

Macao Polytechnic Institute
School of Health Sciences and Sports
Bachelor of Science in Biomedical Technology
(Pharmacy Technology)

Module Outline

Academic Year 2020 / 2021 Semester 2

Learning Module	Pharmacognosy		Class Code	BSPG2102
Pre-requisite(s)	Nil			
Medium of Instruction	English / Cantonese		Credit	4
Lecture Hours	48 hrs	Lab/Practice Hours	12 hrs	Total Hours 60 hrs
Instructor	Kenny Kuok, Lecturer		E-mail	cfkuok@ipm.edu.mo
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Description

This 60-hours learning module is one of the professional modules of the pharmacy technician program. This learning module introduces basic concepts for pharmacognosy, pharmaceutical botany and the chemistry of natural products. The external characteristics, chemical components, biogenesis and medical uses of selected crude drugs will be covered, and the identification and analytical methods for different types of the chemical ingredients in crude drugs will be introduced.

Learning Outcomes

After completing the learning module, students will be able to:

1. Familiar with the basic knowledge of pharmaceutical botanical and the usage of natural herbs;
2. Familiar with the sources, ingredients, properties and medical use of crude drugs;
3. Describe the definition, classification and preparation procedure for crude drugs;
4. Describe the active ingredients in crude drugs, and their chemical structures, properties and characteristics.

Content

1. Introduction to pharmacognosy (2 hours)
 - 1.1 *Definition of crude drugs*
 - 1.2 *Nomenclature for plants*
 - 1.3 *General descriptions for crude drugs*
 - 1.4 *Classifications for crude drugs and its components*

2. Carbohydrates and related compounds (6 hours)
 - 2.1 *Definition and chemical structure characteristics of carbohydrates*
 - 2.2 *Biogenesis of carbohydrates*
 - 2.3 *Monosaccharides*
 - 2.4 *Oligosaccharides*
 - 2.5 *Polysaccharides – Homoglycans and heteroglycans*

3. Glycosides and related compounds (4 hours)
 - 3.1 *Definition and biosynthesis of glycosides*
 - 3.2 *Classification of glycosides*
 - 3.3 *Glycoside-containing natural products*

4. Lipids and related compounds (4 hours)
 - 4.1 *Definition and biosynthesis of lipids*
 - 4.2 *Saturated, monounsaturated and polyunsaturated fixed oils*
 - 4.3 *Fats and related compounds*
 - 4.4 *Waxes and related compounds*

5. Terpenoids and related compounds (8 hours)
 - 5.1 *Definition and classifications of terpenoids*
 - 5.2 *Biosynthesis of terpenoids*
 - 5.3 *Triterpenoids – Saponins and cardiac glycosides*
 - 5.4 *Volatile oils and spices*
 - 5.5 *Resins and resin combinations*

6. Plant phenolic compounds (4 hours)
 - 6.1 *Definition and classifications of plant phenolic compounds*
 - 6.2 *Biosynthesis of plant phenolic compounds*
 - 6.3 *Simple phenolic compounds*
 - 6.4 *Tannins*
 - 6.5 *Flavonoids and related glycosides*
 - 6.6 *Anthraquinones and related glycosides*
 - 6.7 *Lignans, neolignans and lignins*

7. Alkaloids and related compounds (8 hours)
 - 7.1 *Definitions, classifications and characteristics of alkaloids*
 - 7.2 *Alkaloids derived from amination reactions*
 - 7.3 *Alkaloids derived from anthranilic acid*
 - 7.4 *Alkaloids derived from histidine*
 - 7.5 *Alkaloids derived from lysine*
 - 7.6 *Alkaloids derived from nicotinic acid*
 - 7.7 *Alkaloids derived from ornithine*
 - 7.8 *Alkaloids derived from tyrosine*
 - 7.9 *Alkaloids derived from tryptophan*
8. Extraction and separation methods for natural products (4 hours)
9. Active learning module (4 hours)

Practice (12 hours)

10. Experiments (8 hours)
 - 10.1 *Extraction and TLC analysis of crude drugs*
 - 10.2 *Column chromatography of crude drugs*
11. Visit (4 hours)

12. Test (2 class hours)

13. Examination (2 hours)

Teaching Method

Lectures, videos and experiments

Attendance

Attendance requirements are governed by the “Academic Regulations Governing Bachelor’s Degree Programmes of Macao Polytechnic Institute”. Students are not eligible to attend the final examination and re-sit examination if the absence rate exceeds 30%. Moreover, an “F” will be given as the final grade to students who have less than the stated attendance for this enrolled module. *Also, any students scoring less than 35% of the total mark in the final examination will be given an “F” grade for the course even if the overall grade is 50% or higher.*

Assessment

This learning module is graded on a 100 point scale, with 100 being the highest possible score and 50 being the passing score.

	Item	Description	Percentage	Submit Date
1.	Active learning module and report	Will be announced in class	10%	2021/05/14 (09:00-13:00)
2.	Experimental reports	Extraction and separation of crude drugs	20%	2021/04/30 (09:00-13:00) 2021/05/07 (09:00-13:00)
3.	Test	Will be announced in class	30%	2021/03/23 (09:00-11:00)
4.	Final exam	All material in this semester	40%	2021/05/21 (11:00-13:00)
Total Percentage:			100%	

Teaching Material(s)

Reference

Reference book(s)

Biren N. Shah, A.K. Seth (2013). *Textbook of Pharmacognosy and Phytochemistry* (2nd edition). Elsevier.

Ashutosh Kar. (2007). *Pharmacognosy and Pharmacobiotechnology* (Revised-expanded 2nd edition). New age international (P) Ltd.

William Charles Evans. (2009). *Trease and Evans' Pharmacognosy* (16th edition). Saunders Ltd.

Paul M. Dewick. (2002). *Medicinal natural products: a biosynthetic approach* (2nd edition). Wiley.