AL-YEMENIA UNIVERSITY
Pharmacy
Program Specification

Pharmacy Program Specification

1. Program Identification and General Information	
Program Title and degree	Bachelor in Pharmacy
Unit responsible to grant degree	Faculty of Medical Sciences
Unit responsible in program implementation	Department of Pharmacy
Program Type	Independent
Department / scientific departments participating in the program	Faculty of Medical Sciences
Program Study language	English and Arabic
Beginning of the study year	2016/2017
Program Attendance system	Compulsory Attendance
Program place implementation	University Campus
Program Study system	Semester
Time required to graduate	5 Years (173 Credit Hours)
Admission Qualifications	High School Degree
Admission Appreciation	70% at least
Program Coordinator Name	
last date approval for program specifications	

2. Vision, Mission & Aims of the University

- **Vision:**
  Getting the leadership and the excellence in the fields of higher education and scientific research so as to achieve the persistent development.

- **Mission:**
  Providing distinguished education of high quality through creating inspiring environment for education and intellectual creativity, and to support the scientific research in Yemen so as to fulfill the market needs nationally and regionally

- **Aims:**
  1) To be outstanding in providing the educational programs that equip the students with the knowledge and skills needed by the business market.
  2) Supporting and enhancing the scientific research theoretically and practically in the different fields.
  3) To be committed in applying the quality standards and looking for getting the academic accreditation.
  4) Providing the necessary infrastructure to support the educational process and motivating the students' activities.
  5) Improving the relationships with the universities and scientific research institutions nationally, regionally and internationally.
  6) Serving the society through establishing training and consultant centers.

3. Vision, Mission & Aims of the Faculty

- **Vision:**
  Leadership and excellence in the field science of pharmacy and medical laboratories locally, regionally and globally**.**

- **Mission:**
  Providing specialized educational programs of high quality in the fields of pharmacy and medical laboratories to improve healthcare services through educational programs in accordance with quality standards that can support national pharmaceutical industries, market needs and serve community

- **Aims:**
  1. To be excellence in the provision of educational programs in the areas of pharmacy and laboratories that earn the student necessary knowledge and skills to meet the needs of the labor market
  2. Encouraging and supporting scientific research in the fields of pharmacy and laboratories science.
  3. Providing educational environment of high quality in accordance with the modern techniques of education.
  4. Serve the community, manage the safe and efficient distribution of medications through practicing in an ethical, legal manner and according to the GMP and GPP guidelines.
  5. Performing students the pharmaceuticals qualitative and quantitative analytical techniques according to GLP and GPMP guidelines to assess the quality and quantity of raw materials from natural or synthetic sources and different pharmaceutical products.

4. Vision, Mission & Aims of the Department

- **Vision:**
  Leadership and excellence in the field of teaching pharmacy science locally and internationally

- **Mission:**
  To prepare graduates who are competent, professional and ethical in pharmaceutical science, offering and providing healthcare services in accordance with quality standards to provide the health-related needs of the society and be the first department is in Yemen in this field.

- **Aims:**
  1) Preparing specialized graduates in the field of pharmaceutical science, who are well-qualified at the academic and professional levels, in accordance with international quality assurance standards.
  2) Continue development of the department academic programs and updating them to cope with recent development of society and its needs.
  3) Developing a partnership with the public and private sectors by conducting studies and providing consultancy in information technology filed.
  4) Provide students with basic concepts and skills of research and develop their initiative and ability to carry out independent research as a basis for further postgraduate study in the field.
  5) Training students to think critically, communicate effectively and work in a team.

5. Program References

This program based on a number of similar references and programs in the Yemeni, regional and international universities, which include the following:

Academic Standards:

- National Academic Reference Standards for Health Sciences(NARS) which is based on Accreditation Council for Pharmacy Education (ACPE) http://naqaae.eg/wp-content/uploads/2014/10/NARS-Pharmacy-final-version.pdf

Government Guidelines

- Law No. (13/2005) concerning universities, higher institutes and private colleges and its executive regulations.
- Standards of the Council of Quality and Academic Accreditation.

Similar Programs:

#	University Name	Faculty	Department	Country	Program Accrediting Body	Univ. Website
1	University of Jordan	Faculty of Pharmacy	Department of Pharmacy	Jordan	ACPE	www.pharmacy.ju.edu.jo
2	Sharjah University	Pharmacy College	Department of Pharmacy	Sharjah. UAE	CCAP	www.sharjah.ac.ae
3	Ajman University	Pharmacy College	Department of Pharmacy	Ajman. UAE	CCAP	www.ajman.ac.ae
4	USM	Pharmacy College	Department of Pharmacy	Malaysia	MHE	www.pha.usm.my\pharmacy
5	Kansas University	Pharmacy College	Department of Pharmacy	Kansas. USA	ACPE	www.ku.edu
	University of Connecticut	Pharmacy College	Department of Pharmacy	Connecticut, USA	ACPE	www.pharmacy.uconn.edu

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6. Specification of the graduate student

The graduate of Pharmacy from the University has a distinguished profile of the graduates of the faculties of pharmacy in the other universities. This is based on the university's syllabus for the teaching of the Bachelor of Pharmacy, which is characterized by diversity and flexibility, focusing on practical courses and field training, in addition to extracurricular activities and self-confidence. The specifications of a graduate of the college of pharmacy can be detailed from the university as follows:

- It has a strong and distinctive scientific structure especially in the fields of chemistry and biology.
- Able to conduct experiments, necessary pharmaceutical calculations, prepare some pharmaceutical prescriptions according to the Good Laboratory Practice (GLP).
- Acquire extensive experience in the field of scientific, practical and research, enabling him to work in the pharmaceutical industries and laboratories in Drug Desiyn, discovery and analysis.
- Capable of establishing and managing private pharmaceutical projects.
- Able to provide medical care to patients, including selection of appropriate dose according to the patient's need as well as advise the patient about the use the drug and expected side effects to ensures patient's safety, benefit of treatment and reliable communication with the patient.
- Able to detect errors in prescriptions, as well as communicate and interact with patients and community
- Has an efficient communication and marketing skills to work as a medical advertising representative in pharmaceutical companies or medical warehouses.
- Is able to interact with the patient and diagnose certain diseases and find the necessary treatment according to the constitutions of medicines and the World Health Organization as provided by the ethics of medical professions as mentioned earlier.
- Is able to raise the level of health and develop the pharmaceutical sector in terms of pharmaceutical service and create new jobs serving the health sector in general and pharmacist in particular and strengthen the role of pharmacist in the community and supports the mutual trust between the pharmacist and his countrymen to live up to the profession under the current economic and political pressures on pharmacists in Yemen

- He has sufficient scientific knowledge and practical experience in all fields of pharmacy and subjects to enable him to complete his educational career in any high-level specialization he wants in prestigious international universities.
- Is able to work in the governmental sector in all its fields of hospitals, health centers, medical control and medical inspection, as the requirements of the Ministry of Health for these sensitive jobs is very accurate and under the pressure of strong competition.
- Is able to use paper references and electronic resources in addition to the use of technology to conduct research and draw conclusions related to pharmaceutical, medical and pharmaceutical, all the scope of his work.
- Is able to work in educational institutions, which requires a sufficient amount of medical and pharmaceutical knowledge in addition to the distinguished personality, which in turn enables the graduate of pharmacy, whatever the place where he competes to work to prove himself and achieve what is required in the fields of teaching and scientific research, thus achieving the desired excellence that qualifies him for development and advancement.
- The graduate of Pharmacy department enjoys a strong leadership, perseverance and ability to integrate and produce under the pressure of work and life, ensuring continuity in success, development and self-expression.

7. Intended Learning Outcomes:

At the end of this program student will:

A- Knowledge and understanding:

- **(A1)** Demonstrate knowledge of essential pharmaceutical sciences.
- **(A2)** Know basic principles of biopharmaceutic & pharmacokinetic , its application in therapeutic usage of medicine and bioequivalence studies.
- **(A3)** Acquire the required knowledge of all basic ,assisting or behavioral sciences.

B- Cognitive skills:

- **(B1)** Join the knowledge and understanding of principles related to pharmaceutical sciences
- **(B2)** Apply the pharmaceutical knowledge in designing safe & effective drug and dealing with novel drug delivery system(NDDS) and ability in applying modern scientific methods for analysis.
- **(B3)** Explain the stages of pharmaceutical industry & apply principles of good manufacturing practice(GMP) and choose the suitable methods of extraction ,manufacturing ,detecting and titration of active ingredient from their different sources.
- **(B4)** Detect the reasons of medical interaction in prescriptions to minimize medical errors and Classify drugs according to function ,chemical structure and detect their structure activity relationship (SAR) in addition to differentiate drug dosage forms.

C- Professional and practical skills:

- **(C1)** Calculate the suitable doses for each age ,sex or medical case & use the medical terms and Choose drugs depending on clear understanding of disease causes and give advice to individuals of community about safe and effective use of drugs (especially OTC drugs) in addition to practice skills of marketing.
- **(C2)** Extract , formulate ,manufacture , dispense drugs and perform quality control tests(Q.C) according to GMP .
- **(C3)** Use efficiently the laboratory instruments and devices required in preparation or analyzing.

- **(C4)** Perform required tests and bioequivalence studies.

D- General and transferal Skills:

- **(D1)** Communicate effectively with health care team and practice the marketing skills of medicines.
- **(D2)** Demonstrate transition from a dependent to an active self-directed learner and take evidence decisions based on regular practice of searching.
- **(D3)** Use effectively relevant and appropriate technologies to enhance learning and communication.

8. Teaching Strategy

It includes description of teaching strategies to achieve learning out comes of the program (lecture, seminar, laboratory, groups, ect. with description of how to use them and average of each of in every course

Teaching Strategy	Description of how it will be used
Lectures	It is the most frequently employed teaching method to convey knowledge and explain theories to students .
Seminars	These are mainly used with small groups of students discussing and negotiating the different concerns of their studies.
Lab experiments	Students doing practices in pharmaceutical sciences
Cooperative learning	Helps the students to work with each other so as to foster their abilities in problem-solving and creativity.
Field visits and training	Field visits to the pharmaceutical companies, medical laboratories and medical facilities .
Dialogue and discussion	Allowing the students to ask questions during the lecture
Training at computer labs	Used mainly in pharmaceutical laboratories, industrial plant and hospitals
Presentations	Helps the students to be more confident with themselves by showing what knowledge they have acquired
Self-learning	Self-learning is the process by which learners teach themselves
Training in Biochemical Labs	Students learn practical labs, and acquire skills in field of study

9. Assessment Strategy

Regulation and rules of setting for exams (do the program have its own regulations and rules and special conditions or it is according the faculty roles) Describe the way in which assessment is used across the program to achieve its teaching and learning outcomes

Assessment Strategy	Its description(in which course it will be used and in which rate)
Midterm tests	Closed – book examinations are used in all levels.
Final exam	Closed – book examinations are used in all.
Oral tests	This type of exams is allotted to test the oral proficiency of the students involved in the program.

Quizzes	This method of evaluation is used in most of the courses given in the program.
Reports' and projects evaluation.	Coursework such as "Research Papers"; reports; presentations used in many courses.
Interviews and evaluating the presentation	Most of the courses in the program will use these tasks to foster the students to work hardly and constantly.
Oral discussion.	These kinds of tasks are to be performed in the class in order to create in the students the sense of cooperation and team work.
Home Work	By Assignment individually or in group

10.Intended learning outcomes (ILOs) of the Program:

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

Program Intended Learning Outcomes	Teaching strategies	Assessment Strategies
A1, A2,A3	Lectures Practical Discussion Training	Midterm tests Final exam Oral tests Quizzes.

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

Program Intended Learning Outcomes	Teaching strategies	Assessment Strategies
B1 , B2, B3,B4	Theoretical Lectures Practical Lectures Discussion Presentations Brain Storm Problems solving. Training	Midterm tests Final exam Oral exam Quizzes Reports' presentation Oral discussion.

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

Program Intended Learning Outcomes	Teaching strategies	Assessment Strategies
C1, C2**, C3**,C4	Training Assignments Discussion Presentations Brain Storm Problems Solving	Midterm tests Final exam Oral exam Quizzes Reports' presentation Oral discussion.

(D) Alignment Program Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Program Intended Learning Outcomes	Teaching strategies	Assessment Strategies
D1, D2**,**D3	Assignment Lab experiments Field visits Training Presentations	Reports' presentation Oral discussion.

11. Curriculum Map

Write sub Learning Outcomes, attached it with the program specification document, it should be used as a base to write the curriculum map. The curriculum map will be designed in a table containing courses of the program. It should also indicate the relationships or contribution of each course in achieving the program main and sub-learning outcomes.

Program ILOs																
#	Course Code	Courses	Knowledge and Understanding			Intellectual Skills				Professional and Practical Skills				Transferable Skills		
			A1	A2	A3	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3
1	CEU1121	Physical Pharmacy	✓			✓	✓					✓	✓	✓	✓	✓
2	CR1213	Biostatistics			✓	✓	✓	✓		✓		✓		✓	✓	✓
3	CEU1222	Introduction to Pharmacy History			✓	✓								✓		
4	COG1231	Botany	✓			✓	✓					✓	✓	✓	✓	
5	CEU2123	Pharmaceutics 1	✓			✓	✓	✓	✓		✓		✓	✓	✓	✓
6	ASS2181	Immunology	✓		✓	✓								✓	✓	
7	CEU2124	Pharmaceutical Calculation			✓	✓				✓		✓		✓	✓	
8	MCH2252	Organic Chemistry 2			✓	✓	✓		✓			✓	✓	✓	✓	
9	ACH2272	Analytical Chemistry 2			✓	✓	✓	✓				✓	✓	✓	✓	
10	CEU2225	Pharmaceutics 2	✓			✓	✓		✓		✓	✓	✓	✓	✓	✓
11	ASS2282	Psychology			✓	✓								✓	✓	
12	MCH3253	Organic Chemistry 3			✓	✓	✓		✓			✓	✓	✓	✓	
13	ACH3173	Analytical Chemistry 3			✓	✓	✓					✓	✓	✓	✓	
14	COG3132	Pharmacognosy1	✓			✓	✓	✓			✓	✓	✓	✓	✓	✓
15	CEU3126	Pharmaceutics 3	✓			✓	✓		✓		✓	✓	✓	✓	✓	✓
16	ASS3183	Microbiology1		✓	✓	✓	✓					✓	✓	✓	✓	✓
17	ASS3184	Biochemistry 1		✓	✓	✓	✓					✓	✓	✓	✓	✓

18	MCH3254	Organic Chemistry 4			✓	✓	✓					✓	✓	✓	✓	✓
19	COG3233	Pharmacognosy2	✓			✓	✓	✓			✓	✓	✓	✓	✓	✓
20	CEU3227	Pharmaceutics 4	✓			✓	✓				✓		✓	✓	✓	✓
21	ASS3285	Microbiology2		✓	✓	✓	✓			✓		✓	✓	✓	✓	✓
22	ASS3286	Biochemistry 2		✓	✓	✓	✓			✓		✓	✓	✓	✓	✓
23	COL3241	Pharmacology 1	✓	✓		✓			✓	✓				✓	✓	
24	MCH4155	Medicinal Chemistry 1	✓	✓		✓	✓		✓			✓	✓	✓	✓	✓
25	COG4134	Phytochemistry 1	✓			✓	✓		✓			✓	✓	✓	✓	✓
26	CEU4128	Biopharmaceutics & Pharmacokinetic 1	✓	✓	✓	✓							✓	✓	✓	✓
27	COL4142	Pharmcology2	✓	✓		✓			✓	✓				✓	✓	
28	ASS4187	Pathology		✓	✓	✓								✓	✓	
29	COL4143	Toxicology			✓	✓	✓						✓	✓	✓	
30	MCH4256	Medicinal Chemistry 2	✓	✓		✓	✓		✓			✓	✓	✓	✓	✓
31	COG4235	Photochemistry 2	✓			✓	✓		✓			✓	✓	✓	✓	✓
32	CEU4229	Biopharmaceutics & Pharmacokinetic 2	✓	✓		✓	✓					✓	✓	✓	✓	✓
33	COL4244	Pharmcology3	✓	✓		✓			✓	✓				✓	✓	
34	ASS4288	Parasitology			✓	✓								✓	✓	
35	MCH5157	Medicinal Chemistry 3	✓			✓	✓		✓			✓	✓	✓	✓	✓
36	COG5136	Applied Phrmacognosy	✓			✓	✓	✓			✓	✓	✓	✓	✓	✓
37	MAC5163	Clinical Pharmacy 1	✓			✓			✓	✓				✓	✓	
38	COL5145	Pharmacology 4	✓	✓		✓			✓	✓				✓	✓	
39	MAC5161	Industrial Pharmacy 1	✓			✓	✓	✓			✓	✓	✓	✓	✓	✓
40	MAC5165	Quality control	✓			✓					✓	✓	✓	✓	✓	✓
41	MAC5166	Community Pharmacy	✓			✓				✓				✓	✓	
42	MCH5258	Medicinal Chemistry 4	✓			✓	✓		✓			✓	✓	✓	✓	✓
43	MAC5267	Hospital Pharmacy	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓
44	MAC5264	Clinical Pharmacy 2	✓			✓			✓	✓				✓	✓	

45	MCH5259	Drug Desiyn	✓			✓			✓	✓				✓	✓	✓
46	MAC5262	Industrial Pharmacy 2	✓			✓	✓	✓			✓	✓	✓	✓	✓	✓
47	ASS5289	Drug Marketing	✓		✓	✓				✓				✓		
48	CEU5230	Cosmetics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
49	ER5281	Graduation Project				✓				✓	✓	✓	✓	✓	✓	✓

12. Program Study System

- Time required to complete the program
- Number of hours and percentage of total program hours distributed as a whole

Credit hours	No. Of Credit hours	Percentage of total program hours
University Requirements	12	07%
Faculty Requirements	27	16%
Program Requirements	134	77%
Total Program Credit Hours	173	100%

13. Admission Requirements

Specify the criteria of admission in the program process, such as percentage of secondary school, audition, placement tests, or interview.

- Student must be got Secondary science certificate (at least **70%)**.
- Original documents and going throw admission process.
- Pass the assessment and testing of the admission or personal interview committee under the applicable regulations.
- Completing university admission application form
- Payment of the tuition fees specified in the Financial Regulations at the beginning of the academic year.
- The applicant has not been dismissed from any other university due disciplinary reasons.
- No admission allowed in two program at the same time.

14. Attendance requirements

Clarifying the rules and regulations which specify conditions of progression from level to other in order to proceed to the next year. rules and regulations to drop out or to transfer to another program in the same faculty.

All roles are taken from the Univ. system for student affairs and we notice on the main points:

- Pass all courses with maximum mark percent 100% and minimum mark percent 50%
- For practical courses student most pass the 2 parts theoretical and practical
  - Pass theoretical part with minimum mark percent 35%
  - Pass practical part with minimum mark percent 35%
  - The total mark for the 2 parts not less than 50%
- Student goes from study level to the next with no more than 3 failed courses

15. Graduation Requirements

Clarifying the rules and regulations which specify conditions of the graduation from the program

- Must pass all courses with total credit hours 159 hours
- Minimal limit of marks to pass in each of the program courses:50 Marks
- Successful Completion of Graduation Project.

