

Republic of Yemen
Ministry of Higher Education & Scientific Research
21 September University for Medicals and Applied Sciences



Faculty of Clinical Pharmacy

Bachelor of Clinical Pharmacy & Pharm. D.

Course Specification of **Pharmacognosy 2**

Course Code. (02.04.252)

2022



T4: This Template is Developed and Approved by CAQA-Yemen, 2023

Prepared by:	Reviewed by:	Head of the Department:	Quality Unit:	Dean
Dr. Salwa M.Raweh	Dr..labele noman		Dr. Abdulelah Thabet	Dr. Ali Alyahawi

I. General Information:

1.	Course Title:	Pharmacognosy 2			
2.	Course Code:	02.04.252			
3.	Credit Hours:	Credit Hours	Theory Contact Hours		Practical Contact Hours
			Lecture	Tutorial/Seminar	Lab Clinical
		4	2		2 --
4.	Level/ Semester at which this Course is offered:	2 nd Level / 2 nd Semesters			
5.	Pre –Requisite (if any):	Pharmacognosy 1			
6.	Co –Requisite (if any):	None			
7.	Program (s) in which the Course is Offered:	Bachelor of Clinical Pharmacy & Pharm. D			
8.	Language of Teaching the Course:	English			
9.	Location of Teaching the Course:	Faculty of Clinical Pharmacy			
10.	Prepared by:	Dr.Salwa M Raweh			
11.	Date and Number of Approval by Council:	2024			

II. Course Description:

This course is a continuation of Phytochemistry II that covers the therapeutic and pharmaceutical value of medicinal plants, the relevant chemical structures and the biosynthetic origin, methods of extraction, separation, purification, classification, and quantification of metabolites of natural products, and their biosynthetic origin: glycosides, sugars (mono, disaccharides, polysaccharides) and bitter principles, their properties and therapeutic values. Chromatography and its application in the analysis of medicinal plant constituents; practical applications of major method.

III. Course Intended Learning Outcomes (CILOs) : Upon successful completion of the course, students will be able to:		Referenced PILOs	
A. Knowledge and Understanding:		I, P or M/A	
a1	Identify the actions of the medicines within living systems, therapeutics uses of medicines in human, adverse reactions, interactions of medicines, toxicity, and misuse or abuse.		<u>A3</u>
a2	Describe the analytical methods, principles, design, development, and validation of pharmaceutical products.		A2
B. Intellectual Skills: Upon successful completion of the course, students will be able to:			
b1	Select appropriate Standard Operating Procedures (SOP) to conduct qualitative and quantitative analysis of pharmaceutical preparations.		B1, B2
b2	Apply pharmaceutical calculation in different pharmaceutical practice		B3
C. Professional and Practical Skills:			
c1	Operate different pharmaceutical equipment's and instruments and use emerging technologies in pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to Good Laboratory Practice (GLP) , Good Storage Practice (GSP) and cGMP guidelines.		C1
c2	. Extract, isolate, purify, identify, standardize, formulate natural products and assure their rational use.		C2
D. Transferable Skills:			
d1	Interact and communicate effectively and ethically with patients, public, and health care professionals.		D1
d2	Retrieve the essential references of evidence-based practice to achieve maximum clinical effectiveness.		D2
I= Introduced, P=Practiced or M/A= Mastered/Advanced			

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
a1	Identify the biosynthesis of secondary metabolites and major biosynthetic pathways	Interactive lectures Problems solving Small group discussions	Midterm exam -Final term exam -Quizzes
a2	Demonstrate appropriate knowledge and skills of the methods of Extraction and separation of natural plant constituents	Interactive lectures Problems solving Small group discussions ▪	Midterm exam -Final term exam -Quizzes ▪

(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
b1	Describe the physico-chemical properties of natural products	Interactive lectures Problems solving Small group discussions	Midterm exam -Final term exam -Quizzes
b2	Estimate the different active chemical constituents of the medicinal plants .	Interactive lectures Problems solving ▪ Small group discussions	Midterm exam -Final term exam ▪ -Quizzes

