX

FAR341/4 - Respiratory, Renal, Blood Systems and Therapy (80)

FAR342/3 - Cardiovascular System and Therapy (81)

FAR343/2 - Gastrointestinal System and Therapy (82)

FAR344/4 - Central Nervous System and Therapy (83)

FAR346/2 - Applied Pharmacognosy (84)

FAR347/2 - Oncology Pharmacy (85)

FAR352/3 - Clinical Pharmacy Practice (86)

FAR353/2 - Applied Pharmacokinetic (87)

FAR381/0 - Forensic Pharmacy and Ethics (88)

FAR391/4 - Pharmacoepidemiology and Pharmacoeconomics in Developing Countries (88)

FAR411/2 - Advanced Pharmaceutical Analysis (89)

FAR422/2 - Advanced Drug Delivery (90)

FAR423/4 - Pharmaceutical Processing (91)

FAR424/4 - Industrial Pharmacy (92)

FAR425/6 - Industrial Training (93)

FAR453/3 - Applied Therapeutics I (94)

FAR454/3 - Applied Therapeutics II (95)

FAR457/2 - Medication Counseling Practice (96)

FAR458/2 - Nuclear Pharmacy (97)

FAR459/2 - Pharmacogenomics (97)

FAR460/2 - Traditional and Complementary Medicine (98)

FAR461/2 - Hospital Pharmacy (99)

FAR462/2 - Community Pharmacy (100)

Elective Courses: 24 Units

FEL273/2	-	Veterinary Pharmacy (101)
FEL274/2	-	Health Promotion Pharmacy (102)
FEL373/2	-	Drug Modelling (103)
FEL374/2	-	Drug and Society (104)
FEL375/2	-	Malay Traditional Medicine (104)
FEL472/4		Research Exercise (106)
FEL473/2	-	Geriatrics Pharmacy (106)
FEL475/2	-	Toxicology (107)
FEL476/2		Current Topics in Human Physiology (108)
FEL477/2	-	Personal Care (108)
FEL478/2		Patient Bed Side Physiology (109)

9.0 STUDENTS' FEEDBACK

The aim of this feedback form is to obtain students' response regarding the contents of this Guidebook. This information obtained will be useful in improving it.

Please respond to items 1 - 5 below based on the following 4-point scale.

1 - Strongly Disagree	2 - Disagree	3 - Agree	4 - Strongly Agree

Please circle the number.

1. This guidebook is very useful.

1	2	3	4

2. The information provided in this guidebook is accurate.

1	2	3	4

If you chose 1 or 2 for question no. 2, please state the page number that contains information that is inaccurate in the space below.

3. The information provided in this Guidebook is clear and easy to understand.

1	2	3	4

4. On the whole, the quality of this Guidebook as good.

1	2	3	4

5. I prefer to use CD compared to this Guidebook.

1	2	3	4

6. If you think other information should be included to make this Guidebook better, please write your suggestions in the space below.

Please submit this feedback form to your School's General Office in the 4th week of Semester 1, Academic Session 2017/2018