16. Study Guidance Plan

First components of the study plan

The study plan in the Department of pharmacy consists of **(173 credit** hours) distributed as follows in the table

#	Requirement Type	Credit Hours
1	University Requirement	12
2	Faculty Requirement	27
3	Program Requirement	134
Total of credit hours		173

Second University Requirement

#	Course Code	Course Name	Credit. Hours
1	UR1102	Arabic language101	2
2	UR1104	English language 1	2
3	UR1101	Islamic culture	2
4	UR1201	Arabic Language 102	2
5	UR1205	English Language 2	2
6	UR1206	Introduction To Computer	2
Total of credit hours			12

Third Faculty Requirement

#	Course Code	Course Name	Credit. Hours
1	CR1111	Biology	3
2	CR1112	General Chemistry	3
3	CR2114	Physiology 1	2
4	CR2115	Anatomy	2
5	MCH2151	Organic Chemistry 1	3
6	ACH2171	Analytical Chemistry 1	3
7	CR2216	Physiology 2	2
8	CR2217	Histology	3
9	CR4118	First Aids	2
10	CR4219	Public Health	2
11	CR5220	Research Methodology	2

Total of credit hours	27

Forth Program Requirement

	Course Code	Course Name	Credit. Hours
1	CEU1121	Physical Pharmacy	3
2	CR1213	Biostatistics	2
3	CEU1222	Introduction to Pharmacy history	2
4	COG1231	Botany	3
5	CEU2123	Pharmaceutics 1	3
6	ASS2181	Immunology and serology	2
7	CEU2124	Pharmaceutical Calculation	2
8	MCH2252	Organic Chemistry 2	3
9	ACH2272	Analytical Chemistry 2	3
10	CEU2225	Pharmaceutics 2	3
11	ASS2282	Psychology	2
12	MCH3253	Organic Chemistry 3	3
13	ACH3173	Analytical Chemistry 3	3
14	COG3132	Pharmacognosy1	3
15	CEU3126	Pharmaceutics 3	3
16	ASS3183	Microbiology1	3
17	ASS3184	Biochemistry 1	3
18	MCH3254	Organic Chemistry 4	3
19	COG3233	Pharmacognosy2	3
20	CEU3227	Pharmaceutics 4	3
21	ASS3285	Microbiology2	3
22	ASS3286	Biochemistry 2	3
23	COL3241	Pharmacology 1	2
24	MCH4155	Medicinal Chemistry 1	3
25	COG4134	Phytochemistry 1	3
26	CEU4128	Biopharmaceutics & Pharmacokinetic 1	3

27	COL4142	Pharmcology2	2
28	ASS4187	Pathology	2
29	COL4143	Toxicology	3
30	MCH4256	Medicinal Chemistry 2	3
31	COG4235	Photochemistry 2	3
32	CEU4229	Biopharmaceutics & Pharmacokinetic 2	2
33	COL4244	Pharmcology3	2
34	ASS4288	Parasitology	3
35	MCH5157	Medicinal Chemistry 3	3
36	COG5136	Applied Phrmacognosy	3
37	MAC5163	Clinical Pharmacy 1	3
38	COL5145	Pharmacology 4	2
39	MAC5161	Industrial Pharmacy 1	3
40	MAC5165	Quality control	3
41	MAC5166	Community Pharmacy	3
42	MCH5258	Medicinal Chemistry 4	3
43	MAC5267	Hospital Pharmacy	2
44	MAC5264	Clinical Pharmacy 2	3
45	MCH5259	Drug Desiyn	2
46	MAC5262	Industrial Pharmacy 2	3
47	ASS5289	Drug Marketing	2
48	CEU5230	Cosmetics	3
49	ER5281	Graduation Project	4
Total of credit hours			134

Fifth Semesters Plans for the Bachelor of Pharmacy Program (173 credit hours

Year 1 (Semester 1)

#	Course Code	First Year / First Semester	Credit Hours				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	CEU1121	Physical Pharmacy	2		2		3
2	CR1112	General Chemistry	2		2		3
3	CR1111	Biology	2		2		3
4	UR1104	English language 1	2				2
5	UR1101	Islamic culture	2				2
6	UR1102	Arabic language101	2				2
Total of Credit Hours			15				

Year 1 (Semester 2)

#	Course Code	First Year/ Second Semester	Credit Hours				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	COG1231	Botany	2		2		3
2	CEU1222	Introduction To Pharmacy History	2				2
3	CR1213	Biostatistics	2				2
4	UR1206	Introduction To Computer	2				2
5	UR1205	English Language 2	2				2
6	UR1201	Arabic Language102	2				2
Total of Credit Hours			13				

Year 2 (Semester 1)

#	Course Code	Second Year/ First Semester	Credit Hours				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	CEU2124	Pharmaceutical Calculation	2				2
2	ACH2171	Analytical Chemistry1	2		2		3
3	ASS2181	Immunology& serology	2				2
4	CEU2123	Pharmaceutics 1	2		2		3
5	MCH2151	Organic Chemistry 1	2		2		3
6	CR2115	Anatomy	2				2
7	CR2114	Physiology 1	2				2
Total of Credit Hours			17				

Year 2 (Semester 2)

#	Course Code	Second Year / Second Semester	Credit Hours				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	ASS2282	Psychology	2				2
2	ACH2272	Analytical Chemistry2	2		2		3
3	CEU2225	Pharmaceutics 2	2		2		3
4	MCH2252	Organic Chemistry 2	2		2		3
5	CR2217	Histology	2		2		3
6	CR2216	Physiology 2	2				2
Total of Credit Hours			16				

Year 3 (Semester 1)

#	Course Code	Third Year / First Semester	Credit Hours				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	ASS3183	Microbiology1	2		2		3
2	ASS3184	Biochemistry 1	2		2		3
3	CEU3126	Pharmaceutics 3	2		2		3
4	COG3132	Pharmacognosy1	2		2		3
5	ACH3173	Analytical Chemistry 3	2		2		3
6	MCH3253	Organic Chemistry 3	2		2		3
Total of Credit Hours			18				

Year 3 (Semester 2)

#	Course Code	Third Year / Second Semester	Credit Hours				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	ASS3285	Microbiology2	2		2		3
2	ASS3286	Biochemistry 2	2		2		3
3	COL3241	Pharmacology 1	2				2
4	CEU3227	Pharmaceutics 4	2		2		3
5	COG3233	Pharmacognosy2	2		2		3
6	MCH3254	Organic Chemistry 4	2		2		3
Total of Credit Hours			17				

Year 4 (Semester 1)

#	Course Code	Fourth Year / First Semester	Credit Hours				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	COL4142	Pharmcology2	2				2
2	CR4118	First Aids	2				2
3	COL4143	Toxicology	2		2		3
4	ASS4187	Pathology	2				2
5	CEU4128	Biopharmaceutics & Pharmacokinetic 1	2		2		3
6	COG4134	Phytochemistry 1	2		2		3
7	MCH4155	Medicinal Chemistry 1	2		2		3
Total of Credit Hours			18				

Year 4 (Semester 2)

#	Course Code	Fourth Year / Second Semester	Credit Hours				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	CR4219	Public Health	2				2
2	ASS4288	Parasitology	2		2		3
3	COL4244	Pharmcology3	2				2
4	CEU4229	Biopharmaceutics & Pharmacokinetic 2	2				2
5	COG4235	Phytochemistry 2	2		2		3
6	MCH4256	Medicinal Chemistry 2	2		2		3
Total of Credit Hours			15				

Year 4 (Summer Semester)

#	Course Code	**Level 4 / summer course**	Contact Hours				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	PH4246	**Field Training (Three Months)**					

Year 5 (Semester 1)

#	Course Code	Fifth Year / First Semester	Credit Hours				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	COG5136	Applied Pharmacognosy	2		2		3
2	MAC5166	Community Pharmacy	2		2		3
3	MAC5165	Quality control	2		2		3
4	MAC5161	Industrial Pharmacy 1	2		2		3
5	COL5145	Pharmacology 4	2				2
6	MAC5163	Clinical Pharmacy 1	2		2		3
7	MCH5157	Medicinal Chemistry 3	2		2		3
Total of Credit Hours			20				

Year 5 (Semester 2)

#	Course Code	Fifth Year / Second Semester	Credit Hours				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	CEU5230	Cosmetics	2		2		3
2	MCH5259	Drug Desiyn	2				2
3	ASS5289	Drug Marketing	2				2
4	MAC5264	Clinical Pharmacy 2	2		2		3
5	MAC5267	Hospital Pharmacy	2				2
6	MAC5262	Industrial Pharmacy 2	2		2		3
7	MCH5258	Medicinal Chemistry 4	2		2		3
8	CR5220	Research Methodology	2				2
9	ER5281	Graduation Project			8		4
Total of Credit Hours			24				

Year 5 (Summer Semester)

#	Course Code	**Level 5 / summer course**	Contact Hours				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	PH5247	**Field Training (Three Months)**					

17. Facilities required to implement the program

a. Learning Resources:
- Books
- Journals and periodicals
- Thesis (Master + PhD)
- Articles and research in the web.
- Electronic library.

b. Equipment, tools and educational materials
- Projectors
- Classrooms
- Wi-Fi internet
- Labs equipped

18.Evaluation and improvement of the program

- **Evaluation of the learning outcomes of the program:**

#	Evaluation Tool	Program Intended learning outcomes
1	Graduation Tracking	Knowledge, understanding and general skills
2	assessment	Knowledge, understanding and mental skills

Program Coordinator:

Head of Department:

University's president:

Curriculum Specifications Of The Program

First Year
First Semester

Course specification of Islamic culture

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Islamic culture**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	First Year / First Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	Arabic				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

I- وصف المقرر

: صمم هذا المقرر لتزود الطالب بالمعارف والمهارات والاتجاهات السلوكية اللازمة في مجال الأخلاقيات الإسلامية المهنية والتي تمكنه من التحلي بأخلاقيات الإسلام والصفات التي تميزه عن غيره من الناس في هذا المجال والابتعاد عن المفسدات ومحاوله تعزيز الثوابت وأزاله السلبيات.

الأهداف التعليمية: -

1. يكتسب المفاهيم العامة للأخلاقيات الجيدة وأثرها في حياة الفرد.
2. يعدد مبادئ وتعاليم الإسلام ومصادرها وأسسها.
3. يحدد الأخلاقيات التي يدعو الإسلام إليها ويتحلى بها.
4. يشرح رأي الإسلام في القضايا المعاصرة ويقدم الحلول لها.
5. يثقف المجتمع حول العادات الضارة التي ظهرت فيه.
6. يلم بالقوانين الطبية واللوائح المنظمة للمهنة.
7. يدرك أهمية تجنب الأخطاء في المهنة وعقوبتها وفق القانون والشرع.
8. يتحلى بما يدعو إليه الإسلام من أخلاقيات وسلوك.
9. يستشعر عظمه الله وشرعه في تنظيم الحياة للإنسان في هذه المعمورة.

III – مخرجات تعلم المقرر

بعد الانتهاء من هذا المقرر سيكون الطالب قادرا على أن :

مخرجات المعرفة والفهم:

a1. يبين مدى تميز الأمة الإسلامية بثقافة عريقة بين الثقافات البشرية في مقوماتها وعناصرها وخصائصها.

a2. يصف موقف الإسلام من قضايا العصر في مجالات العلوم النظرية والتطبيقية المختلفة ويناقشها من المنظور الإسلامي.

المهارات الذهنية

b1 .يفرق بين الثقافة الإسلامية وغيرها من الثقافات و يستنتج مساوئ الثقافات الأخرى.

المهارات العملية و المهنية

c1.يطبق القوانين الطبية واللوائح المنظمة للمهنة و يتجنب الأخطاء في المهنة وعقوبتها وفق القانون والشرع.

المهارات العامة

d1 .يطور مهارة النقد الهادف والبناء والحوار والمناقشة مع الآخرين .

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• أسس العقيدة الإسلامية وأثرها التربوي (أركان الإسلام، الإيمان، والإحسان) • مصادر التشريع الإسلامي ومقاصدها • أخلاق يدعو الإسلام إليها: - الصدق - الأمانة - الإخلاص في العمل والعبادة - السرية - الإتقان في العمل - الأخلاق الفاضلة • *الإسلام والمرأة* • *الشورى في الإسلام* • حقوق الإنسان في الإسلام • هدى الإسلام في الصحة والحفاظ عليها • *اثأر الغزو الفكري*	6	3
2	• مفهوم وأهمية ومصادر علم أخلاقيات المهنة ○ المفهوم ○ الأهمية ○ المصادر	4	2
3	• الأبعاد الجديدة لعلم الأخلاقيات المهنية في نظر الإسلام: • أخلاقيات المهنة	6	3

	• حكم الإسلام وأخلاقيات في: (الإجهاض التجميل، نقل الدم والأعضاء، الاستنساخ، منع الحمل، تشريح الجثث، الموت الرحيم، الدواء والصوم، الأدوية والإدمان، التداوي بالأعشاب والرقي.)		
4	• **المبادئ الأخلاقية الأساسية في الممارسة المخبرية:** - مبدأ الإخلاص والولاء لله لما يخدم المريض. - مبدأ عدم الإضرار بالمريض - مبدأ قول الحقيقة والمحافظة على أسرار المريض - إخلاص النية لله في كل عمل تقوم به للمريض حتى تنال الأجر من الله.	**4**	**2**
5	• **العوامل المؤثرة على العلاقة بين الطب التشخيصي والمريض:** - المرض والمعرفة - الخصائص الشخصية لكل من الصيدلي والمريض - الإطار الذي تم فيه هذه العلاقة - لعلاقة الإيجابية/السلبية - العلاقة التوجيهية/المتعاونة المشاركة/ المتبادلة	**4**	**2**
6	• **بعض المشكلات المعاصرة وكيفية حلها في الإسلام:** - سوء التغذية - انتشار الأمراض - حكم وأثر ممارسه العادات الضارة: (المخدرات – المهدئات – اللواط -العادة السرية.....الخ)	**4**	**2**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1- Lectures
2- Tutorial

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F- REFERENCES:

- المدخل إلى الثقافة الإسلامية : د . محمد رشاد سالم ، دار القلم ، الكويت ، الطبعة التاسعة ، 1407هـ .
- الثقافة الإسلامية د/حسن الاهدل، د/ عبد الحكيم.

Course specification of Arabic language 101

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	Course Title:	Arabic language 101				
2	Credit hours:	C.H				Total
		Theoretical	Practical	Training	Seminar	
		2				2
3	Study level/ semester at which this course is offered:	First Year / First Semester				
4	Pre –requisite (if any):					
5	Co –requisite (if any):					
6	Program (s) in which the course is offered:	Bachelor of Pharmacy				
7	Language of teaching the course:	Arabic				
8	The department in which the course is offered:	pharmacy				
9	Location of teaching the course:	Faculty of medical scientists – AL-Yemenia University				
10	Prepared by:					
11	Date of approval:					

B- PROFISIONAL INFORMATION:

وصف المقرر: صمم هذا المقرر ليزود الطالب بالمعارف والمهارات والاتجاهات السلوكية اللازمة في مجال اللغة العربية والتي تمكنه من تفادي الأخطاء في الكتابة حتى يتسنى له الكتابة الصحيحة عند تعلمه وكتابته للاختبارات والمحاضرات.

الأهداف التعليمية: -

عند نهاية المقرر سيكون الطالب قادراً على أن: -

1. **يعدد أقسام الكلام والأخطاء الإملائية الشائعة**
2. **يستخرج أسلوب الاستثناء والحال والتمييز**
3. **يقوم بالبحث في المعاجم عن أصول الكلمات**
4. **يستطيع رسم الهمزة وعلامة الترقيم.**
5. **يفرق بين المبتدأ والخبر**
6. **يحدد النواحي الأدبية في الجوانب الشعرية**
7. **يستخرج التوابع اللغوية.**
8. **يتمكن من كتابه وقراءه التقارير والرسائل العلمية بصوره بلاغيه ووضوح تام.**

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. تعريف كل من لأسماء الظاهرة المعربة والمبنية والمبتدأ والخبر.
a2. القدرة على كتابة الرسالة الإدارية والتقارير والسيرة الذاتية.
a3. توضيح الحكم الإعرابي للفعل والفاعل. والإلمام بأشهر أبواب النحو التي يستقيم بها اللسان ويعتبر من سلامة القول منطوقاً ومكتوباً.

B-Intellectual Skills:

b1. الذوق الأدبي من خلال الاطلاع على أشهر النصوص الأدبية.
b2. تمييز الفروق اللغوية بين التراكيب، والعبارات، والجمل الواردة في كل نص لغوي.
b3. تحليل النصوص الأدبية تحليلا لغويا سليما.

C-Practical Skills:

c1. استخراج المبتدأ والخبر والفعل والفاعل من نص لغوي وإعرابهما.
c2. إعراب الأسماء والأفعال المبنية والأسماء والأفعال المعربة إعرابًا صحيحًا.

D-General Skills and Attitudes:

d1. العمل بفعالية مع زملائه بروح الفريق الواحد أثناء تحليل النص اللغوي داخل القاعة الدراسية.
d2. تطوير قدراته الذاتية من خلال استخدام مصادر التعلم المختلفة ومنها الانترنت.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• أقسام الكلام والأخطاء اللغوية - الإملائية الشائعة • من الأدب الجاهلي: - معلقه طرفه. - شعر الصعاليك (تأبط شرا) • من أمثال العرب • خطبه حجه الوداع • علامة الإعراب علامات الترقيم	10	5
2	• المبتدأ والخبر • الشعر والأدب: - المقامة العلمية - سحر الربيع - رثاء الأندلس - قافلة لضياع (بدر شاكر)	6	3
3	• التوابع • الأدب المعاصر والابتهالات • أسلوب الاستثناء • الحال والتمييز • البحث في المعاجم • رسم الهمزة • نماذج من التقارير والرسائل العلمية.	12	6

	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understand

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F- REFERENCES:

1- **اللغة العربية (نصوص أدبيه وتطبيقات نحويه-متطلبات الجامعه101-102)**
المؤلفون (د/الحميري، د/الحذيفي، د/الزمر، د/الخربي، د/العبيدي).
2- **قواعد اللغة العربية المؤلف: فواد نعمه.**

Course specification of General Biology

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Biology**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	First Year / First Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Acquire understanding and knowledge about general characters and economic importance of different microorganisms.
2. Recognize the basics on which the different microorganisms are classified into major and minor groups.
3. Gain an idea about plant physiology.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Outline the principles of biological classification and binomial nomenclature؛ demonstrate an understanding of the evolutionary history of life on earth؛

a2- Examine and describe the structure and function of cells and their organelles؛

a3- Demonstrate an understanding of cell reproduction, DNA structure and protein synthesis and basic Mendelian genetics؛ discuss the laws governing energy transformations and the role of enzymes in biological systems؛

B-Intellectual Skills:

b1- Distinguish osmosis and diffusion.

b2- Distinguish light and dark reaction in photosynthesis.

b3- Distinguish aerobic and anaerobic respiration.

C-Practical Skills:

c1- Isolate, cultivate and purify microorganism

c2- Use light microscopic examination in identification of microorganisms.

c3- Prepare colloidal solution.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Introduction to biology:** • Origin and nature of life, from simplest single-celled forms to complex plants and animals and human beings. • Classification and Naming Organisms: principles and problems of classification, taxonomic hierarchy, species concept, binomial nomenclature system of classification.	4	2
2	**Cell Structure and Function:** • An Overview: cell theory, basic cell structure and function, prokaryotic and eukaryotic cells, cell organelles • Membrane Structure and Function: basic models of membrane structure, diffusion, osmosis, dialysis, membrane transport: facilitated diffusion, active transport, endocytosis, exocytosis.	8	4

	• Meiosis and mitosis, DNA structure: genes to proteins, simple Mendelian genetics.		
3	**Energy Transformations:** • Metabolism: Ground Rules and Main Principles: laws governing energy transformations, metabolic reactions and pathways, enzymes, coupling and ATP; Energy - Acquiring Metabolism: photosynthesis and chemosynthesis; Energy - Releasing Metabolism: glycolysis, aerobic and anaerobic pathways, and energy yields.	**6**	**3**
4	**Introductory Ecology:** • What is ecology? Ecosystem components, flow of energy, biogeochemical cycles, systems ecology, human impact on the environment.	**4**	**2**
5	**Genetics:** • Basic principles of Mendelism, molecular genetics, structure and function of genes and chromosomes, populations and evolution	**6**	**3**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS

1- Lectures
2- Tutorial

E- STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%

Total	100	%

F- REFERENCES:

1- E. Solomon, L.Berg, D. Martin 2008 Biology 8th edition (Thomson Brooks Cole, Belmont.U.S.A).

2- Aish Zaytoon (1996), Human biology, (National Publishing Library), Jordan.