(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
c1	Use the basic laboratory equipment's and chemicals effectively and safely.	Lectures Seminars Discussions Lab Experiments Self Learning	Quizzes Midterm Exam Final Written Exam laboratory and other written reports ▪ Final Practical Exam
c2	Perform different laboratory procedures in the analysis of active constituents of natural sources.	Lectures Seminars Discussions Lab Experiments Self-Learning ▪	Quizzes Midterm Exam Final Written Exam laboratory and other written reports ▪ Final Practical Exam

(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:



Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Practice efficiency in a team, problem-solving, decision making and leadership characters	Discussion - Self Learning ▪ - Presentation	Research Oral discussion. ▪ Group work
d2	Use technology in recognize different resources and information.	Discussion ▪ Self Learning ▪ Presentation	Research Oral discussion. ▪ Group work

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Metabolic pathways in higher plants and their determination	– Study of utilization of radioactive isotopes in the investigation of Biogenetic studies	1	2	a1,a2,b1,b2,d2
2	Phenylpropanoids and Flavonoids	– General introduction, composition, chemistry & chemical classes, biosources, therapeutic ,uses and commercial applications	2	4	a1,a2,b1,b2,d2
3	Steroids, Cardiac Glycosides & Triterpenoids, saponins	▪ General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	2	4	a1,a2,b1,b2,d2
4	Volatile oils	▪ General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	2	4	a1,a2,b1,b2,d2
5	Mid exam	–	1	2	a,a2,b1,b2
6	Resins	▪ General introduction,	1	2	a,a2,b1,b2

Prepared by:
Dr. Salwa M.Raweh

Reviewed by:
Dr..labe noman

Head of the Department:

Quality Unit:
Dr. Abdulelah Thabet

Dean
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		composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications			
7	terpenoids & Naphthoquinones	General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	1	2	a1,a2,b1,b2,d2
8	Hallucinating drugs	- Introduction (definition of hallucinations, types and stages of hallucination) - Psychoactive plants: stimulants (cocaine, caffeine), Hallucinogens (Marijuana, LSD), depressants (opium), tobacco, ergot, Khat, nutmeg, Datura stramonium	1	2	a1,a2,b1,b2,d2
9	Anticancer drugs	- Introduction (definition, classification of drugs, cytostatic) - Anticancer plants : Peganum harmala (harmine, harmaline) Catharanthus roseus (vincristine, vinblastine) Colchicum autumnale (colchicine's) Taxus brevifolia (Taxol) Podophyllum resin (Podophyllotoxin, etoposide)	1	2	a1,a2,b1,b2,d2
10	Isolation, Identification and Analysis of Phytoconstituents	Resins: Podophyllotoxin, Curcumin.	1	2	a1,a2,b1,b2,d2



11	Industrial production, estimation and utilization of the following phytoconstituents	Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, ▪ Taxol, Vincristine and Vinblastine.	1	1	a1,a2,b1,b2,d2
12	Basics of Phytochemistry	▪ Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.	1	2	a1,a2,b1,b2,d2
16	Final Theoretical Exam		1	2	a,a2,b1,b2
Number of Weeks /and Units Per Semester			16	32	

B. Practical Aspect (Lab/Clinical) (if any):

No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	- Determine of glucose & sucrose in a mixture	1	2	c1,c2,d1,d2
2	- Determine of maltose & glucose in a mixture	1	2	c1,c2,d1,d2
3	- Thin Layer & Paper Chromatography Characterization of Flavonoids from citrus groups	1	2	c1,c2,d1,d2
4	- Determine of glucose & sucrose in a mixture	1	2	c1,c2,d1,d2
5	- Determine of maltose & glucose in a mixture	1	2	c1,c2,d1,d2
6	- Thin Layer & Paper Chromatography Characterization of Flavonoids from citrus groups	1	2	c1,c2,d1,d2
7	- Determine of glucose & sucrose in a mixture	1	2	c1,c2,d1,d2
8	- Determination of oxides in V.Oils. & identification	1	2	c1,c2,d1,d2

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No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
	of monosaccharides			
9	- Determine of phenols in V.Oils. & Ident. of non reducing disaccharides	1	2	c1,c2,d1,d2
10	- Determine of ester value in wintergreen oil & Indent. of reducing disaccharides	1	2	c1,c2,d1,d2
11	- Determine of peroxides in V.Oils. & Ident. of agar and starch	1	2	c1,c2,d1,d2
12	Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh.	4	8	c1,c2,d1,d2
13	- FINAL PRACTICAL EXAM	1	2	c1,c2
Number of Weeks /and Units Per Semester		15	30	

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Assignment 1 Search about drugs contain volatile oils	2	5	d1,d2,
2	Assignment 2: Written and Oral exams, Quizzes, homework, participation, Reports , and Practical examination, practical reports, Practical works and presentations	11	5	All CILOs
Total			10	5

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	10 th	10	10 %	a1,a2, b1,b2, c1, d1,d2,
2	Quizzes	6 th	5	5 %	a1,a2, b1,b2
3	Mid-Term Practical Exam	6 th	10	10 %	a1,a2, b1,b2, c1,c2
4	Mid-Term Theoretical Exam	7 th	10	10 %	a1,a2, b1,b2,d2
5	Final Practical Exam	15 th	15	15 %	,c1,c2
6	Final Theoretical Exam	16 th	50	50 %	a1,a2, b1,b2
Total			100	100%	

IX. Learning Resources:

1- Required Textbook(s):

- 1- Jarald E.E. and Jarald S. E.,(2017); "Textbook of Pharmacognosy and Phytochemistry", 2nd ed New Delhi : CBS Publishers & Distributors Pvt Ltd
- 2- Evans W.C., Evans D. & Trease E., Saunders "Trease and Evans (2009); 'Pharmacognosy' 16th ed. Elsevier, New York.

2- Essential References.

- 1- 1-Deema Nasser Hijjawi; Al Manhal FZLLC (2009). Pharmacognosy, 1st ed , Amman : Academic for Publishing and Distribution Co.
- 2- Chukwuebuka Egbuna (2018). Pharmacognosy, 1st ed, Toronto : Apple Academic Pr

3- Electronic Materials and Web Sites etc.

1 -Websites:

www.pubmed.com

- 3- <http://www.sciencedirect.com>

Other Web Sources:

- 4- <http://www.scifinder.com>

- 5- <http://www.scirus.com>

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X. Course Policies: (Based on the Uniform Students' By law (2007))

1	Class Attendance: Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	Tardiness: A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	Exam Attendance/Punctuality: No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	Assignments & Projects: Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	Cheating: Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	Forgery and Impersonation: Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	Other policies: The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Faculty of Clinical Pharmacy

Bachelor of Clinical Pharmacy & Pharm. D.

Course Plan (Syllabus) of **Pharmacognosy-II**

Course Code. 02.04.252

I. Information about Faculty Member Responsible for the Course:						
Name of Faculty Member:		Office Hours				
Location & Telephone No.:						
E-mail:	salraweh@gmail.com	SAT	SUN	MON	TUE	WED THU

2022- 2023

II. Course Identification and General Information:

11.	Course Title:	Pharmacognosy-II				
12.	Course Code:	02.04.252				
13.	Credit Hours:	Credit Hours	Theory Contact Hours		Practical Contact Hours	
			Lecture	Tutorial/Seminar	Lab	Clinical
		3	2		2	--
14.	Level/ Semester at which this Course is offered:	2 nd years / 2 nd Semester				
15.	Pre –Requisite (if any):	Pharmacognosy-I				
16.	Co –Requisite (if any):	-				
17.	Program (s) in which the Course is Offered:	Bachelor of Clinical Pharmacy & Pharm. D				
18.	Language of Teaching the Course:	English				
19.	Location of Teaching the Course:	Faculty of Clinical Pharmacy				
20.	Prepared by:	Dr. Salwa M. Raweh				
11	Date and Number of Approval by Council:	2022				

III. Course Description:

This course is a continuation of Phytochemistry II that covers the therapeutic and pharmaceutical value of medicinal plants, the relevant chemical structures and the biosynthetic origin, methods of extraction, separation, purification, classification, and quantification of metabolites of natural products, and their biosynthetic origin: glycosides, sugars (mono, disaccharides, polysaccharides) and bitter principles, their properties and therapeutic values. Chromatography and its application in the analysis of medicinal plant constituents; practical applications of major methods.