Course specification of English Language 1

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**English Language 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	First Year / First Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

For students undertaking this course, the aims are to:

1. Provide the student with basic principles in English language including reading, writing, listening and grammar with some medical terms.
2. Acquire skills of reading, extracting and handling the information from some short passages.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Recognize the mistakes in grammar in some passages.
a2- Extract the information from some short passages.
a3- Define some medical terms**.**

B-Intellectual Skills:

b1. Use correct verbs and grammar in writing**.**

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Reading** • Preventive medicine • Infectious diseases • How body fight infection • Nutrition • Malnutrition • Smoking • Tropical diseases	4	2
2	**Grammar** • Verb tenses • Simple present • Simple past • Present continuous • Present perfect • Past perfect • Active and passive voice	6	3
3	**Writing** • Report writing • Letter Writing: • Applications / communications such as business correspondences • Official communications and acknowledgements.	8	4

4	**Listening** • Rabies • Heat stroke • Heat exhaustion • Harmful effect of sun on the skin.	**4**	**2**
5	**Some pharmaceutical terms** **Introduction** • Definition • Composition of medical terms • Examples - Pharmaceutical dosage forms. - Drug administration routes. - Calculation of drug dosage forms	**6**	**3**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1-Lectures
2- Tutorial

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F- REFERENCES:

1- Laquire Blass, (2005), Well read 1, Oxford University press.
2- Essential Books (Text Books).

Course specification of General chemistry

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**General chemistry**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	First Year / First Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

For students undertaking this course, the aims are to:

1. Recognize basic concepts of matter and its classification.
2. Express mass relationships in chemical reactions.
3. Acquire properties of gases, liquids, and solids.
4. Gain the concepts of thermos chemistry; quantum theory and electronic behavior; periodic relationship of elements in the periodic table; intermolecular forces; and solutions.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Classify matter; distinguish between physical and chemical properties , use the periodic table to classify elements and predict trends in properties;

a2. Define and explain the concepts of atomic mass, average atomic mass, mole, molar mass and perform calculations involving these ,write, explain and apply the gas laws;

a3. Explain the kinetic molecular theory (KMT) of gases and use the KMT to qualitatively explain the gas laws; argue the differences between ideal and non-ideal gas behavior;

B-Intellectual Skills:

b1.Analyze different types of matters.
b2.Write different chemical symbols.
b3.Categorize common processes as exothermic or endothermic and know the sign conventions.
b4.Trace the various atomic theories; analyze the Bohr model and the line spectra.

C-Practical Skills:

c1. Perform chemical experiments
c2. Balance and interpret chemical equations and perform stoichiometric calculations.
c3. Apply significant figures and appropriate units in all measurements and calculations;
c4. Employ electron configurations and orbital diagrams for multi electron atoms.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Introduction to Chemistry:** • Matter: Classification, States, Physical, and Chemical Properties	2	1
2	**Atoms, Molecules, and Ions:** • The Atomic Theory • The Structure of the Atom • Atomic Number, Mass Number, Isotopes • The Periodic Table • Molecules and Ions • Chemical Formulas • Naming Compounds	2	1
3	**Mass Relationships in Chemical Reaction:** • Atomic Mass • Molar Mass of an Element and Avogadro's Number • Molecular Mass • Percent Composition of Compounds • Chemical Reactions and Chemical Equations • Amounts of Reactants and Products • Limiting Reagents • Reaction Yield	4	2

4	**Gases**: • Substances That Exist as Gases • Pressure of a Gas • The Gas Laws • The Ideal Gas Equation • Gas Stoichiometry • Dalton's Law of Partial Pressure • The Kinetic Molecular Theory of Gases • Deviation from Ideal Behavior	**2**	**1**
5	**Thermochemistry**: • Energy Changes in Chemical Reactions • Introduction to Thermodynamics • Enthalpy	**2**	**1**
6	**Quantum Theory and the Electronic Structure of Atoms:** • From Classical Physics to Quantum Theory • Bohr's Theory of the Hydrogen Atom • The Dual Nature of the Electron • Quantum Mechanics • Quantum Numbers • Atomic Orbitals • Electron Configuration • The Building-Up Principle	**4**	**2**
7	**Periodic Relationships Among the Elements:** • Periodic Classification of the Elements • Periodic Variation in Physical Properties • Ionization Energy • Electron Affinity	**2**	**1**
8	**Chemical Bonding: Basic Concepts:** • Lewis Dot Structure • The Ionic Bond • The Covalent Bond • Electronegativity • Writing Lewis Structure • The Concept of Resonance • Bond Energy	**2**	**1**
9	**Chemical Bonding: Molecular Geometry and Hybridization:** • Molecular Geometry • Dipole Moments • The Valence Bond Theory • Hybridization of Atomic Orbitals • Hybridization in Molecules Containing Double and Triple Bonds	**4**	**2**

10	**Intermolecular Forces in Liquids and Solids:** • The KMT of Liquids and Solids • Intermolecular Forces • Properties of Liquids • Crystalline vs. Amorphous Solids • Phase Changes • Phase Diagrams	**4**	**2**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS

1- Lectures
2- Tutorial

E- STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

1- MICHAEL FREEMANTLE-1995- Chemistry in Action- SECOND EDITION-London.paperback.
2. Alam, Akhtar, Hussain, and Shaquiquzzaman – 2012-Practical Pharmaceutical Analytical Chemistry- New Delhi.Elsevier Science**.**

Course specification of Physical Pharmacy

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Physical Pharmacy**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	First Year / First Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION

1- AIMS OF THE COURSE:

1. Acquire detailed knowledge and understanding concerning physicochemical properties of drugs and excipients that could affect drug performance and the development of an efficacious dosage form.
2. Recognize how to utilize these principles in the design of active drugs and pharmaceutical dosage forms.
3. Explain the relationship between the physicochemical principles, pharmaceutical formulations and biological activity of drugs.

2- INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Recognize the significance of solubility, distribution phenomena & adsorption phenomena in pharmaceutical systems and in the bioavailability of drugs.
a2. Describe adsorption & the contribution of diffusion & solubility processes to drug absorption and how this affecting the action of the drug in particular disease.
a3. Explain Micrometrics & the origin and the consequences of the interfacial phenomenon and different modes of drug decomposition & adsorption.

B-Intellectual Skills:

b1. Distinguish different types of matters, analyze pharmaceutical degradation data and relate it to drug stability.
b2. Correlate the concepts of interfacial phenomena & micrometrics with the formulation and stability of colloidal preparations.
b3. Correlate solubility, permeability ,diffusion , adsorption properties & micromeritics of drug material to its bioavailability that meet the health care professionals.
b4. Predict possible complexation related problems in pharmaceutical systems based on chemical structures.

C-Practical Skills:

c1. Perform on laboratory instruments and devices used in preparation and analyzing of pharmaceuticals.
c2. Apply extraction , adsorption, viscosity ,crystallization & density processes.
c3. Apply flowability evaluation measurement of surface tension.
c4. Identify drug incompatibility reactions.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Solubility** ▪ Determination of solubility o Techniques of aqueous solubility determination of non-ionized, ionized and unstable drugs ▪ Factors/ parameters affecting solubility ▪ Enhancement of solubility ▪ Extraction ▪ Solubility and partitioning coefficient	**4**	**2**

	▪ Preservative action in oil-water systems		
2	**Principles of dissolution** ▪ Dissolution process and its mathematical treatment; ▪ Intrinsic dissolution ▪ Particulate/ multi-particulate dissolution ▪ Modeling and equations ▪ Dissolution test design ▪ *In vitro* dissolution of solid dosage forms; I*n vitro - in vivo* correlations of dissolution	**4**	**2**
3	**Rheology** ▪ Principles of rheology. ▪ Measuring methods in the rheology.	**2**	**1**
4	**Surface tension** ▪ Surface tension ▪ surfactants ▪ critical micelle concentration(CMC) ▪ Effect of counter ion and temperature on surface tension and temperature on CMC-values ▪ Pharmaceutical applications of surfactants	**4**	**2**
5	**Adsorption** ▪ Adsorption at solid surfaces ▪ adsorption isotherms	**2**	**1**
6	**Powders and rheology of powders** ▪ Micromeritics and characterization of powders ▪ Shape factors ▪ Angle of repose ▪ Flow-ability& aging ▪ Effect of glidants compatibility ▪ Parenteral powders	**4**	**2**
7	**Complexation** ▪ Metal complexes ▪ Organic molecular complexes ▪ inclusion compounds ▪ methods of analysis ▪ crystalline structure of complexes	**2**	**1**
8	**Drug and formulation stability** ▪ Various types and sources of stability problems and procedure/ protocol for carrying out stability studies of drug substances and their formulations with special reference to ICH guidelines ▪ Physical stability testing ▪ Highlights on accelerated/ ambient/ controlled physical stability testing of solutions, disperse systems, aerosols, coated/ uncoated tablets, gelatin capsules, and sustained release products	**4**	**2**

	▪ Degradation mechanisms. ▪ Pharmaceutical stability problems (hydrolysis, oxidation, photodegradation, …) ▪ Determination of shelf life and recommended storage conditions		
9	**Incompatibility** ▪ Compatibility test for solid and liquid dosage forms ▪ Incompatibility studies by DSC and XRD ▪ Use of differential scanning calorimetry (DSC) and X-ray diffraction (XRD) in carrying out incompatibility studies	**2**	**1**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorial

E- STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES

1. Aulton ME -2004- Pharmaceutics: The science of dosage form design -3rd edn- Livingstone, United Kingdom.
2. Burns D M and MacDonald-1975- S G G Physics for biology and pre-medical students 2nd edn, Addison-Wesley, USA.
3. Parrott E L- 1993- Pharmaceutical others Physical pharmacy -4th edn- Lea and Febiger, USA.

First Year
Second Semester

Course specification of Botany

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Botany**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	First Year / Second Semester				
4	**Pre –requisite (if any):**	Biology				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

Pharmaceutical Botany is a one semester course aiming

1. Recognize methods of cultivation and processing of Medicinal Plants as drying, packing and preservation.
2. Acquire knowledge on the botanical and biological properties as well as the uses of certain medicinal plants.
3. Interpret use of our natural plant resources to introduce new herbal drugs.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Basic Pharmaceutical Botany that is relevant to botany, medicinal plants, different processes for preparing the drug to the market starting from cultivation, collection and drying.

a2. Key constituents and uses of some medicinal plants with advanced biological values.

a3. Recognize and identify some of the common plants they have encountered.

B-Intellectual Skills:

b1. Retrieve, select and collate appropriate traditional botanical and therapeutic information.

b2. Evaluate primary and secondary evidence and arguments.

b3. Integrate and link information across course components, including plant's constituents from different plants families.

b4. Plan and conduct a research task.

C-Practical Skills:

c1. Analyse samples in the laboratory using appropriate examinations, bearing in mind safety and ethical limitations.

c2. Use appropriate basic laboratory equipment safely and efficiently.

c3. Apply principles and limitation of a range of more advanced practical techniques.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Introduction to botany**	2	1
2	**Classification of the Plant Kingdom**	4	2
3	**General botany (**Brief Description of the Morphology) • Histology • Organography • Reproduction	8	4
4	**Cultivation, propagation, Selection plants of medicinal value**	6	3

5	**Collection and Preparation of Medicinal Plants**	**4**	**2**
6	**The most important plants with pharmaceutical, toxicological, food and cosmetic interest**	**4**	**2**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1-Lectures
2- Tutorial

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

1- E.Solomon, L.Berg, D.Martin 2008 Biology 8th edition (Thomson Brooks Cole, Belmont.U.S.A College Publishing)
2- Cecie Starr (1997), Basic concept in biology Third edition, (International Thomson Publishing Company), Belmont, U.S.A
3- Practical notes in Botany and Medicinal Plants.

Course specification of English Language 2

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**English Language 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	First Year / Second Semester				
4	**Pre –requisite (if any):**	English Language 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

For students undertaking this course, the aims are to:

1. Provide the student with basic principles in English language including reading, writing, listening and grammar with some medical terms.
2. Acquire skills for reading, extracting and handling the information from some short passages.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Correct the mistakes in grammar in some passages.
a2- Extract the information from some short passages.
a3- Define some medical terms**.**

B-Intellectual Skills:

b1. Use correct verbs and grammar in writing**.**

D-General Skills and Attitudes:

d1- Work effectively both in a team, and independently on solving problems.
d2- Use internet and search for information.
d3- Communicate effectively with his teacher and colleagues.
d4- Write a scientific assay**.**

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Reading** • Immunity and immunization • Foods for thought • Malaria • Cholera • Epidemic diseases	4	2
2	**Grammar** • Punctuation • Articles • Phrases • Conditionals • Prepositions	6	3
3	**Writing** • Report writing • Letter Writing: • Applications / communications such as business correspondences • Official communications and acknowledgements.	8	4
4	**Listening** • Anemia • Losing weight • Safe water and foods	4	2
5	**Pharmacological Terminology:**	2	1

	• Classification of drug actions, pharmacokinetics, and systemic classification of drugs. • Autonomic, CNS, cardiovascular, and renal system. • Chemotherapy, locally acting, vitamins and hormones.		
6	**Pathology and Diagnosis:** • Infectious diseases. • Rheumatic diseases. • Peptic ulcers. • Surgical operations. • Skin diseases. • Gynecological diseases. • Laboratory investigational terms. • Other familiar medical terms and abbreviations	**4**	**2**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1-Lectures
2- Tutorial

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F- REFERENCES:

1- Lecture notes for English department stuff member in the university.
2- Amr Al Himairi, (2005), English for medical students, Sana'a University, Sana'a, Republic of Yemen.

Course specification of Arabic Language 102

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Arabic Language 102**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	First Year / Second Semester				
4	**Pre –requisite (if any):**	Arabic Language 101				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	Arabic				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

صمم هذا المقرر ليزود الطالب بالمعارف والمهارات والاتجاهات السلوكية اللازمة في مجال اللغة العربية والتي تمكنه من تفادي الأخطاء في الكتابة حتى يتسنى له الكتابة الصحيحة عند تعلمه وكتابته للاختبارات والمحاضرات.

1. القدرة على كتابة الرسالة الإدارية والتقارير والسيرة الذاتية.
2. تعريف كل من لأسماء الظاهرة المعربة والمبنية والمبتدأ والخبر.
3. توضيح الحكم الإعرابي للفعل والفاعل
4. الإلمام بأشهر أبواب النحو التي يستقيم بها اللسان ويعتبر من سلامة القول منطوقاً ومكتوباً.
5. الذوق الأدبي من خلال الاطلاع على أشهر النصوص الأدبية.
6. تمييز الفروق اللغوية بين التراكيب، والعبارات، والجمل الواردة في كل نص لغوي.
7. تحليل النصوص الأدبية تحليلا لغويا سليما.
8. استخراج المبتدأ والخبر والفعل والفاعل من نص لغوي وإعرابهما.
9. إعراب الأسماء والأفعال المبنية والأسماء والأفعال المعربة إعرابًا صحيحًا.
10. العمل بفعالية مع زملائه بروح الفريق الواحد أثناء تحليل النص اللغوي داخل القاعة الدراسية.
11. تطوير قدراته الذاتية من خلال استخدام مصادر التعلم المختلفة ومنها الانترنت.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. تعريف كل من لأسماء الظاهرة المعربة والمبنية والمبتدأ والخبر.
a2. القدرة على كتابة الرسالة الإدارية والتقارير والسيرة الذاتية.
a3. توضيح الحكم الإعرابي للفعل والفاعل والإلمام بأشهر أبواب النحو التي يستقيم بها اللسان ويعتبر من سلامة القول منطوقاً ومكتوباً.

B-Intellectual Skills:

b1. الذوق الأدبي من خلال الاطلاع على أشهر النصوص الأدبية.
b2. تمييز الفروق اللغوية بين التراكيب، والعبارات، والجمل الواردة في كل نص لغوي.
b3. تحليل النصوص الأدبية تحليلا لغويا سليما.

C-Practical Skills:

c1. استخراج المبتدأ والخبر والفعل والفاعل من نص لغوي وإعرابهما.
c2. إعراب الأسماء والأفعال المبنية والأسماء والأفعال المعربة إعرابًا صحيحًا.

D-General Skills and Attitudes:

d1. العمل بفعالية مع زملائه بروح الفريق الواحد أثناء تحليل النص اللغوي داخل القاعة الدراسية.
d2. تطوير قدراته الذاتية من خلال استخدام مصادر التعلم المختلفة ومنها الانترنت.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	قراءة نصوص نثرية وشعرية تدريبات صفية	4	2
2	قراءة نصوص نثرية وشعرية تدريبات صفية	4	2
3	كتابة الرسالة الإدارية تدريبات صفية	2	1
4	كتابة التقرير تدريبات صفية	2	1
5	امتحان نصفي الفصل	2	1
6	السيرة الذاتية تدريبات صفية	2	1
7	القواعد النحوية (الجملة الاسمية ونواسخها) تدريبات صفية	4	2
8	القواعد النحوية (الجملة الفعلية ومكملاتها) تدريبات صفية	2	1
9	بعض القواعد الإملائية (همزتا الوصل والقطع – الهمزة المتوسطة – علامات الترقيم) تدريبات صفية	2	1
10	دراسة نصوص من الشعر العربي وتحليلها وتذوقها	2	1

	تدريبات صفية+ تكاليف		
11	امتحان نهائي	**2**	**1**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1-Lectures
2- Tutorial

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work to assess intellectual skills
2- Midterm exam to assess the knowledge & understanding
3-Final term exam to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30 %
Final-term Examination	60 %
Seminar & Quiz	10 %
Total	100 %

F- REFERENCES:

1. تاريخ الأدب العربي / د. أحمد حسن الزيات.
2. المصادر الأدبية واللغوية في التراث العربي / د. عز الدين إسماعيل.
3. الأدب العربي الحديث / د. محمد صالح الشطبي.

Course specification of Biostatistics

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Biostatistics**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	First Year / Second Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	Arabic				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

At the end of this course student should be:

1. Acquire knowledge various classes (i.e. experimental, observational, overview and health related) of biomedical literature.
2. Aware of the situation when each type of biomedical literature is required
3. Understand the purpose of each type of these literature
4. Recognize the design of each type and how it differs from the others
5. Familiar with some of the characteristics of each type that is required in the evaluation process.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Explain the differences between experimental, observational Literature and the purpose of the study type

a2- Justify when meta-analysis studies are usually required and conducted (this question is general for all types).

a3- Identify the prevalence of characteristics of diseases in a population.

B. Intellectual skills

b1. Apply in practice the use of charts that describe the education phenomena.

b2. Analyze the electronic information using the computer programs and identify the challenges of a particular specialization that might face .

C-Practical Skills:

c1. Finding ways in evaluation of knowledge and intellectual skill about making the reports statically.

c2.Deal with data & analyze them by different statistical methods.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• Data description,	2	1
2	• Displaying data,	2	1
3	• Elementary concepts of the probability,	2	1
4	• Theoretical and sample characteristics (mean, dispersion, median, etc.)	4	2
5	• Statistical estimations, confidence intervals.	2	1
6	• Testing hypotheses,	2	1
7	• one- and two sample t-tests,	2	1
8	• Contingency tables and related evaluations.	2	1

9	• Regression and correlation analysis,	**2**	**1**
10	• analysis of variance,	**2**	**1**
11	• Multiple comparisons.	**2**	**1**
12	• Non-parametric methods (Mann-Whitney, Wilcoxon, Kruskal-Wallis, Friedman test, rank-correlation).	**4**	**2**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1-Lectures
2- Tutorial

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F- REFERENCES:

1- Book: Drug Information: Guide for pharmacist 2nd edition (Chapter 7). By Patrick M. Malone & Kristian Wilconson
2- Polgar Colton, T. 2000.Biostatistics in Medicine. Little Brown and Co.Boston. 4th edition.

Course specification of Introduction To Computer

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Introduction To Computer**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		1	**2**			**2**
3	**Study level/ semester at which this course is offered:**	First Year / Second Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

For students undertaking this course, the aims are to:

1. To instill an awareness of the various types of information sources available.
2. Provide a technical introduction for computer science and medical information science.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Define each part of computer hardware, its function and use of each office program.
a2- Acquire the basics of how computers operate, with an emphasis on knowledge of practical issues (storage devices, RAM, types of printers etc.)
a3- Recognize various computer applications in medicine - for instruction, information managing, computer based medical record, etc.

B-Intellectual Skills:

b1-Interpret data of computer aided teaching and testing.