IV. Course Intended Learning Outcomes (CILOs) :

Upon successful completion of the Course, student will be able to:

A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:

- | | |
|----|--|
| a1 | Identify the biosynthesis of secondary metabolites and major biosynthetic pathways |
| a2 | Demonstrate appropriate knowledge and skills of the methods of Extraction and separation of natural plant constituents |

B. Intellectual Skills: : Upon successful completion of the course, students will be able to:

- | | |
|----|--|
| b1 | Describe the physico-chemical properties of natural products |
| b2 | Estimate the different active chemical constituents of the medicinal plants. |

C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:

- | | |
|----|--|
| c1 | Use the basic laboratory equipment's and chemicals effectively and safely. |
| c2 | Perform different laboratory procedures in the analysis of active constituents of natural sources. |

D. Transferable Skills: : Upon successful completion of the course, students will be able to:

- | | |
|----|---|
| d1 | Practice efficiency in a team, problem-solving, decision making and leadership characters |
| d2 | Use technology in recognize different resources and information. |

V. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	Metabolic pathways in higher plants and their determination	Study of utilization of radioactive isotopes in the investigation of Biogenetic studies	1	2
2	Phenylpropanoids and Flavonoids	General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and	2	4

		commercial applications		
3	Steroids, Cardiac Glycosides & Triterpenoids, saponins	General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	2	4
4	Volatile oils	General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	2	4
5	Mid exam	—	1	2
6	Resins	General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	1	2
7	terpenoids & Naphthoquinones	General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	1	2
8	Hallucinating drugs	- Introduction (definition of hallucinations, types and stages of hallucination) - Psychoactive plants: stimulants (cocaine, caffeine), Hallucinogens (Marijuana, LSD), depressants (opium), tobacco, ergot, Khat, nutmeg, Datura stramonium	1	2
9	Anticancer drugs	- Introduction (definition, classification of drugs, cytostatic) - Anticancer plants : Peganum harmala (harmine, harmaline) Catharanthus roseus (vincristine, vinblastine) Colchicum autumnale (colchicine's) Taxus	1	2

		brevifolia (Taxol) Podophyllum resin (Podophyllotoxin, etoposide)		
10	Isolation, Identification and Analysis of Phytoconstituents	Resins: Podophyllotoxin, Curcumin.	1	2
11	Industrial production, estimation and utilization of the following phytoconstituents	- Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, - Taxol, Vincristine and Vinblastine.	1	1
12	Basics of Phytochemistry	Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.	1	2
13	Final Theoretical Exam			
Number of Weeks /and Units Per Semester			16	32

B. Case Studies and Practical Aspect:			
No.	Tasks/ Experiments	Number of Weeks	Contact Hours
1	Determination. of glucose & sucrose in a mixture	1	2
2	Determination of maltose & glucose in a mixture	1	2
3	Thin Layer & Paper Chromatography Characterization of Flavonoids from citrus groups	1	2
4	Determination of oxides in V.O. & identification of monosaccharides	1	2
5	Determination of phenols in V.O. & Ident. of non-reducing disaccharides	1	2
6	Determination of ester value in wintergreen oil & Ident. of reducing disaccharides	1	2

7	▪ Determination of peroxides in V.O.& Ident. of agar and starch	1	2
8	▪ Determination of aldehydes in V.O. & Ident. of gum Arabic and gum Tragacanth	1	2
9	▪ Determination of ketones	1	2
10	▪ Separation of mixture of thymol and menthol and their identification	1	2
11	▪ Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh.	4	8
12	▪ FINAL PRACTICAL EXAM	1	2
Number of Weeks /and Units Per Semester		15	30

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	Metabolic pathways in higher plants and their determination	– Study of utilization of radioactive isotopes in the investigation of Biogenetic studies	1	2
2	Phenylpropanoids and Flavonoids	– General introduction, composition, chemistry & chemical classes, biosources, therapeutic ,uses and commercial applications	2	4
3	Steroids, Cardiac Glycosides & Triterpenoids, saponins	▪ General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	2	4
4	Volatile oils	▪ General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	2	4
5	Mid exam	–	1	2



No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
6	Resins	General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	1	2
7	terpenoids & Naphthoquinones	General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	1	2
8	Hallucinating drugs	- Introduction (definition of hallucinations, types and stages of hallucination) - Psychoactive plants: stimulants (cocaine, caffeine), Hallucinogens (Marijuana, LSD), depressants (opium), tobacco, ergot, Khat, nutmeg, Datura stramonium	1	2
9	Anticancer drugs	- Introduction (definition, classification of drugs, cytostatic) - Anticancer plants : Peganum harmala (harmine, harmaline) Catharanthus roseus (vincristine, vinblastine) Colchicum autumnale (colchicine's) Taxus brevifolia (Taxol) Podophyllum resin (Podophyllotoxin, etoposide)	1	2
10	Isolation, Identification and Analysis of Phytoconstituents	Resins: Podophyllotoxin, Curcumin.	1	2
11	Industrial production, estimation and	Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine,	1	1

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
	utilization of the following phytoconstituents	Taxol, Vincristine and Vinblastine.		
12	Basics of Phytochemistry	Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.	1	2
16	Final Theoretical Exam		1	2
Number of Weeks /and Units Per Semester			16	32

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	Metabolic pathways in higher plants and their determination	Study of utilization of radioactive isotopes in the investigation of Biogenetic studies	1	2
2	Phenylpropanoids and Flavonoids	General introduction, composition, chemistry & chemical classes, biosources, therapeutic ,uses and commercial applications	2	4
3	Steroids, Cardiac Glycosides & Triterpenoids, saponins	General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	2	4
4	Volatile oils	General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	2	4
5	Mid exam	—	1	2



No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
6	Resins	General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	1	2
7	terpenoids & Naphthoquinones	General introduction, composition, chemistry & chemical classes, BioSource's, therapeutic ,uses and commercial applications	1	2
8	Hallucinating drugs	- Introduction (definition of hallucinations, types and stages of hallucination) - Psychoactive plants: stimulants (cocaine, caffeine), Hallucinogens (Marijuana, LSD), depressants (opium), tobacco, ergot, Khat, nutmeg, Datura stramonium	1	2
9	Anticancer drugs	- Introduction (definition, classification of drugs, cytostatic) - Anticancer plants : Peganum harmala (harmine, harmaline) Catharanthus roseus (vincristine, vinblastine) Colchicum autumnale (colchicine's) Taxus brevifolia (Taxol) Podophyllum resin (Podophyllotoxin, etoposide)	1	2
10	Isolation, Identification and Analysis of Phytoconstituents	Resins: Podophyllotoxin, Curcumin.	1	2
11	Industrial production, estimation and	Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine,	1	1



No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
	utilization of the following phytoconstituents	Taxol, Vincristine and Vinblastine.		
12	Basics of Phytochemistry	Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.	1	2
16	Final Theoretical Exam		1	2
Number of Weeks /and Units Per Semester			16	32

No.	Tasks/ Experiments	Number of Weeks	Contact Hours
1	- Determine of glucose & sucrose in a mixture	1	2
2	- Determine of maltose & glucose in a mixture	1	2
3	- Thin Layer & Paper Chromatography Characterization of Flavonoids from citrus groups	1	2
4	- Determine of glucose & sucrose in a mixture	1	2
5	- Determine of maltose & glucose in a mixture	1	2
6	- Thin Layer & Paper Chromatography Characterization of Flavonoids from citrus groups	1	2
7	- Determine of glucose & sucrose in a mixture	1	2
8	- Determination of oxides in V.Oils. & identification of monosaccharides	1	2
9	- Determine of phenols in V.Oils. & Ident. of non reducing disaccharides	1	2
10	- Determine of ester value in wintergreen oil & Ident. of	1	2