C -Practical Skills:

c1- Tolerate working in MS-WINDOS.

c2- Use of WORDPROCESSOR.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Introduction to computers** • Historical background: • The student will learn briefly the historical development of computers and the evolution of digital world. • Why should I bother learning? • What can a computer do? • In general ▪ A computer is a machine, which knows nothing. Yet it is extremely fast in calculations, it has an enormously strong and capacious memory and it doesn't get bored repeating things. • For me: • Student • Textbooks in digital form • Demonstrations: digital videos, simulators • Internet search • Physician • Keeping records • References on CD's • Continous medical education ▪ Researcher • Searching the literature • Statistical analysis • Presentations ▪ Lecturer • Presentations • Keeping up to date ▪ What are the various computer components and accessories? • CPU, BIOS, RAM • Input devices: Keyboard, Mouse, Pen, scanner etc… • Output devices: Printer, Sound, Monitor, Datashow etc…	14	7

	• Storage dedvices: Hard disk, Floppy, CD, Flash etc… • Role of Software • System • Various operating systems • What is the system responsibility • Applications ▪ Word processing ▪ Database ▪ Biostatistics ▪ Presentations ▪ Internet and communication ▪ Protecting my computer from virus threats • What is a virus anyway • Why are there viruses • How to defend myself • Keeping updated		
2	▪ **Introduction to Word:** • Advantages of using computers instead of typewriter • Basic terminology • Document, page, paragraph, line, SPACE • Font • Using the keyboard • Typing a document • Editing and formatting a document • Undo and redo • Font size, type and color • Emphasizing particular words • Alignment • Copy, cut and paste ▪ Tables • Simple drawings • Inserting a picture • Saving a document • o Computer Assisted Instruction	**14**	**7**
	Total	**28**	**14**
	D- TEACHING AND LEARNING METHODS:		

1-Lectures
2- Tutorial

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

1- Lecture notes for Computer department stuff member.
2- Anita Goel, “Computer Fundamentals”, Pearson Education India, 1st edition, 2010.

Course specification of introduction To Pharmacy History

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Introduction to Pharmacy History**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	First Year / Second Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

For students undertaking this course, the aims are to:

1. Familiarize students with future of pharmacy profession.
2. Develop the students understanding of work areas of pharmacist.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Give an account of the knowledge, work areas of a pharmacy dispenser, organization of health care and pharmacy, basic pharmaceutical terminology and concepts, pharmaceutical process from research and development

a2. Give an account of the history of pharmacy,

a3. Give an account of the institutions responsible for pharmaceutical products in society.

B- General Skills and Attitudes:

b1. Work effectively both in a team, and independently on solving problems.

b2. Use internet and search for information.

b3. Communicate effectively with his teacher and colleagues.

b4. Write a scientific assay**.**

D-General Skills and Attitudes:

d1- Work effectively in team.
d2- Demonstrate written and oral communication skills.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**History and scope of pharmacy**	4	2
2	**Pharmacy careers and ethics**	2	1
3	**Introduction to pharmacy as a discipline**	4	2
4	**The function and responsibility of pharmacy dispensing**	4	2
5	**The organization of health care: laws and regulations**	4	2
6	**Information retrieval in the pharmacy field**	4	2
7	**Future of pharmacy practice in different settings** • Practice of community pharmacy • Role of pharmacist's in ▪ Industry ▪ Hospital ▪ Government ▪ Military ▪ Research	4	2
8	**pharmacy education and international and national organizations**	2	1
	Total	28	14

D- TEACHING AND LEARNING METHODS:

1-Lectures
2- Tutorial

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & quiz	10	%
Total	100	%

F- REFERENCES:

1- Lecture notes for stuff member in the department
2- Michael E. Aulton, FAAPS, Kevin M.G.(2007). Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 3ed edition . UK.

Second Year
First Semester

Course specification of Analytical chemistry 1

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Analytical Chemistry 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Second Year / First Semester				
4	**Pre –requisite (if any):**	General Chemistry				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1- Recognize the benefits and problems of analytical chemistry for society.
2- Define the basic principles of analytical chemistry and analytical techniques used in analytical chemistry
3- Explain the Requirements of suitable volumetric analysis and acid-base concepts.
4- Demonstrate an understanding of solution chemistry, prepare and performing stoichiometric calculations in all parts of chemistry.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Recognize the different types of analytical chemistry techniques.
a2. Identify the importance requirements of suitable volumetric analysis and express the concentrations of solutions.
a3. Explain the neutralization reactions, acid-base, indicators, buffer solutions, precipitation reaction, redox reaction, complexometric titrations and the types of cations and anions.

B-Intellectual Skills:

b1. Analyze the different types of samples.

b2. Integrate the concepts of analytical chemistry with those of other related fields and interpret certain medical phenomena based on such concepts.

C-Practical Skills:

c1. Use the balance, equipment in laboratory to identify and measure the concentrations.
c2. Apply rules and guidelines related to safety precautions in the laboratory to perform experiments in a risk-free environment
c 3. Design and apply experiments in the field of analytical sciences.
c 4. Calculate the different types of concentrations of solution.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Course introduction; qualitative and quantitative analysis, role of analytical chemistry in pharmacy and medicine.	2	1
2	Method of expression of concentrations (part 1).	2	1
3	Method of expression of concentrations (part 2).	2	1
4	Principle of volumetric analysis.	2	1
5	Applications involving molarity, normality and weight percent calculations.	2	1
6	Acid-base Equilibria in aqueous solution and pX concept (x: H^+, OH^-)	2	1
7	pH calculations & Buffer solutions and physiological buffers.	2	1
8	Neutralization reactions; acid-base titrations, titration curve, factors affecting and theory of indicators.	2	1
9	Calculation involving applications.	2	1
10	Titration of polyprotic acids and polyequivalent bases.	2	1
11	Applications involving determinations of mixtures of acids and mixtures of basses.	2	1

12	Acid-base equilibria in nonequeous solution.	**2**	**1**
13	Titration curves and equivalent point determination.	**2**	**1**
14	Application involving; carboxylic acids phenols and amines determinations.	**2**	**1**
Total of hours		**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion.
3. Lab. Work.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	**100**	**%**

F- REFERENCES:

1. Analytical Chemistry bu Gary D. Christian publisher: Wiley; 6edition (March7,2003) ISBN:0471214728.
2. Analytical chemistry (an introduction) by Skoog/West/Holler (edition)6th (1994), Saunders Golden SunBurst series, ISBN:0-03-097285.
3. Quantitative analysis by R.A-Day, JR, A.L-UNDERWOOD (editors) 6th edition (1991), prentice-Hall, ISBN:0-13-747361-3.
4. Quantitative analysis chemistry by James S. FRITZ, GOERG H. SCHENK (editors) 5th edition (1987), prentice-Hall, Englewood Clifts, ISBN:0-205-10480-0.

Course specification of Anatomy

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Anatomy**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Second Year / First Semester				
4	**Pre –requisite (if any):**	Biology				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

For students undertaking this course, the aims are to:

1. To acquire an appropriate background about and recognize the normal structure and function of the body and of each of its major systems
2. To acquire an appropriate background about and understand different stages of the life cycle and how these affect normal structure and function
3. To Identify and examine the normal Anatomy of the body and of each of its major organ systems grossly.
4. Mention and describe the different types of tissues
5. Demonstrate knowledge of the structure and function of the body and its major organ systems and of the molecular and cellular mechanisms

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Describe basic animal structure in terms of tissues and organ systems.
a3. Outline the ways in which animals acquire nutrients and describe the structure and function of organs associated with this process
a3. Describe the functional capabilities of each tissue type and relate them to the structure

B-Intellectual Skills:

b1. Interpret the normal anatomical structures on radiographs
b2. Interpret some clinical findings in relation to developmental basis
b3. Correlate anatomical facts with the manifestation of various nerve injuries the body.
b4. Distinguish aerobic and anaerobic respiration.

C-Practical Skills:

c1. Detect the important features of skeleton
c2. Present the gross morphology of different body organs
c3. Interpret the arrangement of various body organs and internal structures in their normal places (in cadavers and preserved specimens)
c4. Detect the surface Anatomy of various arteries and nerves and other internal structures.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Skeleton** • Structure and classification • Bones of upper and lower limb • Joints	**2**	**1**
2	**Respiratory** • Structure • The lungs and bronchioles	**2**	**1**
3	**Digestive system** • The mouth cavity • Esophagus • Stomach, liver spleen and pancreas • Intestine • Appendix • Rectum	**6**	**3**

4	**Nervous system**
	• Structure and Classification
	• Structure of spinal cord
	• Spinal nerves
	• The autonomic nervous system
	  ○ Sympathetic
	  ○ Parasympathetic
		4	**2**

5	**Cardiovascular system** • The heart • Blood vessels	**2**	**1**
6	**Kidney** • The kidney • Ureter • Urinary bladder	**2**	**1**
7	**Anatomy of sense organs** • Eye • Ear • Nose • skin	**2**	**1**
8	**Anatomy of endocrine glands** • Thyroid • Pancreas • Pituitary • Adrenal glands • Gonads	**4**	**2**

9	**Reproductive system**
	• **Female:**
	  ▪ The uterus
	  ▪ The vagina
	  ▪ The ovary
	  ▪ Anatomy of the breast
	• **Male :**
	  ▪ The testis
	  ▪ Scrotum
	  ▪ The penis
		4	**2**

	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures using data show
2. Video animation and seminars
3. Group discussion
4. Tutorial
5. Laboratory work (Models)

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F- REFERENCES:

1. David Shier, 2012, Holes Anatomy & Physiology 11th Edition, McGraw Hill, USA.
2. William Arnould-Taylor, 1998, Textbook of Anatomy and Physiology, 3rd edition, Nelson Thornes, USA.

Course specification of Immunology and Serology

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Immunology and Serology**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Second Year / First Semester				
4	**Pre –requisite (if any):**	Biology				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. Acquire knowledge about the structure and functions of the immune system.
2. Recognize types of immune response.
3. Correlate the structure and role of the major histocompatibility complex HLA .
4. Illustrate the development of immunological tolerance and autoimmunity .
5. Identify types of hypersensitivity reactions .
6. Recognize the basis of tumor immunology .
7. Discuss immune responses against infectious diseases .

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Recognize all types hypersensitivity reactions and illustrate immune responses against infectious diseases.

a2. Explain effects of aging on the immune system.

a3. Acquire the knowledge of immunology of neonatal and childhood period .

B-Intellectual Skills:

b1. Explore development of immunological tolerance and autoimmunity .

b2. Differentiate primary versus secondary immunodeficiencies.

b3. Investigate structure and role of the major histocompatibility complex HLA.

C-Practical Skills:

c1. Interpret passive and active immunoprophylaxis.

D-General Skills and Attitudes:

d1. Work effectively in team.

d2. Demonstrate written and oral communication skills

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Immunology: a. Immunity. b. Antigen- Antibody reaction	**2**	**1**
2	Complement system Phagocytes & natural killer cells.	**2**	**1**
3	Immune response & hypersensitivity.Autoimmunity	**4**	**2**
4	Innate immunity	**2**	**1**
5	Adaptive immunity	**2**	**1**
6	Anibody(structure,specificity,diversity & generation)	**4**	**1**
7	T cell & B cell	**6**	**3**
8	Immunodeficiency	**4**	**2**
9	Cancer immunology	**4**	**2**
Total		**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F- REFERENCES:

1-Immunology: A Short Course (Coico, Immunology) 7th Edition by Richard.

2-Basic immunology Function and disorders of the immune system 5e (5th Edition) by Abul K. Abbas, Shiv Pillai.

Course specification of Organic chemistry 1

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Organic chemistry 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Second Year / First Semester				
4	**Pre –requisite (if any):**	General Chemistry				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

At the end of this module, student will be able to:

1. Nomenclature the different organic compounds.
2. Acquire a Knowledge of basic organic chemistry regarding synthesis and reactions of the main organic functional groups, organic stereochemistry.
3. Have a good understanding of organic sugar types.
4. Draw the molecular structure of organic compounds

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Explain chemical behavior, chemical reactions and name of any organic compounds
a2. Recognize the preparation of any organic compounds from different sources.
A3. Acquire the required knowledge of all basics chemistry, reactions and structures of different compounds.

B-Intellectual Skills:

b1. Analyze the different organic compounds according to their functional groups and elements.
b2. Carry out simple chemical reactions.
b3. Write chemical reaction equation.
b4. Identify the products of any reaction
b5. Distinguish the functional groups of organic compounds by their physical and chemical properties.

C-Practical Skills:

c1. Apply appropriate laboratory techniques in synthesis the organic compounds and analyzing their purity, safety, potency and quality as per GMP.
c2. Identify organic compounds by using chemical reaction tests.
c3. Perform a selection of basic laboratory procedures in general chemistry.

D-General Skills and Attitudes:

d1. Work effectively both in a team, and independently on solving problems.
d2. Communicate effectively with others.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Introduction to organic compounds:** • Classification of carbon compounds: Aliphatic compounds, Alicyclic compounds, Aromatic compounds, Heterocyclic compounds. • The structures and nomenclature of functional groups. • Bonding in organic compounds: covalent bonding, co – ordinate boding, ionic bonding in organic compounds, and the hydrogen bond. • Structure and physical properties of organic compounds: bond dissociation energy, polarity of bonds, polarity of molecules, melting points, intermolecular forces (Dipole – dipole interactions, hydrogen bonds, and Van Der Waals forces), boiling point, and solubility. • Acids and bases: The Lowry – Bronsted definition, and the Lewis definition.	2	1

	• Hybridization of atomic orbitals of carbon: carbon atom in the ground state and in the excited state, SP^3-Hybridization, SP^2 Hybridization, SP – hybridization, the formation of single, double, and triple bonds between carbon atoms, the structure of NH_3 and H_2O (SP3 – Hybridization).		
2	**Isomerism:** Introduction and definition, structural isomerism (Definition, chain isomerism, position, isomerism, functional isomerism, Metamerism, Tautomerism), Stereoisomerism or stereochemistry (Definition, tetrahedral carbon atom, optical isomerism, polarized light, optical activity, specific optical rotation, polarimeter, chirality, enantiomerism, racemisation (definition, racemic modification preparation, and resolution of racemic modifications), Diastereomrism, Geometric isomerism (cis – and trans – isomers), Z/E isomerism, Meso compounds, Relativ and absolute configurations (definition, relative configurations D – and L -, absolute configurations R –and S -), number of stereoisomers, representation of configuration of enantiomers, (Fisccher's projection, Newmann's projection, Wedge projection, and Sawhorse projection Formulas), elements of symmetry (plane and centre of symmetry), optical isomerism without Asymmetric Atom.	**2**	**1**
3	**Conformational Isomerism of Alkanes:** Definition, Staggered, Eclipsed, and Gauche Conformers, Factors influencing the Conformational Stability (Torsional Strain, Steric Strain due to V	**2**	**1**
4	**Alkanes (Paraffinic Hydrocarbons):** Definition and Nomenclature, Structural Isomerism, Nomenclature of Functional groups, General methods of preparation, naturally occurring Alkanes, Properties of Alkanes, General Reactivity, Halogenation, Oxidation, Dehydrogenation, Nitration, and Sulphonation of Alkanes	**2**	**1**
5	**Alkenes-Double Bond (Olifinic Hydrocarbons):** Definition, Nomenclature, Compounds of Biological interest which containDouble Bonds, General methods of preparation, Properties of Alkenes, General reactivity (Addition of Halogens, Addition of water and related compounds, Oxidation - Reduction of the Double Bond, Addition reactions ound to the substituted Double Bond and Markovnikov's Rule).	**2**	**1**

6	**Commutative Dienes:** Commutative Dienes (Synthesis and Reactions), Isolated Dienes (Synthesis and Reactions), Conjugated Dienes (Synthesis and Reactions). **Alkynes:** Definition and Nomenclature, General methods of preparation, Reactions of Alkynes	**2**	**1**
7	**Cyclic Aliphatic Hydrocarbons (Cycloalkanes):** Definition, Nomenclature, Conformations of Cycloalkanes and their Stabilities, Factors influencing stability of conformation (Angle Strain Torsional Strain, Steric Strain, Dipole -dipole interactions), Conformations of Cyclohexane (Chair Conformation, and Boat Conformation), Equate and Axial Bonds in Cyclohexane, 1,3-Diaxial interactions in substituted Cyclohexane, Stereoisomerism in Cyclic Compounds (cis and trans-isomers), Enantiomers in Cyclic Compounds.	**2**	**1**
8	**Chemical Reactions:** General aspects of Chemical Reactions, Reaction Mechanism Classification of Organic Reactions (Substitution, Elimination, Addition to Multiple Bonds, Molecular Rearrangements), Classification of Organic Reagents (Nucleophiles, Electrophiles, and Free Radicals), Charge Distribution in Organic Molecules and Electronegativity, Inductive effect, Mesomeric Effect and -Electron Delocalisation and Resonance.	**2**	**1**
9	**Energy Changes during Reactions:** Bond Dissociation Energy, Heat of Reaction, Energy of Activation, Transition State, Progress of Reaction (Exothermic and Endothermic Reaction).	**2**	**1**
10	**Aliphatic Nucleophilic Substitution Reactions:** Definition, the Relationship between Nucleophilicity and Basicity, the SN2 Mechanism, the SN1 Mechanism, the Factors Favoring either SN2 orSN1 Reactions, Energetics of SN1 and SN2 Reactions, Stereochemistry of SN1 and SN2 Reactions, Mixed SN1 and SN2 Mechanisms, Transition between SN1 and SN2 Mechanisms, Factors influencing the Course of Substitution Reactions (Nature of the substrate, Nature of the Solvent, Nature of Nucleophile, Nature of the Leaving Group, the Neighbouring Group Participation).	**2**	**1**

11	**Elimination Reactions:** Elimination, - Elimination or 1,2-Elimination (Dehydrogenation, Dehydration Dehalogenation, and Dehydrohalogenation), E1 and E2 Mechanism Competition between E2 and SN2 Reactions, E1cB Eliminations, Orientation of Double Bond	**2**	**1**
12	**Alkylation:** Definition, Perkin's Reaction, Knoevenagel's Reaction, Stobbe's Condensation, Michael's Addition Reaction, Cyanoethylation, Mannich's Reaction, Reformatsky's Reaction	**2**	**1**
13	**Molecular Rearrangements:** Definition, Pinacol's rearrangement, Wanger-Meerwein's rearrangement, Wolff rearrangement, Hofmann's rearrangement, Lossen's rearrangement, Beckmann's rearrangement, Claisen's rearrangement, Allylic rearrangement, Favorskii's rearrangement, Orton's rearrangement	**2**	**1**
14	**Free Radical Reactions:** Definition, Generation of Stable Free Radicals, Generation of Short-lived Free Radicals, Radical Coupling Reactions, Types of Free Radical Reactions (Radical Displacement, Radical Addition, Radical Substitution in Aromatic Systems).	**2**	**1**
Total		**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures using data show.
2. video animation and seminars
3. Solving Problem method.
4. Laboratory work.
5. directed reading.
6. independent study and discussion

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12

Assessment 3 final exam		Week 16
Weighing of Assessments		
Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	**100**	**%**

F- REFERENCES:

1-Organic chemistry: A short course by Harold Hart, Leslie E. Craine, David J. Hart, publisher: Houghton Miffin college; 10th edition (January 1999) ISBN: 0395902258.

2-Paul M.Dewick, 2006, Essentials of Organic Chemistry, 1st edition,Willy black well publisher, US

Course specification of Pharmaceutical Calculation

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Pharmaceutical Calculation**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				2
3	**Study level/ semester at which this course is offered:**	Second Year / First Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

The aim of the course is to acquire students with the principles of pharmaceutical calculations. In addition to managing proper and safe dispensing of medicine.

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

1. Distinguish the methods of pharmaceutical calculation
2. Recognize the proper medical terminology, abbreviations and symbols in health reports and pharmacy practice
3. Calculate the proper dose of drugs for adults and pediatrics
4. Apply simple mathematical conversions for weight, volume, temperatures
5. Utilize the proper medical terminology, to communicate with other health care professionals
6. Employ proper calculations for preparation of different pharmaceutical preparations
7. Communicate effectively with patients and health care professionals
8. Work effectively as a part of a team to perform the required tasks

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.

a2- Distinguish the methods of pharmaceutical calculation

a3- Recognize the proper medical terminology, abbreviations and symbols in health reports and pharmacy practice

B-Intellectual Skills:

b1. Calculate the proper dose of drugs for adults and pediatrics

b2. Write simple mathematical conversions for weight, volume, temperatures

b3. Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.

b4. Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.