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No.	Tasks/ Experiments	Number of Weeks	Contact Hours
	reducing disaccharides		
11	- Determine of peroxides in V.Oils. & Ident. of agar and starch	1	2
12	▪ Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh.	4	8
13	- FINAL PRACTICAL EXAM	1	2
Number of Weeks /and Units Per Semester		15	30

No.	Tasks/ Experiments	Number of Weeks	Contact Hours
1	- Determine of glucose & sucrose in a mixture	1	2
2	- Determine of maltose & glucose in a mixture	1	2
3	- Thin Layer & Paper Chromatography Characterization of Flavonoids from citrus groups	1	2
4	- Determine of glucose & sucrose in a mixture	1	2
5	- Determine of maltose & glucose in a mixture	1	2
6	- Thin Layer & Paper Chromatography Characterization of Flavonoids from citrus groups	1	2
7	- Determine of glucose & sucrose in a mixture	1	2
8	- Determination of oxides in V.Oils. & identification of monosaccharides	1	2
9	- Determine of phenols in V.Oils. & Ident. of non reducing disaccharides	1	2
10	- Determine of ester value in wintergreen oil & Ident. of reducing disaccharides	1	2
11	- Determine of peroxides in V.Oils. & Ident. of agar and	1	2

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No.	Tasks/ Experiments	Number of Weeks	Contact Hours
	starch		
12	Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh.	4	8
13	- FINAL PRACTICAL EXAM	1	2
Number of Weeks /and Units Per Semester		15	30

VI. Teaching Strategies of the Course:

- Lecture
- Instructor – student Interactive
- Exercises
- Presentation
- Office hours
- Seminar
- Assignment
- Self-Learning

VII. Assessment Methods of the Course:

خطأ! لم يتم العثور على مصدر المرجع.

- Assignments
- Quiz
- Exam
- Oral Presentation

VIII. Assignments:

No.	Assignments	Week Due	Mark
1	Assignment 1 Search about drugs contain volatile oils	2	5
2	Assignment 2: Written and Oral exams, Quizzes, homework, participation, Reports, and Practical examination, practical reports, Practical works and presentations	11	5
Total			10

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	Assignments	10th	10	10 %
2	Quizzes	6th	5	5 %
3	Mid-Term Practical Exam	6 th	10	10 %
4	Mid-Term Theoretical Exam	7th	10	10 %
5	Final Practical Exam	15th	15	15 %
6	Final Theoretical Exam	16th	50	50 %
Total			100	100%

X. Learning Resources:

1- Required Textbook(s):

- 1- Jarald E.E. and Jarald S. E.,(2017); "Textbook of Pharmacognosy and Phytochemistry", 2nd ed New Delhi : CBS Publishers & Distributors Pvt Ltd
- 2- Evans W.C., Evans D. & Trease E., Saunders "Trease and Evans(2009); 'Pharmacognosy' 16th ed. Elsevier, New York

2- Essential References.

- 1- 1-Deema Nasser Hijjawi; Al Manhal FZLLC(2009). Pharmacognosy, 1st ed, Amman : Academic for Publishing and Distribution Co.
- 2- Chukwuebuka Egbuna,(2018), Pharmacognosy, 1st ed, Toronto : Apple Academic Pr

3- Electronic Materials and Web Sites etc.

1 - Websites:

www.pubmed.com

3- <http://www.sciencedirect.com>

Other Web Sources:

1- <http://www.scifinder.com>

2- <http://www.scirus.com>

XI. Course Policies: (Based on the Uniform Students' Bylaw (2007))

1	Class Attendance: Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	Tardiness: A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	Exam Attendance/Punctuality: No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	Assignments & Projects: Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	Cheating: Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	Forgery and Impersonation: Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	Other policies: The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.