C-Practical Skills:

c1. Utilize the proper medical terminology, to communicate with other health care professionals

c2. Employ proper calculations for preparation of different pharmaceutical preparations

c3. Extract, isolate, purify, identify and formulate the natural products and assure their rational use

c4. Conduct research studies and utilize the results in different pharmaceutical fields

D-General Skills and Attitudes:

d1. Communicate effectively with patients and health care professionals

d2. Work effectively as a part of a team to perform the required tasks**.**

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Introduction Some fundamentals of measurement and pharmaceutical calculations.	**2**	**1**
2	The International System of Units Interpretation of prescription or medication order.	**2**	**1**
3	Household measures Reducing and enlarging formula.	**2**	**1**
4	Density Specific gravity Specific volume.	**2**	**1**
5	pharmaceutical measurement.	**2**	**1**
6	Percentage preparation Ratio strength Simple conversion from percentage to ratio strength.	**2**	**1**
7	Mid-term exam.	**2**	**1**

8	Dilution and concentration.	**2**	**1**
9	Stock solution, Dilution.	**2**	**1**
10	Allegation medial**.**	**2**	**1**
11	Allegation alternate.	**2**	**1**
12	Calculation of pediatric dose according to body weight, age and body surface area**.**	**2**	**1**
13	Calculation of chemotherapeutic dose according to body weight, age.	**2**	**1**
14	Calculation of chemotherapeutic dose according to body surface area.	**2**	**1**
Total		**28**	**14**

D- TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorial

E- STUDENT ASSESSMENT METHODS

1- Participation & semester work — to assess intellectual skills
2- Midterm exam — to assess the knowledge & understanding
3-Final term exam — to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30%
Final-term Examination	60%
Quiz	10%
Total	**100%**

F- REFERENCES

Howard C. Ansel, 2010, Pharmaceutical Calculations. 13th Ed., Georgia, Publisher: Lippincott.

Course specification of Pharmaceutics 1

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Pharmaceutics 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Second Year / First Semester				
4	**Pre –requisite (if any):**	Physical Pharmacy & Pharmaceutical Calculation				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

To acquire student a detailed knowledge and understanding concerning preparation and controlling of various pharmaceutical dosage forms.

To provide the student with the knowledge about the theoretical principles outlined in the syllabus in relation to preformulation concepts, design and formulation of a different pharmaceutical dosage forms.

Correlate the theoretical knowledge to the formulation of proprietary dosage forms discussed in this syllabus and an understanding of the manufacturing processes involved in the preparation of these dosage forms.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Explain the principles of reformulation of pharmaceutical dosage forms.
a2. Describe the characteristics of the liquid dosage forms and explain how these characteristics affect the action of the drug.
a3. Explain the principles of design and formulation, manufacturing of pharmaceutical liquid dosage forms.

B-Intellectual Skills:

b1. Analyze the instability of pharmaceutical dosage forms when occurred.
b2. Categorize the drug manufacturing relating problems and solve it.
b3. Manipulate the stability study data.

C-Practical Skills:

c1. Prepare of certain pharmaceutical dosage forms.
c2. perform quality control for pharmaceutical dosage form.
c3. Formulate good and stable dosage form like solutions, emulsion and suspension.
c4. Design and perform stability studies for pharmaceutical dosage forms.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Pre-formulation studies** ▪ Study of physical properties of drug and its effect on formulation like • Physical form • Particle size • Shape • Density and angle of repose • Wetting • Dielectric constant • Solubility • Dissolution • Organoleptic properties ▪ Excipients compatibility ▪ Drug extraction ▪ Selection of solvent ▪ Maceration and percolation ▪ Common solvents used in pharmacy.	**4**	**2**

2	**Solution**
	• Introduction
	• Classification of pharmaceutical solution
	  ○ Aqueous solution
	  ○ Non aqueous solution
	• Formulation (vehicles used and additives)
	• Isotonicity
	• Stability of solution
	• Manufacture of solution
		8	**4**

3	**Suspension** • Advantages and disadvantages • Pharmaceutical application of suspension • Types of suspensions • Formulation of suspension • Difference between Flocculation, deflocculation. • Factors affecting sedimentation rate of suspension. • Formulation of various types of suspensions. • flocculating agents • Viscosity modifiers • Formulation additives • Stability testing of suspension	**6**	**3**

4	**Emulsion**
	• Emulsion types
	• Emulsion uses
	• Identification of emulsion type
	• Emulsion formulation
	  ▪ Choice of emulsion type, and oil phase
	  ▪ Emulsion consistency
	  ▪ Choice of emulsifying agent
	• Preparation of emulsion
	• Classification of emulsifying agents
	• Stability of emulsion
	• Stability testing of emulsion
		6	**3**

5	**Parenteral preparation**
	• Pre-formulation factors
	  ○ Route of administration of injection
	  ○ Water for injection
	  ○ Pyrogenecity
	  ○ Non-aqueous vehicles
	  ○ Isotonicity and methods of adjustment
	• Formulation details
	  ○ Formulation of injection (the vehicles, osmotic pressure, pH, specific gravity, suspension for injection, emulsion for injection)
		4	**2**

	○ Containers and closures selection • **Sterilization** ○ Importance ○ Methods		
Total hours		**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures
2. Tutorials
3. Practical
4. visiting to pharmaceutical industry companies.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	**100**	**%**

F- REFERENCES:

1. Aulton ME Pharmaceutics: The science of dosage form design Livingstone, 1988.
2. Burns D M and MacDonald S G G Physics for biology and pre-medical students 2nd edn, Addison-Wesley, 1975.
3. Collett D M and Aulton M E Pharmaceutical practice Churchill Livingstone, 1990.
4. Martin A N and 30th edn, Pharmaceutical Press, 1993.
5. Parrott E L Pharmaceutical others Physical pharmacy 4th edn, Lea and Febiger, 1993.

Course specification of Physiology 1

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Physiology 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Second Year / First Semester				
4	**Pre –requisite (if any):**	Biology				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelors of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. Acquire an appropriate functional background of cells, tissues, organs& systems.
2. Integrate physiological data & mechanisms with the ongoing basic sciences: Anatomy, histology& biochemistry and clinical applications.
3. Follow the rapidly changing and inflating details about molecular biology & genetics.
4. Explore in detail the functions of the autonomic, the neuromuscular, the respiratory and the cardiovascular systems as well as their integration to achieve homeostasis.
5. Develop the basic scientific research skills as well as effective communication and team work attitudes.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Recognize the cellular functions at the organelle and molecular level.
a2. Describe & explain the function of the nerve cell the nerve & muscle fiber grossly & the molecular level.
a3. Explain function of the autonomic nervous system, different component of blood, the respiratory & cardiovascular system both grossly and molecular level.

B-Intellectual Skills:

b1. Analze the most important physiological laboratory results (blood, respiratory, neuromuscular), to distinguish a physiological from pathological condition.
b2. Comment, on some clinical parameters such as: ABP, ECG, nerve conduction velocity pulmonary functions for a normal individual.
b3. Integrate physiology with other basic and clinical sciences.

C-Practical Skills:

c1. Detect the most important respiratory function tests.
c 2. Perform the measurement of the arterial blood pressure.
c 3. Manipulate a stethoscope for hearing heart & respiratory sounds.
c 4. Record & read an electrocardiogram.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Cell:** • Brief account on cell structure	1	2
2	**Respiratory system:** • Physiology of respiration. • Control of respiration • Hypoxia, cyanosis and dyspnea • Pulmonary function tests	2	4
3	**Digestive system:** • Function of digestive organs. • Movements of alimentary canal • Role of enzymes in digestive process	2	4
4	**Nervous system:** • Neurons • Synapses	3	6

	• Ganglion • Membrane potential • Impulse generation and conduction • Reflex arc • Function of central nervous system. • Autonomic nervous system		
5	**Muscular system:** • Physiology of muscle contraction • Movement of muscles. • Muscular disorder	2	4
6	**Urinary system :** • Function of urinary organs. • Fluid & electrolytes balances.	2	4
7	**Physiology of special senses:** • Function of: Skin, Eye, Ear, Nose, and Tongue. • Physiology smell, taste, vision, hearing and pain.	2	4
Total		28	14

D- TEACHING AND LEARNING METHODS:

1. Lectures using data show
2. Video animation and seminars
3. Group discussion
4. Tutorial
5. Laboratory work (Models)

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work — to assess intellectual skills
2- Midterm exam — to assess the knowledge & understanding
3-Final term exam — to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Seminar & Quiz	10 %
Midterm exam	30 %
Final term exam	60 %
Total	**100 %**

F- REFERENCES:

1. Essentials of Human Physiology for Pharmacy, Laurie Kelly first Ed. 2005, CRC Press, Pharmacy Education series.

Second Year
Second Semester

Course specification of Analytical chemistry 2

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Analytical chemistry 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Second Year / Second Semester				
4	**Pre –requisite (if any):**	General Chemistry				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

4- Recognize the benefits and problems of analytical chemistry II for society.
5- Define the basic principles of analytical chemistry II and analytical techniques used in analytical chemistry.
6- Explain the suitable requirements of precipitation titrations.

7- Demonstrate an understanding of solution chemistry, prepare and performing stoichiometric calculations of Ksp,molar solubility and solubility.
8- Define the basic principles of reduction – oxidation Equilibria and complex metric titrations invol EDTA.
6- Describe the types of gravimetric methods.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Recognize the different types of analytical chemistry techniques requirement for suitable volumetric analysis and express the concentrations of solutions.
a2. Explain the neutralization reactions, acid and base,indicators and buffer solutions.
a3. Describe the precipitation reaction, redox reaction, complexometric titrations and the types of cations and anions.

B-Intellectual Skills:

b1. Analyze the different types of samples.
b2. Integrate the concepts of analytical chemistry with those of other related fields and interpret certain medical phenomena based on such concepts

C-Practical Skills:

c1. Use the balance, equipment in laboratory to identify and measure the concentrations.
c2. Apply rules and guidelines related to safety precautions in the laboratory to perform experiments in a risk-free environment
c3. Design and apply experiments in the field of analytical sciences.
c4. Calculate the different types of concentrations of solution.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Course introduction and refreshments for volumetric methods.	**2**	**1**
2	Precipitation Equilibria, factors affecting the solubility of the precipitate.	**2**	**1**
3	Applications involving calculations of sparingly soluble salts.	**2**	**1**
4	Deferent methods of titrations and their applications. Titration curve determination.	**2**	**1**
5	Reduction – Oxidation Equilibria, types of electrochemical cells.	**2**	**1**
6	Electrode potential and types of electrodes.	**2**	**1**
7	Calculations concerning the application of Nernest equation.	**2**	**1**
8	Redox – titration, titration curve and factors the titration curves.	**2**	**1**
9	Iodi and iodo metric titrations and applications for determination of reducing and oxidizing agents.	**2**	**1**
10	Complexation Equilibria Complexation Equilibria complexing, types of agents and their conditions of applications.	**2**	**1**

11	Complexometric titrations involving EDTA	**2**	**1**
12	Applications of EDTA – titration methods	**2**	**1**
13	Gravimetric methods of analysis.	**2**	**1**
14	Application for the determination of deferent types of salts	**2**	**1**
Total		**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion.
3. Lab. Work.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	**100**	**%**

F- REFERENCES:

1. Analytical chemistry (an introduction) by Skoog/West/Holler (edition)6th (1994), Saunders Golden SunBurst series, ISBN:0-03-097285.
2. Analytical chemistry (principles) by john H. Kennedy (editor) 1st edition (1984), HARCORT BRACE JOANOVICH, ISBN: 0-150502700-x.
3. Analytical Chemistry by Gary D. Christian publisher: Wiley; 6edition (March7,2003) ISBN:0471214728
4. Quantitative analysis by R.A-Day, JR, A.L-UNDERWOOD (editors) 6th edition (1991), prentice-Hall, ISBN:0-13-747361-3.

Course specification of Histology

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Histology**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Second Year / Second Semester				
4	**Pre –requisite (if any):**	Anatomy				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

For students undertaking this course, the aims are to:

1.Describe how the embryology development of different tissues and organs from three germ layers: ectoderm, mesoderm, endoderm.
2. Introduce the types of tissues: epithelial, connective, muscles and nervous.
3. Introduce the structures and functions for each tissues.
4.Recognize the locations of each cells.
5. Describe the structures of bone and cartilage.

2-INTENDED LEARNING OUTCOMES:

A. KNOWLEDGE AND UNDERSTANDING:

a1. Recognize how the tissues and organs development during the embryology, By using power point presentation using videos and several pictures.

a2. Identify the chemical systems employing both qualitative and quantitative approaches.

a3. Identify functions of cells and tissues and understand the structures for each tissue, By using power point presentation using videos and several pictures.

B. INTELLECTUAL SKILLS

b1. Correlate between histological structure and function of different organs of all studied systems.

b2. Relate the composition of each tissue type to its specific functions.

b3. Differentiate between normal and abnormal karyotyping .
b4. Predict which structures are present in a cell from its function.

C. PROFESSIONAL AND PRACTICAL SKILLS

c1. List the instruments and techniques used to prepare and study histological specimens. By using power point presentation using videos and several pictures to see the cells and tissues.
c2. Detect different cellular and intracellular components in electron photomicrographs.
c3. Interpret the difference between types of cells and tissues in histological slides.

D. GENERAL AND TRANSFERABLE SKILLS

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Introduction to histology-types of tissues**	**2**	**1**
2	**Epithelium:** • General characteristics of epithelium & its types • Types of simple epithelium (structure & sites) • Structure & sites of stratified squamous & stratified columnar epithelium • Glandular epithelium with reference to sites • Neuro- and myo-epithelium with reference to sites • General functions of epithelium • Modifications of epithelial cells surfaces: Apical, basal & lateral modifications • Basement membrane	**4**	**2**
3	**Connective Tissue:** • General characteristics • Cells of C.T. proper (LM, EM & functions) • Fibers of C.T. • Ground substance • Types of C.T. proper with reference to sites • General functions of C.T. proper • Adipose Tissue	**2**	**1**

4	**Cartilage:** • Types of cartilage • Histology of each type • Sites of each type • General functions	**2**	**1**
5	**Bone:** • Types of bone with reference to sites • Methods of preparation of bone section • Bone cells & their functions • Intercellular substance (components & chemical composition) • Histology of compact bone • Histology of spongy bone • Differences between cartilage & bone • Ossification (intramembranous & intracartilagenous)	**2**	**1**
6	**Blood & Hemopoiesis:** • Components of Blood • Staining of blood cells • Normal structure, size & number of erythrocytes , ultrastructure & functions • Abnormalities in structure, size & number of RBCs • Polycythaemia & anaemia and their causes • Types of WBCs & normal percentage of each • Total RBCs count • Total leucocytic count & its clinical importance • Differential leucocytic count & its importance • Structure (LM & EM) & function of WBCs • Structure (LM & EM) & function of platelets • Types & structure of bone marrow • Erythropoiesis • Granulopoiesis • Development of lympocytes • Development of monocytes • Development of platelets	**4**	**2**
7	**Muscle Tissue:** • General histological characteristics and types of muscle tissue • Skeletal muscle fibers (LM , EM) & molecular structure • Types of skeletal muscle fibers • Mechanism of muscle contraction • Smooth muscle fibers (LM & EM)	**2**	**1**

	• Cardiac muscle fibers (LM & EM) • Conducting system of heart		
8	**Nerve Tissue:** • Types (classification) of neurons & examples • EM of nerve cell body (Perikaryon) Dendrites & axons • Types of nerve fibers with examples • Histology of peripheral nerve fibers • Structure of nerve trunk • Spinal & autonomic ganglia • Synapse • Degeneration & Regeneration of nerve fibers • Neuroglia (Definition, Classification & Sites) • Structure & function of proper neuroglia cells	**4**	**2**
9	**Vascular System:** • General structure of blood vessels & its significance • Large, medium sized & small arteries • Small, medium sized & large veins • Types, sites & structure of Arteriovenous connections	**2**	**1**
10	**Lymphatic (Immune) System:** • Cells involved in the immune system & their functions • Antigen presenting cells • Primary & secondary immune response • Cellular & Humoral immunity • Lymph vessels & distribution of lymphoid tissue • Structure of Lymph node & its immunological function • Structure of Spleen & its function • Differences between lymph node & spleen • Blood supply of spleen & theories of circulation • Structure of Tonsils • Structure & functions of thymus	**4**	**2**
	Total	**28**	**14**
D- TEACHING AND LEARNING METHODS:			

1. Lectures.
2. Discussion.
3. Lab. Work.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	**100**	**%**

F- REFERENCES:

1. Histology and cell biology for medical students part 1 and part 2, 2013 staff members of histology department faculty of medicine Cairo university.
2. Anthony Mescher 2013. Basic Histology: Text and Atlas, 13th edition,2013.

Course specification of Organic chemistry 2

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Organic chemistry 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Second Year / Second Semester				
4	**Pre –requisite (if any):**	General Chemistry				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

At the end of this module, student will be able to:

1. Acquire a Knowledge of basic organic chemistry regarding synthesis and reactions of the main organic functional groups, organic stereochemistry.
2. Nomenclature the different organic compounds.
3. Describe the relationship between structure, physical and chemical properties.
4. Illustrate the preparations and reactions mechanism of common functional groups

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Acquire knowledge the origin and the theory of aromaticity in addition to important features of benzene chemistry (electrophilic substitution reactions and directing groups).
a2. Identify other benzene derivatives such as: alkyl halides halogen, alcohol, ethers and epoxides, aldehydes, ketones, carboxylic acid and amines.
a3. Acquire the required knowledge of all basics chemistry, reactions and structures of different compounds.

B-Intellectual Skills:

b1. Analyze the different organic compounds according to their functional groups and elements.
b2. Carry out simple chemical reactions, write chemical reaction equation.
b3. Identify the products of any reaction
b4. Distinguish the functional groups of organic compounds by their physical and chemical properties.

C-Practical Skills:

c1. Apply appropriate laboratory techniques in synthesis the organic compounds and analyzing their purity, safety, potency and quality as per GMP.
c2. Identify organic compounds by using chemical reaction tests.
c3. Perform a selection of basic laboratory procedures in general chemistry.

D-General Skills and Attitudes:

d1. Work effectively both in a team, and independently on solving problems.
d2. Communicate effectively with others.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Aromatic compounds • Aromatic character, Huckel rule, Nomenclature. • Electrophilic aromatic substitution reactions and mechanism of (Alkylation, halogenations, acylations, nitration, sulphonation) • side chain (halogenations of alkyl side chain, oxidation). o Orientation in monosubstituted benzenes derivatives.	**4**	**2**
2	**Organic halides** • Nomenclature, physical properties. • Synthesis [halogenations of alkanes, addition of HX to alkenes and alkynes, from alcohol ($SOCl_2$, PX_3, PX_5)]. • (S_N1, S_N2, E1, E2)	**4**	**2**

	• Reactions and mechanisms of (nucleophilic substitution elimination, Grignard's reagent, reduction by metal and acids)		
3	**Alcohols** • Nomenclature, physical properties. • Addition of water to alkenes; oxidiation of alkenes • Substitution of halogen in halide alkyl • Grignard reagent with Aldehdydes , ketones and esters, reduction of Aldehdydes, ketones , acids and esters).	**4**	**2**
4	**Alcohols** • Reaction of alcohols (salt formation, oxidation, ester formation. • Reactions with hydrogen halide, $SOCl_2$, PX_3, • Elimination of H_2O	**2**	**1**
5	**Ethers and epoxides** • Nomenclature, physical properties. • Synthesis of ether (dehydration of alcohols, William synthesis of epoxide, synthesis from alkenes and alcohol.. • Reaction of ethers (with HI, reaction of epoxide (three member ring) with H_2O, ROH, HX, $LiAlH_4$, phenol, Grignard reagent.	**4**	**2**
6	**Aldehyde and Ketones** • Nomenclature, physical properties. • Synthesis [oxidation of alcohols, ozonolysis of alkenes, hydration of alkynes, hydrolysis of alkyl dihalides]. • Reaction of aldehyde and ketones [reaction of carbonyl compounds, addition of Grignard reagent, addition of alkynide ions, addition of HCN. • Addition of alcohol,(hemiacetal, cital, hemiketal, and ketal formation, no mechanism) Addition of ammonia and its derivatives, synthesis of amino acids , acidity of aldehaydes and ketones, aldol condensation	**6**	**3**
7	**Carboxylic acid and their derivatives** • Nomenclature, physical properties. • .Synthesis [oxidation of aldehyde], carbonation of Grignard reagent, hydrolysis of nitrile, and carbonation of acetylene. • Reaction of carboxylic acid(salt formation, formation of acid derivatives: acid chloride, acid anhydride, amide, ester.	**4**	**2**

	• Reaction of acid derivatives [elimination reaction, hydrolysis of acid chloride, ester, reaction with acid chloride, acetylation, reduction		
Total		**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures using data show.
2. video animation and seminars
3. Solving Problem method.
4. Laboratory work.
5. directed reading.
6. independent study and discussion

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	**100**	**%**

F- REFERENCES:

1-Organic chemistry: A short course by Harold Hart, Leslie E. Craine, David J. Hart, publisher: Houghton Miffin college; 10th edition (January 1999) ISBN: 0395902258.

2-Paul M.Dewick, 2006, Essentials of Organic Chemistry, 1st edition,Willy black well publisher, USA

Course specification of Pharmaceutics 2

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Pharmaceutics 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Second Year / Second Semester				
4	**Pre –requisite (if any):**	Physical Pharmacy & Pharmaceutical Calculation				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. To acquire a detailed knowledge and understanding concerning preparation and controlling of various pharmaceutical dosage forms.
2. To provide theoretical principles outlined in the syllabus in relation to pre-formulation concepts, design and formulation of a different pharmaceutical dosage forms.
3. To correlate the theoretical knowledge to the formulation of proprietary dosage forms discussed in this syllabus and an understanding of the manufacturing processes involved in the preparation of these dosage forms.

2-INTENDED LEARNING OUTCOMES:

A. KNOWLEDGE AND UNDERSTANDING:

a1- Acquire knowledge on the principles of design and formulation of pharmaceutical aerosol dosage forms.

a2- Recognize the principles of design and formulation of pharmaceutical semisolid dosage forms.

a3- Explain the manufacturing process involved in the preparation of pharmaceutical ophthalmic dosage forms.

B. INTELLECTUAL SKILLS

b1-Analyze the instability of pharmaceutical dosage forms when occurred.
b2-Illustrate the drug manufacturing relating problems and solve it.
b3-Manipulate the stability study data.

C. PROFESSIONAL AND PRACTICAL SKILLS

c1- Prepare of certain pharmaceutical dosage forms.
c2- perform quality control for pharmaceutical dosage form.
c3- Formulate good and stable dosage form like ointments, creams and suppositories**.**
c4- Design and perform stability studies for pharmaceutical dosage forms.

D. GENERAL AND TRANSFERABLE SKILLS

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Ophthalmic preparation** • Principles of ocular drug absorption. • Ophthalmic solution. • Ophthalmic suspension. • Ophthalmic ointments. • Ocuserts (ophthalmic inserts) • Examples of drugs used to treat certain eye diseases.	**6**	**3**

2	**Therapeutic aerosols**
	• Definition and uses of therapeutic aerosols.
	• Instability of aerosols
	• Deposition of aerosols in the human respiratory tract.
	• Formulation and generation of aerosols
	  ○ Pressurized packages
	  ▪ Type of propellants
	  ▪ Containers
	  ▪ Formulation aspects
	  ▪ Performance of pressurized packages as inhalation aerosol generators
	  ○ Air-blast nebulizers
	  ○ Dry powder generators
	• Methods of preparation
	• Evaluation methods
	  ○ Leaking and pressure testing of containers.
		6	**3**

	○ Output, drug concentration and dose delivered Size analysis		
3	**Semisolid dosage forms** • Skin Anatomy and physiology • Percutaneous absorption and factors affecting it. • Ointments ▪ Classification of ointment bases ▪ Additives included in ointment bases ▪ Methods of Preparation of ointments and packaging. ▪ Some examples of medicated ointments • Creams ▪ definition ▪ Classification of creams ▪ Some examples of medicated creams • Pastes ▪ Definition ▪ Composition ▪ Examples of medicated pastes • Gels ▪ Composition and uses • Evaluation of drug release from ointment and cream bases.	**10**	**5**
4	**Suppositories** • Introduction • Advantages and disadvantages • Anatomy and physiology of rectum • Factors affecting rectal drug absorption. • Shapes and size of suppositories. • Types of suppository bases. • Methods of Preparation of suppositories. • Displacement value • Calibration of suppository mould with bases.	**4**	**2**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures
2. Tutorials
3. Practical
4. visiting to pharmaceutical industry companies.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	**100**	**%**

F- REFERENCES:

1. Aulton ME *Pharmaceutics: The science of dosage form design* Livingstone, 1988
2. Burns D M and MacDonald S G G *Physics for biology and pre-medical students* 2nd edn, Addison-Wesley, 1975
3. Collett D M and Aulton M E *Pharmaceutical practice* Churchill Livingstone, 1990
4. Martin A N and others *Physical pharmacy* 4th edn, Lea and Febiger, 1993

Course specification of Physiology 2

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Physiology 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Second Year / Second Semester				
4	**Pre –requisite (if any):**	Biology				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical sciences – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. Acquire an appropriate functional background of cells, tissues, organs& systems.
2. Integrate physiological data & mechanisms with the ongoing basic sciences: Anatomy, histology& biochemistry and clinical applications.
3. Follow the rapidly changing and inflating details about molecular biology & genetics.
4. Explore in detail the functions of the autonomic, the neuromuscular, the respiratory and the cardiovascular systems as well as their integration to achieve homeostasis.
5. Develop the basic scientific research skills as well as effective communication and team work attitudes.

2-INTENDED LEARNING OUTCOMES:

A-KNOWLEDGE and UNDERSTANDING:

a1. Acquire knowledge on the cellular functions at the organelle and molecular level.
a2. Explain the functions of the nerve cell the nerve & muscle fiber grossly & the molecular level.
a3. Illustrate functions of the autonomic nervous system, different component of blood, the respiratory & cardiovascular system both grossly and molecular level.

B-INTELLECTUAL SKILLS:

b1. Analyze the most important physiological laboratory results (blood, respiratory, neuromuscular), to distinguish a physiological from pathological condition.
b2. Comment, on some clinical parameters such as: ABP, ECG, nerve conduction velocity pulmonary functions for a normal individual.
b3. Integrate physiology with other basic and clinical sciences.

C-PRACTICAL SKILLS:

c1. Detect the most important respiratory function tests.
c2. Perform the measurement of the arterial blood pressure.
c3. Manipulate a stethoscope for hearing heart & respiratory sounds.
c5. Present physiological scientific data in a graphical form.

D-GENERAL SKILLS AND ATTITUDES:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Blood and lymph: • Composition and function of blood • Blood groups • Blood coagulation • Anemias • White blood cells and immunity • Lymph formation and function • Lymph channels	**6**	**3**
2	Cardiovascular system: • Heart • Structure and function of heart • Cardiac cycle (blood circulation) • Blood pressure and its regulation • ECG: methods of recording, normal record and common abnormalities.	**4**	**2**
3	Endocrine system: • Physiology of endocrine glands ○ Thyroid ○ Pancreas ○ Pituitary ○ Adrenal glands ○ Gonads	**6**	**3**
4	Reproductive system: • Female:	**12**	**6**

	▪ Functions of Vulva, monsveneris ▪ Functions of Labia major & minor ▪ Functions of Clitoris, Vestibule ▪ Functions of Hymen Bartholin glands. ▪ Function of Ovaries, Fallopian tube, Uterus, Vagina, menstrual cycle, menopause. ▪ Function of Breast. • Male : ▪ Function of semis and scrotum ▪ Functions of Testes, seminal fevous tubules ▪ Functions of Epidielymis, prostate glands ▪ Functions of Vas deferebces seminal vesicles. • Family planning methods • Sexually transmitted diseases		
Total		**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion.
3. Lab. Work.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Seminar & Quiz	10%
-Midterm exam	30%
-Final term exam	60%
Total	**100%**

F- REFERENCES:

1. Essentials of Human Physiology for Pharmacy, Laurie Kelly first Ed. 2005, CRC Press.
2. A–Z of Haematology first Ed. Barbara J. Bain and Rajeev Gupta, Blackwell Publishing Ltd. London 2003.
3. Textbook of Anatomy and Physiology. William Arnould-Taylor and Nelson Thornes, 1998)
4. Anatomy and Physiology 13th edition, David Shier 2012

Course specification of psychology

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**psychology**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Second Year / Second Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. Identify the conditions that affect memory and intelligence.
2. Determine the role of pharmacists in public health education.
3. Recognize the social and behavioral sciences related to pharmacy.
4. Recognize skills of thinking and decision making.
5. Predict" How to improve your mood and money".
6. utilize knowledge and critical understanding of essential facts, concepts, principles and theories relating to the subject area
7. Demonstrate the role of the pharmacist in public health education, regarding vaccination, drug abuse and misuse.
8. Apply negotiation skills.
9. Adopt the principles of patient communication to gain trust from the patient.
10. Develop problem-solving skills.
11. Demonstrate self-protection skills.
12. Developing skills of good selling, finance, stock management and negotiation.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1.Identify the conditions that affect memory and intelligence.
a2.Determine the role of pharmacists in public health education.
a3. Recognize the social and behavioral sciences related to pharmacy.

B-Intellectual Skills:

b1. Recognize thinking and decision making skills.
b2. Predict" How to improve your mood and money".
b3. utilize knowledge and critical understanding of essential facts, concepts, principles and theories relating to the subject area.

C-Practical Skills:

c1. Demonstrate the role of the pharmacist in public health education, regarding vaccination, drug abuse and misuse.
c2. Apply negotiation skills.
c3. Adopt the principles of patient communication to gain trust from the patient.

D-General Skills and Attitudes:

d1. Work effectively both in a team, and independently on solving problems.
d2. Communicate effectively with others.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Introduction and terminology & Psychology of learning	**2**	**1**
2	Psychological principles & Personality.	**2**	**1**
3	Biological basic of behavior & Mental processes: a. Sensation b. Conceit c. Emotion	**2**	**1**
4	Mental abilities	**2**	**1**

5	Motor skills & Psychology of negotiation skill	**2**	**1**
6	Motives	**2**	**1**
7	Psychological health	**2**	**1**
8	An introduction to pharmacological Psychology & Psychotherapy	**4**	**2**
9	Behavioral medicine &The principles of medical sociology	**2**	**1**
10	Sociology of medicine & Sociology of hospital	**2**	**1**
11	Preventive method & Psychological causes of drug abuse and addiction	**2**	**1**
12	Professional medicine	**2**	**1**
13	Psychological and social medicine	**2**	**1**
Total		**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. independent study and discussion
3. video animation and seminars

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Seminar & Quiz	20	%
Mid-Term Examination	30	%
Final-term Examination	60	%
Total	**100**	**%**

A- REFERENCES:

1-Irving B. Weiner, (2003), Handbook of Psychology. Personality and Social Psychology, volume 5, 1st edition, John Wiley & Sons, Inc, Canada.
2. Susan Ayers, Andrew Baum, (2007), Cambridge Handbook of Psychology, Health and Medicine,2nd edition, Cambridge University press, Cambridge,**UK.**

Third Year
First Semester

Course specification of Microbiology 1

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Microbiology 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Third Year / First Semester				
4	**Pre –requisite (if any):**	Biology				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. Acquire knowledge about the antigenic structure of all microorganisms
2. List the classification of microorganisms
3. Deal with infections. Pathogen city and normal microbial flora.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1.Recognize the differential diagnosis of bacteria.
a2. Recognize the pathogens causing diseases in order to prescribe the appropriate medicine**.**
a3. Identify the shape and arrangement of bacteria.

B-Intellectual Skills:

b1. Formulate the different features of the basic principles of microbiology.
b2. Differentiate different bacterial nomenclatures; bacterial names &arrangements.
b3. Plan the different between pathogenic bacteria and normal flora.
b4. Interpretation the result of diagnostic tests.

C-Practical Skills:

c1.Select the suitable and specific media for each each bacteria.
c2. Prepare and identify pathogenic bacteria by growing in cultures, morphologic shape and arrangements.
c3. Identify the differential diagnosis of bacteria

D-General Skills and Attitudes:

d1. Work effectively in team.
d2. Demonstrate written and oral communication skills.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• Fundamentals of microbiology. • Cell structure.	4	2
2	• The major groups of bacteria. • Microbial metabolism	2	1
3	• Microbial genetics • Pathogenicity and infection	2	1
4	• Normal bacterial flora. • Respiratory tract infection • UTI (urinary tract infection).	4	2
5	• Diarrheal diseases • Meningitis • Sepsis (Infection of skin, wounds, burns and eyes).	4	2
6	• Systemic bacteriology	2	1
7	• Systemic bacteriology	2	1
8	• Virology	2	1
9	• Virology	2	1
10	• Mycology	2	1
11	• Mycology	2	1
	Total	28	14

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion.
3. Lab. Work.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

1- Pharmaceutical Microbiology by A.D. Russell, W.B Hugo (editor) publisher: Blackwell Science 3rd edition (December 1983) USBN: 0632010487

2- Medical Microbiology by Patrick Murray, Ken Rosenthal, G. Kobayashi, M, pfaller. Publisher: Mosby 4th edition (January 15 ,2002) ISBN: 0323012132

3- Clinical Microbiology Made Ridiculously Simple

Course specification of Pharmacognosy 1

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Pharmacognosy 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Third Year / First Semester				
4	**Pre –requisite (if any):**	Organic Chemistry 1 & 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

Upon successful completion of this course, the students should be able to

1. Illustrate the morphological and histological structures of different organs of medicinal plants such as seeds, fruits, roots and rhizomes.
2. Discuss role of these medicinal plants in the treatment of different disease conditions.
3. Identify many medicinal Plants microscopically in both their entire and powdered forms.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Describe the histological structure of the different medicinal plant parts, seeds, fruits, roots and rhizomes.

a2. Give an account on the biologically active principles in each plant part (seeds, fruits, roots and rhizomes) as well as their biological activity.

B-Intellectual Skills:

b1. Determine unknown drugs seeds, fruits, roots and rhizomes.. (morphologically and microscopically)

b2. Judge whatever the powdered drug is related to seeds, fruits, roots and rhizomes.

C-Practical Skills:

c1. Use the microscope to decide a given unknown plant powder is related to seeds, fruits, roots and rhizomes.

c2. Design and perform experiments for detection of adulteration.

D-General Skills and Attitudes:

d1. Work effectively in team.

d2. Demonstrate written and oral communication skills.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Introduction to seeds.** • Strophanthus seed. • Nux vomica seed. • Stramonium seed. • Colchicum seed. • Cardamom seed. • Nutmeg seed. • Black mustard seed. • White mustard seed. • Almond seed. • Linseed. • Fenugreek. • Plantago seed. • Castor seed.	8	4
2	**Introduction to fruits** • Umbelliferous fruits • Fennel. • Anise • Coriander • Ammi visnaga. • Ammi majus • Caraway. • Dill. • Cumin. • Celery. • Hemlock. • Black pepper. • Colocynth. • Senna pod. • Juniper.	8	4

	• Star anise. • Lemon peel. • Bitter orange peel. • Hops. • Vanilla. • Ccapsicum. • Poppy • ntroduction to • subterranean organs • (roots & rhizomes)		
3	**Rhizomes:** • Filix mass. • Veratrum. • Valerian. • Rhubarb. • Podophyllum. • Hydrastis. • Ginger. • Galengal. • Turmeric. • Orris. • Calmus • Colchicum.	**6**	**3**
4	**Root:** • Liquorice. • Ipecacuanha • Dandelion. • Krameria. • Derris. • Rauwolfia. • Alkanna. • Senega. • Calumba. • Althea. • Marshmallow. • Gentian. • Belladonna. • Jalap. • Scammony. • Aconite. • Sasaparilla.	**6**	**3**

	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion.
3. Lab. Work.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

Trease, G.E.& Evans, W.C.; “Pharmacognosy”, W.B. Saunders Publishers, Ltd, 15th ed., 2002.

Course specification of Analytical chemistry 3

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Analytical chemistry 3**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Third Year / First Semester				
4	**Pre –requisite (if any):**	General Chemistry				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1- Recognize the benefits and problems of analytical chemistry for society.
2- Define the basic principles of analytical chemistry and analytical techniques used in analytical chemistry III.
3- Explain the Requirements of suitable electromagnetic radiation, and instruments
4- Define the electronic transitions, atomic absorption spectrum, UV-Visible spectroscopy and Beer-Lambert's law.
5- Describe the basic principles of chromatography.
6- Explain the instrumental components and the principles of electrophoresis, gas chromatograp and high performance liquid chromatography.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Recognize the different types of analytical chemistry techniques.
a2. Describe the basic principles of chromatography.
a3. Explain the electromagnetic spectrum, regions of the spectrum and processes in spectroscopy.

B-Intellectual Skills:

b1. Analyze the different types of samples.

b2. Integrate the concepts of analytical chemistry with those of other related fields and interpret certain medical phenomena based on such concepts.

C-Practical Skills:

c1. Use the balance, equipment in laboratory to identify and measure the concentrations.
c2. Apply rules and guidelines related to safety precautions in the laboratory to perform experiments in a risk-free environment
c 3. Design and apply experiments in the field of analytical sciences.
c 4. Calculate the different types of concentrations of solution.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Introduction to Instrument analysis	**2**	**1**
2	Electromagnetic radiation Instruments	**2**	**1**
3	Electronic transitions Absorption spectrumUV-Visible spectroscopy	**4**	**2**
4	Electronic transitions	**2**	**1**
5	Transmittance Beer-Lambert's law	**2**	**1**
6	Beer-Lambert's law, Colorimetry(Visible Light Spectrophotometry)	**2**	**1**
7	Atomic absorption	**2**	**1**
8	Chromatography	**4**	**2**
9	Rate of flow (R_f) value Distribution Constants Retention Times Tailing or Fronting: Quantitative Description of Column Efficiency	**2**	**1**
10	Factors Affecting Column Efficiency and chromatography Separation	**2**	**1**

	Column Resolution ELECTROPHORESIS		
11	Gas Chromatography High Performance Liquid Chromatography	**4**	**2**
Total		**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion.
3. Lab. Work.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	**100**	**%**

F- REFERENCES:

1. Analytical chemistry (an introduction) by Skoog/West/Holler (edition)6th (1994), Saunders Golden SunBurst series, ISBN:0-03-097285.
2. Analytical chemistry (principles) by john H. Kennedy (editor) 1st edition (1984), HARCORT BRACE JOANOVICH, ISBN: 0-150502700-x.
3. Analytical Chemistry by Gary D. Christian publisher: Wiley; 6edition (March7,2003) ISBN:0471214728
4. Quantitative analysis by R.A-Day, JR, A.L-UNDERWOOD (editors) 6th edition (1991), prentice-Hall, ISBN:0-13-747361-3.

Course specification of Biochemistry 1

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Biochemistry 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Third Year / First Semester				
4	**Pre –requisite (if any):**	General Chemistry, Biology				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. To gain an overview of Medical Biochemistry specialty e.g., its philosophy, features and methods.
2. To help students to become familiar with the biochemical knowledge and skills necessary to understand other related subjects.
3. To provide the students with an appropriate exposure to the medical biochemistry discipline this will assist students in understanding biochemical alteration in health and disease.
4. To provide students with good knowledge about structure and function of carbohydrate, lipids and proteins.
5. To provide an explanation of the relationship between the three-dimensional structure of macromolecules and their biological activities.
6. Course Specifications 2005-2006
7. To enable the students to be oriented with structure and biochemical importance of vitamins as well as the structure, functions and kinetics of enzymes.
8. To enable the students to be oriented with concepts of molecular biology and how this field gave us a new perspective and new technology used in the diagnosis, treatment and new drugs design.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Define the structure and function of carbohydrates, lipids, proteins, nucleotides and enzymes and their action , kinetics of and their role in the diagnosis of diseases.

a2. Illustrate structure and role of vitamins derivatives as coenzymes needed in the activity of enzymes and Point out diseases produced by vitamins deficiency and their clinical prints on the biochemical and molecular basis.

a3. Describe the biological transport and cell membrane and their biochemical, clinical and laboratory important and describe DNA structure, replication, mutation and repair.

B-Intellectual Skills:

b1. Interpret symptoms, signs and biochemical laboratory findings of some vitamins deficiency disease.

b2. Interpret some plasma proteins electrophoresis

b3. Point out the clinical significance and some enzymes reactions and kinetics

b4. Point-out the application of molecular biology in basic and clinical sciences

C-Practical Skills:

c1. Detect laboratory reagents and instruments used in biochemistry laboratory.

c2. Perform chemical tests to study the properties of lipids and fatty acid.

c3. Estimation of total plasma proteins.

c4. Detect unknown solutions.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**PHYSICO CHEMICAL PRINCIPLES:** Molecular structure of water. Different types of bonds -Solution-OH and pH- acids and Bases- Normal and molar solutions-Buffers and physiological buffers-osmotic pressure and surface tension- Adsorption and elution and dialysis – Diffusion expression of concentration.	2	1
2	**CARBOHYDRATES:** • Definition, functions and classification: Monosaccharide, disaccharides and polysaccharides	8	4

	• Monosaccharides: Classification, structures and physical and chemical properties. Sugars exhibit various forms of isomerism. • Monosaccharides of physiological importance: glucose, fructose, galactose and mannose. • Glycoside formation with each other and with other compounds. • Sugar derivatives of importance: sugar acids, sugar alcohols, aminosugars and deoxysugars. • Disaccharides: maltose, sucrose, and lactose. • Polysaccharides starch, glycogen, cellulose and insulin. • Glycosaminoglycans (mucopolysaccharides): Structure, function and classification. • Glycoproteins (mucoproteins) proteoglycan.		
3	**LIPIDS:** • Lipids of physiological functions: Definition, classification and general function. • Fatty acids: Saturated and unsaturated w3 and w6 PUFA, OH fatty acids and methyl fatty acids. • Triacylglycerol the main storage form of lipids. • Waxes. • Phospholipids: phosphatidyl compounds - sphingomylines. Importance and functions. • Glycolipids. • Sterols: ergosterol and cholesterol, 7-dehydrocholesterol, vitamin D, bile acids and steroid hormones. • Eicosanoids: prostanoids, prostaglandins, prostacyclins, thromboxanes, leukotrienes and lipoxins. • Polyprenoids: share the same parent cholesterol, ubiquinone and dolichol • Isopernoids : fat soluble vitamins and carotenes • Lipid peroxidation and antioxidants	**6**	**3**
4	**AMINO ACIDS AND PROTEIN:** • Amino acids: classification according to different parameters: Essentiality, polarity, nutritionally, and structural. • Properties: optical activity, amphoteric and general properties, peptide formation (examples — glutathione- insulin etc) - derived compounds.	**6**	**3**

	• Biochemical importance and functions of proteins: structural — defense — enzymes — transport — regulation — some hormones. • Conformation of the proteins: primary, secondary, tertiary, quaternaly — domains — motifs denaturation. • Classification: simple — conjugated. • Hemoproteins: myoglobin and hemoglobin, structural function — hemoglobin, derivatives — types of Hb - cytochromes — catalase. • Immunoglobulin: structure and function of the different type of immunoglobulins. • Methods of proteins separation		
5	**ENZYMES:** • Nature of enzymes: protein mainly - ribozymes. • Mechanism of actions • Specificity. • Classification. • Coenzyxnes and activators • Isoenzymes and zymogens. • Enzyme units— activity — specific activity - factors affecting enzyme activity. • Enzyme kinetics Michaclis constant km and its significance, V max ,Lineweaver -Burk plot (double reciprocal plot) and determinations of km and Vm. • Inhibitors: different types and their effect on km and Vm • Regulation of enzyme activity. • Application and significance of enzyme assay in medicine.	**4**	**2**
6	**VITAMINS:** • Introduction and Classifications • Water soluble vitamins and the derived coenzymes — biochemical changes due to deficiency. • Fat soluble vitamins and their role in biochemical activities	**2**	**1**
	Total	**28**	**14**
	D- TEACHING AND LEARNING METHODS:		

1- Formal Lectures
2- Practical classes
3- Tutorial classes

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

1. **Lippincott's Reviews of Biochemistry,** 3rd edition by Champe PC, Harvey RA, Ferrier DR, Lippincott William & Wilkins London, 2005
2. **Text book of Biochemistry with Clinical Correlations** 5th Ed, Devlin TM Ed.Wiley -Liss New York 2002
3. **Harper's Illustrated Biochemistry:** 26th Ed by Murray RK, Granner DK, Mayes PA, Rodwell VW, McGraw-Hill companies New York, 2003.

Course specification of Organic Chemistry 3

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Organic Chemistry 3**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Third Year / First Semester				
4	**Pre –requisite (if any):**	General Chemistry				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. After completion of pharmaceutical organic chemistry (II) and it's fundamentals, in particular the organic functional groups, this course will provide a comprehensive and sound understanding of the aromatic compounds and their preparations, reactions and IUPAC nomenclature, in this course the student will study the nitrogen compounds, arylhalid. Phenol and sulphonic acid and their derivatives.
2. student will know the organic functional groups and thee preparation and reactions.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Acquire knowledge the origin and the theory of aromaticity in addition to important features of benzene chemistry (electrophilic substitution reactions and directing groups).
a2. Identify other benzene derivatives such as: aryl halides halogen, phenol, nitro compounds diazonium salts,sulfonic acid and their derivatives.
a3. Acquire the required knowledge of all basics chemistry, reactions and structures of different compounds.

B-Intellectual Skills:

b1. Analyze the different organic compounds according to their functional groups and elements.
b2. Carry out simple chemical reactions.
b3. Write chemical reaction equation.
b4. Distinguish the functional groups of organic compounds by their physical and chemical properties.

C-Practical Skills:

c1. Apply appropriate laboratory techniques in synthesis the organic compounds and analyzing their purity, safety, potency and quality as per GMP.
c2. Detect organic compounds by using chemical reaction tests.
c3. Perform a selection of basic laboratory procedures in general chemistry.

D-General Skills and Attitudes:

d1. Work effectively both in a team, and independently on solving problems.
d2. Communicate effectively with others.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Amines:** Definition, Classification, Nomenclature, General Methods of Preparation, Physical Properties, Chemical Properties (Basicity and Salt Formation, Alkylation, Conversion into Amides, Reaction with Nitrous Acid, Ring Substitution in Aromatic Amines, Basicity of Amines, Effect of Substituents on the Basicity of Aromatic Amines, Exhaustive Methylation of Amines and Hofmann Elimination, Cope Elimination).	4	2
2	**Aryl Halides:** Definition**,** Nomenclature, Methods of preparation, Physical properties, Chemical properties (Formation of Grignard reagents, Nucleophilic Aromatic Substitution, replacement by -OH group, replacement by - NH_2 group), The Mechanism of Nucleophilic Aromatic Substitution, Nucleophilic Substitution of Substituted Aryl Halides, Electrophilic Aromatic Substitution, Other Reactions	4	2

	(Wurtz-Fitting Reaction, Ullman Synthesis), The Influence of Substituents on Reactivity in Nucleophilic Aromatic Substitution (Electron-releasing groups, Electron-withdrawing groups), Influene of substituents on orientation in Nucleophilic Aromatic substitution Comparison of Aliphatic and Aromatic Nucleophilic substitutions		
3	**Nitro Compounds:** Structure of Nitro Group, The Importance of Nitro Compounds, General Methods of Preparation (Aliphatic and Aromatic), Reactions of Nitro Compounds (Electrophilic and Nucleophilic Substitutions, Reduction under Different Conditions).	**4**	**2**
4	**Diazonium Salts:** Definition, Nomenclature, Methods of Preparation, The Mechanism of Diazotisation, Physical Properties, Chemical Properties (Replaceme -CI, -Br or -CN Sandmeyer's Reaction, Replacement by -I, Replacement by -F, Replacement by -OH, Replacement by -H, Replacement by Aryl Group, Reduction to Hydrazines, Coupling with Tertiary Amines, Reactiions of Primary and Secondary Amines.	**6**	**2**
5	**Phenols:** Definitions, Nomenclature, Preparations of Phenols, Physical Properties and Hydrogen Bonding, Chemical Properties (Acidity and Effect of Substituents on Acidity of Phenols, Ether Formation-Williamson Synthesis, Ester Formation, Halogenation, Nitration, Sulphonation, FriedelAlkylation and Acylation, Koble Reaction, and Reimer-Tiemann Reaction, Phthalein Reaction with Ferric Chloride).	**6**	**3**
6	**Sulphonic Acids and Their Derivatives:** Definition, Nomenclature, Preparations, Physical Properties, Chemical Properties (Reactions due to lonisable Hydrogen, acidity, salt formation, Formation of Functional Derivatives, formation of sulphonyl chlorides, Replacement of Sulphonic Acid Group by -H, by -OH Group, by -NH Group, Reactions of Aromatic Nucleus, Derivatives of Sulphonic Acid (Chloramine T, Halazone, Saccharin, Sulphanilamide)	**4**	**2**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. seminars.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

1-Organic chemistry: A short course by Harold Hart, Leslie E. Craine, David J. Hart, publisher: Houghton Miffin college; 10th edition (January 1999) ISBN: 0395902258.

2-In adition to the above , the students will be provided with handouts by the lecturer.

3-Organec Chemistry : A Short Course. By Harold Hart, Leslie E. Craine, David J. Hart. Publisher: Houghton Mifflin College: 10th edition (January 1999)

4- Introduction to Organic Chemistry (Study guide & Solutions Manual).by Andrew Streitwieser, Clayton H. Heathercock. Edward M. Kosowe. Publisher: Prentice Hal college Div : (December 1998)

5- Organic Chemistry . by: T.W . Graham Solomons, 8th edition ,2003.

Course specification of Pharmaceutics 3

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Pharmaceutics 3**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Third Year / First Semester				
4	**Pre –requisite (if any):**	Physical Pharmacy & Pharmaceutical Calculation				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. To acquire a detailed knowledge and understanding concerning preparation and controlling of various pharmaceutical dosage forms.
2. To provide theoretical principles outlined in the syllabus in relation to pre-formulation concepts, design and formulation of a different pharmaceutical dosage forms.
3. To correlate the theoretical knowledge to the formulation of proprietary dosage forms discussed in this syllabus and an understanding of the manufacturing processes involved in the preparation of these dosage forms.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Explain the principles of formulation of pharmaceutical solid dosage forms and their characteristics of the solid dosage forms and explain how these characteristics affect the action of the drug.
a2. Understanding the principles of design and formulation of pharmaceutical solid dosage forms.
a3. Know and understand various methods for evaluation of pharmaceutical solid dosage forms.

B-Intellectual Skills:

b1. Recognize the problems encountered during formulation of pharmaceutical dosage forms when occurred.
b2. Identify the drug manufacturing relating problems and solve it.

C-Practical Skills:

c1. Preparation of certain pharmaceutical dosage forms.
c2. perform quality control for pharmaceutical dosage form.
c3. Ability to formulate good and stable dosage form like tablet, capsule and sustained releases dosage forms**.**

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Powder and granules** • Types of powders • Advantages and disadvantages of powders, • Cachets and Tablet triturates. • Preparation of different types of powders encountered in prescriptions. • Weighing methods, possible errors in weighing • Minimum weighable amounts and weighing of material below the minimum weighable amount • Geometric dilution and proper usage and care of dispensing balance. • Granules • Effervescent granules ▪ Formulation ▪ Preparation	**4**	**2**

2	**Tablets**
	Compressed tablets
	• Introduction
	• Advantages and disadvantages.
	• Types of compressed tablets.
	• Tableting methods
	  ○ Direct compression
	  ○ Dry granulation
	  ○ Wet granulation
	• Technology of production of granules on large scale by various techniques.
	• Tablet excipients
	• Large scale production of tablets.
	• Tablet press machines
	• Problems encountered during tablet formulation.
	• Standards quality control tests for tablets.
	• Tablet coating
	  ○ Types of coating
	  ○ Film forming materials
	  ○ Common polymers used for tablet coating.
	  ○ Formulation of coating solution
	  ○ Equipment's for coating
	  ○ Coating process evaluation of coated tablets.
		10	**5**

3	**Capsules**
	Hard and soft gelatin capsules
	• Hard gelatin capsules
	  ○ Advantages and disadvantages
	  ○ Composition of capsule shell
	  ○ Selection of capsule size.
	  ○ Excipients used in hard gelatin capsule formulation.
	  ○ Enteric coating of capsules.
	  ○ Capsule filling process.
	  ○ Storage of hard gelatin capsules.
	• Soft gelatin capsules
	  ○ Advantage and disadvantages.
	  ○ Capsule shell composition.
	  ○ Shapes and sizes.
	  ○ Soft gelatin capsule formulation.
	  ○ Soft gelatin capsule filling process.
		6	**3**

4	**Sustained dosage forms** • Introduction. • Advantages and disadvantages.	**4**	**2**

	• Drugs that can be good candidates for sustained release formulation.
	• Methods to obtain sustained release
	  ○ Pharmaceutical
	  ○ Chemical
	  ○ Biopharmaceutical		

5	**Microencapsulation**
	• Types of microcapsules
	• Importance of microencapsulation in pharmacy,
	• Microcapsulation by
	  ○ Phase separation co-acervation multiorifice
	  ○ Spray drying
	  ○ Spray congealing
	  ○ Polymerization
	  ○ Complex emulsion
	  ○ Air suspension technique
	  ○ Coating pan and other techniques.
		4	**2**

	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

D.1- Lectures
D.2- Tutorials
D.3- Practical

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

1- Aulton ME *Pharmaceutics: The science of dosage form design* Livingstone, 1988
2- Burns D M and MacDonald S G G *Physics for biology and pre-medical students* 2nd edn, Addison-Wesley, 1975
3- Collett D M and Aulton M E *Pharmaceutical practice* Churchill Livingstone, 1990
4- Martin A N and others *Physical pharmacy* 4th edn, Lea and Febiger, 1993
5- Martindale W *The extra pharmacopoeia* 30th edn, Pharmaceutical Press, 1993

Third Year
Second Semester

Course specification of Pharmaceutics 4

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Pharmaceutics 4**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Third Year / Second Semester				
4	**Pre –requisite (if any):**	Pharmaceutical Calculation & Physical Pharmacy				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. *To provide students with an in-depth understanding in principles of drug delivery systems.*
2. To acquire knowledge on the principles, strategies, materials used & fabrication of such drug delivery systems.
3. 3- Illustrate novel pharmaceutical formulations used in drug delivery systems e.g implantable ,transdermal ,Liposomes etc…

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- To Recognize the fundamentals and principles of drug delivery and the applications of these fundamentals to building of controlled drug delivery systems.

a2- To acquire knowledge on the principles, strategies, and materials used in the engineering of drug delivery systems, the various technologies and strategies used in drug delivery

a3- To Explain different materials and approaches used in the design and fabrication of such delivery system

B-Intellectual Skills:

b1-Differentiate between approaches used in the design and fabrication of such delivery System.

b2- Analyze various technologies and strategies used in drug delivery.

C-Practical Skills:

c1- Use different techniques needed for development, formulation, and evaluation of delivery system.

c2- Plan experimental and selecting appropriate techniques demonstrate safe & skillful practical techniques to test the controlled release of materials in an active state.

c3- Identify feasible delivery strategies for these environments based on a predefined set of criteria.

D-General Skills and Attitudes:

d1-Work separately or in a team to research and prepare a scientific topic.

d2-Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• An introduction to the drug delivery system.	4	2
2	• Transdermal drug delivery systems. • Design and fabrication of transdermal/skin drug-delivery.	4	2
3	• Oral drug delivery • Bioadhesive drug delivery system.	4	2
4	• Controlled release dosage forms • Overview of different • carrier systems for advanced drug delivery system.	4	2
5	Approaches to control drug delivery of • Liposomes	4	2

	• Niosomes • Microspheres • Nanoparticles		
6	• Implantable controlled drug delivery system.	**4**	**2**
7	• Ophthalmic drug delivery systems • Drug targeting	**4**	**2**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion.
3. Tutorials.
4. Lab. Work.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

1-Drug Delivery and Targeting; for pharmacists and pharmaceutical Scientists; Anya M. Hillery & Andrew W. Lloyd Ondon and Newyork ; Taylor and Francis)
2- Modified-Release Drug Delivery Technology; Michael J. Rathbone et al.; Marcel Dekker.
3- The theory and Practice of Industrial Pharmacy; LACHMAN; Lea & Febiger
4- Liposome Technology, Vol. 1, Preparation of liposomes; Gregory Gregoriadis; CRC Press, Inc.

Course specification of Biochemistry 2

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Biochemistry 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Third Year / Second Semester				
4	**Pre –requisite (if any):**	General Chemistry & Biology				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. To give the students insight into appreciating how understanding of metabolic processes occurring in the human body, could contribute to the
2. To make students familiar with the various control and integrating mechanisms of diverse biochemical events in different metabolic processes, and to understand normal and abnormal human metabolism.
3. To provide knowledge of basic chemical constituents of biological fluids in health and disease, with the ability to determine the relevant investigations for their applications in clinical diagnosis.
4. To enable the student to illustrate and/or describe the metabolic pathways of purines and pyrimidines bases.
5. To enable the student to point out the bioenergetics of the concerned metabolic pathways under different physiological circumstances.
6. To acquire students experience in biochemical methodology in order to be aware with the clinical biochemistry techniques as diagnostic tools and to be

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Define the metabolic pathways of carbohydrates, lipids, proteins, nucleotides and their micro-molecules and determine the site of each.

a2- Point out the related metabolic disorders and their clinical prints on biochemical and molecular basis, the role of antioxidants in prevention and treatment of chronic diseases.

a3- Classify the functions of hormones and minerals, their biochemical, clinical and laboratory importance and deficiency manifestations of each.

B-Intellectual Skills:

b1- Investigate symptoms, signs and biochemical laboratory findings of some metabolic disorders.

b2- Interpret urine report outcome**.**

b3- Point out the clinical significance of determination of plasma levels of glucose, total proteins, albumin, cholesterol, creatinine and uric acid**.**

b4- Point-out the etiology of metabolic disturbance in a given case study report.

C-Practical Skills:

c1- Identify the physical and chemical characters of normal urine under different physiological conditions.

c2- Perform chemical tests to detect abnormal constituents of urine.

c3- Estimate serum levels of glucose, total proteins, albumin, cholesterol, creatinine and uric acid by colorimetric methods.

c4- Assess glucose tolerance by glucose tolerance test.

D-General Skills and Attitudes:

d3- Work effectively in team.

d4- Demonstrate written and oral communication skills.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• **Carbohydrate metabolism** ○ glycogen metabolism, gluconeogenesis, special metabolism of fructose, galactose and aminosugars, pathological aspects of carbohydrate	2	1

	metabolism and their clinical implications with special emphasis on diabetes mellitus and biochemistry of insulin and other disorders of carbohydrate metabolism and their clinical importance.		
2	• **Metabolism of lipids:** o Dietary lipids, digestion and absorption, metabolism of triacylglycerol, fatty acid metabolism, metabolism of: eicosanoids, conjugated lipids, cholesterol, ketone bodies, classification and disorders of plasma lipoproteins. Pathological aspects of lipid metabolism and their clinical implications.	**2**	**1**
3	• **Metabolism of proteins:** o Dietary proteins, digestion and absorption, general aspect of protein metabolism, metabolism of ammonia, metabolism of individual amino acids with related errors of metabolism, pathological aspects of protein and amino acid metabolism and their clinical implications.	**2**	**1**
4	• **Metabolism of Heme:** o Synthesis of porphyrins and heme, catabolism, hyperbilirubinemia and porphyries.	**2**	**1**
5	• **Bioenergetics steps, regulation, and importance.**	**2**	**1**
6	• **Metabolism of purines and pyrimidines:** o Digestion and absorption of nucleic acids, biosynthesis and catabolism of purines and pyrimidines with the related errors of metabolism (including gout), and synthetic base analogues and their clinical use.	**2**	**1**
7	• **Integrative aspect of metabolism:** o Interconversion of major food stuffs. Metabolic interrelationship between adipose tissue, the liver and extrahepatic tissues. Starve fed state: early fasting— fasting — fed. Glucose hemostasis. Metabolic interrelationship of tissues in various hormonal states obesity, exercise. Pregnancy and lactation.	**2**	**1**

8	• **Mineral**: o Major elements (Ca-P-Mg-Na-K-CI-S) and trace elements (Fe, Cu, Zn, Mn, Co., Cr., I.)	**2**	**1**
9	• **Body Fluids:** o Composition of milk, blood, CSF, sweat seminal fluid and urine in health and disease. Blood plasma, clinical importance of plasma enzymes and proteins. Biochemical aspects of coagulation.	**2**	**1**
10	• **Biochemistry of endocrine glands:** o Group I hormones that bind to intracellular receptor. Group II hormones that hind to cell surface receptor. Mode of action. Secondary messenger. Hormones that regulate calcium: Parathyroid hormones, calcitonin and calciteriol. Endocrine functions of pancreas: Insulin, glucagon, somatostatin and pancreatic polypeptide: Structure, function an their pathological disorders. Hormones of hypothalamus, pituitary, thyroid adrenal and gonads: Structure, function and their pathological disorders.	**2**	**1**
11	• **Tissue chemistry and immunochemistry:** o Biochemistry of connective tissue, bone connective tissue, skeletal and cardiac muscles and cytoskeleton, biochemistry of immune responses.	**2**	**1**
12	• **Free radicals and antioxidants:** o Sources of free radicals. Effect of free radicals on tissues. Antioxidants: types and their roles in prevention and treatment of chronic diseases and cancer	**2**	**1**
13	• **Proteins, Amino acids, disorders related with structures and metabolism.**	**2**	**1**
14	• **Liver and Kidney function and disorders**	**2**	**1**
	Total	**28**	**14**
	D- TEACHING AND LEARNING METHODS:		

1- Lectures.
2- Discussion.
3- Lab. Work.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

1. **Lippincott's Reviews of Biochemistry,** 3rd edition by Champe PC, Harvey RA, Ferrier DR, Lippincott William & Wilkins London, 2005
2. **Text book of Biochemistry with Clinical Correlations** 5th Ed, Devlin TM Ed.Wiley -Liss New York 2002
3. **Harper's Illustrated Biochemistry:** 26th Ed by Murray RK, Granner DK, Mayes PA, Rodwell VW, McGraw-Hill companies New York, 2003.

Course specification of Microbiology 2

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Microbiology 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Third Year / Second Semester				
4	**Pre –requisite (if any):**	Biology				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. Recognize the principles of sterilization and disinfection.
2. Have knowledge of all types of antimicrobial agents and their mechanisms of action.
3. Deal with bacterial resistance against antimicrobial agents.
4. Illustrate classification of non-antibiotic antimicrobial agents and their mechanisms of action.
5. To deal with microbiological aspects of pharmaceutical industry.
6. Acquire knowledge of factory and hospital hygiene and good manufacturing practice

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1.Recognize all types of antimicrobial agents and their mechanisms of action.
a2. Illustrate bacterial resistance against antimicrobial agents.
a3. Acquire the knowledge of factory and hospital hygiene and good manufacturing practice.

B-Intellectual Skills:

b1. Formulate the different features of the basic principles of microbiology.
b2. Differentiate classes of non-antibiotics antimicrobial agents.

b3. Plan factory and hospital hygiene and good manufacturing practice

C-Practical Skills:

c1. Perform bacterial resistance test against antimicrobial agents.
c2. Apply microbiological aspects of pharmaceutical industry.

D-General Skills and Attitudes:

d1. Work effectively in team.
d2. Demonstrate written and oral communication skills.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• An Introduction to the pharmaceutical Microbiology	2	1
2	• Sterilization and principles and practice of disinfection	2	1
3	• Anti-microbial agents • Types of antibiotics, synthetic, anti-microbial agents and semi synthetic.	4	2
4	• Clinical uses of anti- microbial drugs • Manufacture of antibiotics.	2	1
5	• Methods of assaying antibiotics	2	1
6	• Bacterial resistance to antibiotics and (MIC) • Chemical disinfectants, antiseptic and preservatives	4	2
7	• Evolution of non- antibiotic anti-Microbial agents • Mode of action of non-antibiotic antibacterial agents	2	1
8	• Resistance to non-antibiotic anti-microbial agent	2	1
9	• Microbiological aspects of pharmaceutical processing	2	1

10	• Ecology of microorganisms as it affects the pharmaceutical	**2**	**1**
11	• Microbial spoilage and preservation of pharmaceutical products	**2**	**1**
12	• Contamination of non-sterile pharmaceutical in hospital and community environments (nosocomial infection)	**2**	**1**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion.
3. Lab. Work.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

1. Pharmaceutical Microbiology by A.D. Russell, W.B Hugo (editor) publisher: Blackwell Science 3rd edition (December 1983).
2. Medical Microbiology by Patrick Murray, Ken Rosenthal, G. Kobayashi, M, pfaller. Publisher: Mosby 4th edition (January 15 ,2002).
3. Clinical Microbiology Made Ridiculously Simple.
4. Medical Microbiology & Immunology: Examination & Board Review by Warren , Md, phd Levinson, Ernest, Md, phd Jawetz. Publisher: Appleton & Lange; 7th edition (July 12, 2002) ISBN :0071382178

Course specification of Organic chemistry 4

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Organic chemistry 4**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Third Year / Second Semester				
4	**Pre –requisite (if any):**	General Chemistry				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1.Use different chemical information for modeling and analyzing given problems in design of new pharmaceutical compounds as new drugs.
2. Describe the physical and chemical properties of organic compounds.
3.Acquire knowledge about the application of IR ,NMR and UV spectroscopy in identification of organic compounds
4. Explain the synthesis and reactions of polynuclear hydrocarbons and heterocyclic compounds.
5. Recognize current concepts and basic knowledge of polynuclear hydrocarbons and heterocyclic organic compounds.
6. Provide students with basic knowledge of spectroscopy application of identification of organic compounds.
7. Ability of writing chemical reaction mechanisms and identify unknown organic compounds.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Recognize the nomenclature and chemistry of heterocyclic compounds and the different methods of preparation and reactions of them.

a2. Acquire the required knowledge of chemistry, reactions and structures of polynuclear compounds.

B-Intellectual Skills:

b1. Analyze the different organic compounds according to their functional groups and elements.

b2. Carry out simple chemical reactions, write chemical reaction equation.

b3. Differentiate between the products of any reaction.

b4. Distinguish the functional groups of organic compounds by their physical and chemical properties.

C-Practical Skills:

c1. Apply appropriate laboratory techniques in synthesis the organic compounds and analyzing their purity, safety, potency and quality as per GMP.

c2. Identify organic compounds by using chemical reaction tests.

c3. Perform a selection of basic laboratory procedures in general chemistry.

D-General Skills and Attitudes:

d1. Work effectively in team.

d2. Demonstrate written and oral communication skills.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• **Polynuclear Aromatic Compounds :** ○ Definition, Bonding in Polynuclear Aromatic Compounds (Naphthalene, Anthracene, Phenanthrene), Naphthalene, Nomenclature and Isomerism of Naphthalene Derivatives, Physical Properties of Naphthalene, Chemical Properties of Naphthalene (Substitution reactions, Halogenation, Nitration, Sulphonation, Friedel-Craft's Reactions, The Mechanism of Substitution in Naphthalene, Addition Reactions, Reduction, Addition of Halogens, Oxidation, Orientation of Substitution in Naphthalene and Its Derivatives, Effect of Activating and Deactivating Groups), Anthracene, Phenanthrene.	8	4
2	• **Heterocyclic Compounds:**	8	4

	○ Definition, Nomenclature of Monocyclic Rings Containing One or More Heteroatoms (Pyrrole, Furan, Thiophen, Imidazole, Oxazole, Thiazole, Pyrazole, Pyrrroline, Pyrrolidine, Pyridine, Pyrimidine and Purine), Nomenclature of Bicyclic Rings Containing One or More Heteroatoms (Purine, Quinoline, Isoquinoline, Carbazole), Aromaticity of Heterocyclic Compounds, Five-membered Heterocyclic Compounds (with One or Two Heteroatoms), Electrophilic Substitution of Five-membered Rings, Six-membered Heterocyclic Compounds with One Oxygen as a Heteroatom (-Pyran, - Pyran, - Pyrone, -Pyrone and Their Derivatives), Six-membered Heterocyclic Compounds with One Nitrogen as a Heteroatom (Pyridine, Quinoline, Acridine and Their Derivatives), Reactions of Six-membered Heterocyclic Compounds, Six-memebered Heterocyclic Compounds with Two Heteroatoms (Pyridazine, Pyrimidine, Pyrazine and Their Derivatives), Condensed Systems Consisting of Pyrazine Ring**.**		
3	• **Elemental Analysis** ○ **Elemental Analysis and Calculations:** (Qualitative Elemental Analysis, Quantitative Elemental Analysis, Determination of the Molecular Weight) by the Vapour Density Method, by the Cryoscopic Method, by the Rast Method, by the Neutralisation Equivalent, and by the Vapour Pressure Osmometry Method), Molecular Formulas, The Index of Hydrogen Deficiency. ○ **Electronic absorption Spectroscopy (UV/VIS):** Definition, Electronic Energy Changes, Principles of Absorption Spectroscopy, The Relationship of max and max to Structure, Solvents, Chrmophores, The Effect of Conjugation, The Woodward-Fieser Rules for Dienes, Carbonyl Compounds, Solvent Shifts (a more detailed examination), Aromatic Compounds, Substituents with Unshared Electrons, Substituents Capable of -Conjugation, Electron Releasing and Electron Withdrawing Effects, Disubstituted Benzene Derivatives, Polynuclear Aromatic Hydrocarbons and Heterocyclic Compounds, Model Compound Studies Visible Spectra, Colour in Compounds. ○ **Infrared Spectroscopy:**	**12**	**6**

	Introduction, The Infrared Absorption Process, Uses of the IR Specrum, The Modes of Vibration and Bending (Symmetric and Asymmetric Stretching Vibrations, and In-plane and Out of Plane Bending Vibrations), Bond Properties and Absorption Trends, Examining IR Spectra, Correlatio Charts and Tables, Analysis of IR Spectrum. ○ **Nuclear Magnetic Resonance (NMR) Spectroscopy:** Introduction, Nuclear Spin States, Nuclear Magnetic Moments, Absorption of Energy, The Mechanism of Absorption (Resonance) The Chemical Shift and Shielding, The NMR Spectrometer, Chemical Equivalence, Integrals, Chemical Environmental and Chemical Shifts, Local Diamagnetic Shielding (Electronegativity Effects, Hybridization Effects, Acidic and Exchangeable Protons, Hydrogen Bonding), Magnetic Anisotropy, Spin-Spin Splitting(N+1) Rule, The Origin of Spin-Spin Splitting, Pascal's Triangle, Coupling Constant. **Mass Spectroscopy (MS):** The Mass Spectrometer, The Mass Spectrum, Molecular Weight Determination, Molecular Formulas from Isotope Ratio Data, Some Fragmentation Patterns, Additional Topics.		
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures using data show.
2. video animation and seminars.
3. Solving Problem method.
4. Laboratory work, directed reading.
5. Independent study.
6. Discussion.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F- REFERENCES:

1. Louis D. Quin, John A. Tyrell, Fundamentals of Heterocyclic Chemistry, 2010, John Wiley and Sons, Inc. Hoboken, New Jersey.
2. R. T. Morrison and R. N. Boyd, Organic Chemistry, 2002, 6th edition, Pearson
3. Prentice Hall of India Pvt. Ltd, New Delhi.
4. Jerry and March, Advanced Organic Chemistry ; reaction, mechanism and structure, 2007, 6th edition, John Wiley and Sons, Inc., Hoboken, New Jersey.

Course specification of Pharmacognosy 2

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Pharmacognosy 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Third Year / Second Semester				
4	**Pre –requisite (if any):**	Organic Chemistry 1 & 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

Upon successful completion of this course, the students should be able to

1. Illustrate the morphological and histological structures of different organs of Medicinal plants such as seeds, fruits, roots and rhizomes.
2. Discuss role of these medicinal plants in the treatment of different disease conditions.
3. Identify many medicinal plants microscopically in both their entire and powdered forms.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Describe the histological structure of the different medicinal plant parts viz. herbs and unorganized drugs.
a2- Give an account on the biologically active principles in each plant part viz. (herbs and unorganized drugs) as well as their biological activity.
a3- Design a regime for optimum nutrition (minerals and vitamins).

B-Intellectual Skills:

b1- Determine unknown drugs viz. herbs and unorganized drugs. (morphologically, microscopically and chemically).
b2- Judge whatever the powdered drug is related to herbs and identify unorganized drugs through chemical tests.

C-Practical Skills:

c1- Use the microscope to decide a given unknown plant powder is related to herbs and unorganized drugs.
c2- Design and perform experiments for detection of adulteration.
c3- Perform some experiments to know the nature of unorganized.

D-General Skills and Attitudes:

d1- Work effectively in team.
d2- Demonstrate written and oral communication skills.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• **Introduction to herbs** ○ Hyoscyamus ○ Lobelia ○ Mentha ○ Ergot ○ Cannabis ○ Thyme ○ Diatoms ○ Focus &laminaria ○ Carrageen ○ Saccharomyces. ○ Penicillium ○ Mushroom. ○ Cetraria ○ Ephedra ○ Sabina ○ Broom tops	**10**	**5**

2	• **Introduction to unorganized drugs** ○ Opium ○ Agar ○ Gelatin ○ Gambier ○ Cutch ○ Aloes ○ Ehinacea ○ Kinos ○ Colophony ○ Rectified oil of ○ turpentine. ○ Guaiacum resin ○ Jhan resin ○ Cannabis resin ○ Mastic ○ Copaiba ○ Canada turpentine ○ Myrrh ○ Asafetida ○ Galbanum ○ Ammoniacum ○ Olibanum ○ Benzoin ○ Balsam Peru ○ Balsam Tolu ○ Storax ○ Gum acacia ○ Gum tragacanth ○ Karaya gum ○ Manna ○ Guar gum ○ Simbhal ○ Tamal ○ Evening primrose ○ Theobroma oil ○ Castor oil ○ Linseed oil ○ Olive oil ○ Almond oil ○ Bees wax ○ Carnuba wax ○ Purified honey ○ Royal jelly ○ Bee propolis ○ Bee pollen ○ Bee venom	**10**	**5**

	○ Unorganized drugs in		
3	• **Vitamins and minerals**	**8**	**4**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion.
3. Lab. Work.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

Trease, G.E.& Evans, W.C.; "Pharmacognosy", W.B. Saunders Publishers, Ltd, 15th ed., 2002.

Course specification of Pharmacology 1

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Pharmacology 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Third Year / Second Semester				
4	**Pre –requisite (if any):**	Physiology 1 & 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. Acquire a knowledge about the pharmacokinetic of drugs (absorption, distribution, metabolism and excretion).
2. Provide pharmacodynamics of drugs (mechanism of drug action & their biological effects on different body organs and drug-protein binding) and dosage form of drugs (advantages & disadvantages).
3. Recognize uses & adverse drug reactions & their side effects (drug toxicity, abuse, and their misuse).
4. Explain the types of drug-drug interactions.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

- **a1-** Define the drugs affecting G.I.T & R.S.**,** identify mechanism of action , side effects and indication of the drugs.
- **a2-** Illustrate the reasons for various indication of the drugs.
- **a3-** Recognize various drugs used in hospitals, polyclinic and pharmacy sections**.**

B-Intellectual Skills:

- **b1-** Read the dive prescribed drugs.
- **b2-** list precaution to be taken for each drug.
- **b3-** Analyze how to deal with patient when side effect occurred.

C-Practical Skills:

- **c1-** Detect the side effect and adverse effect.
- **c2-** Apply the abbreviations used in pharmacology**.**

D-General Skills and Attitudes:

- **d3-** Work effectively in team.
- **d4-** Demonstrate written and oral communication skills.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• **General pharmacology** ○ General pharmacology Definitions. ○ Drug source & classification. ○ Pharmacokinetic: Absorption, Distribution, bio transformation & Excretion. ○ Routes of drugs administration. ○ Pharmacodynamics: –Theory of receptors, -drug-protein binding ○ Adverse drug effects. ○ Drug-drug interaction.	**4**	**2**
2	• **Autonomic Nervous System:** • **General Physiological principles.** • **Sympathomimetic:** ○ Adrenaline, Noradrenaline, ephedrine, Isoprenaline, Dopamine, Dobutamine, amphétamine& methyl amphetamine. • **Sympathomimetics for specific systems** ○ Vasopressor sympathomimetics e.g.: mephenteramine, methoxamine, phenylephrine ○ Vasodilator and uterine relaxants sympathomimetics e.g. isoxsuprine & Ritodine	**6**	**3**

	○ Nasal decongestants e.g. Naphazoline, Xylonetazoline, tetrahydrazoline. ○ Antiasthmatic sympathomimetics e.g: Salbutamol& terbutaline.		
3	• **Sympathetic Depressants:** • **Adrenergic Receptor Blockers** • **α-blockers:** ○ Ergot alkaloids e.g: ergotamine & ergometrine. ○ Imidazoline derivatives e.g. tolazoline & phentolamine ○ Beta-haloalkyl amines e.g phenoxybenzamine & dibenamine. ○ Other cx- blockers e.g: prazosin, yohimbine - Treatment of migraine & phaeochromocytoma.	**2**	**1**
4	• **β- Blockers:** ○ Selective f3 Blocker e.g: Acebutolol, etc.... ○ Selective 1 blocker e.g: Atenolol, Butoxamine, etc... ○ Non selective i3 32 blocker e.g: propranolol, etc	**2**	**1**
5	• **α and β- blockers: e.g: labetalol.** ○ Antiadrenergic drugs: e.g. guanethidine, bretylium, reserpine & a methyldopa. ○ a_2-receptor agonist: a_2 receptor stimulants e.g: Clonidine.	**2**	**1**
6	• **Parasympathomimetics:** ○ Choline esters e.g.: acetyicholine, methacholine, carbachol, Bethanecol. ○ Natural cholinomimetic alkaloids e.g.: pilocarpine. ○ anticholinesterase drugs e.g.: physostigmine, Neostigmine, Neostigmine substitutes pyridostigmine, edrophonium) & Organophosphorus compounds.	**4**	**2**
7	• **Treatment of Mysthenia gravis:** • **Parasympathetic depressants:** ○ Natural products e.g.: Atropine & hyoscine. ○ Synthetic atropine substitutes: 1- Mydriatics & cycloplegics e.g: Homatropine, etc. 2- Antispasmodics e.g: pirenzepine, etc... 3- Antiparkinsonism e.g: Benzotropine, etc. ○ Ganglion stimulants & blockers (Nicotine ، D.M.P.P, hexamethoni urn, etc…).	**4**	**2**

8	• **Drugs affecting GIT** o Antiulcer and antacid drugs. o Emetics and antiemetic drugs. o Liver disease and gallstones. o Constipation & laxatives. o Diarrhea & anti-diarrheal agents. o Amoebiasis & Giardiasis. o Inflammatory bowel disease (IBD). o Anorexigenic agents. o Appetizers. o Digestants. o Carminatives.	**4**	**2**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Group Discussion.
3. practical.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F- REFERENCES:

1- Rang, Dale and Ritter Pharmacology (2000).
2- Katzung –Basic and Clinical Pharmacology (2001).
3- Tripathi –Essential Pharmacology (2001).
4- Laurence, Bennett and Brown-Clinical pharmacology (1997).
5- Goodman & Gilman's- The pharmacological basic of therapeutics (1995).

Fourth Year
First Semester

Course specification of Biopharmaceutics &Pharmacokinetic 1

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Biopharmaceutics &Pharmacokinetic 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fourth Year / First Semester				
4	**Pre –requisite (if any):**	Pharmaceutics 1 - 4				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

To provide a conceptual and quantitative background in pharmacokinetic theory and applications needed to pursue advanced studies in clinical pharmacokinetics and biopharmaceutics as applied to drug delivery system design and pharmacokinetic theory.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Understanding the effects of various physicochemical, biochemical, physiological and pathological processes on the kinetics and extent of drug absorption, distribution, and elimination.

a2. Explain the effects of dosage form design and routes of drug administration on therapeutic drug levels optimization.

a3. Characterize the impact of efflux proteins at various anatomical sites (i.e., intestinal, placental, and blood-brain barrier), first-pass effect, on the concentration and pharmacologic effect achieved**,**

B-Intellectual Skills:

b1. Design of bioavailability and bioequivalence studies**.**

b2. Analyze empirical pharmacokinetic models to devise and optimize dosage regimens.
b3. Classify pharmacokinetic models.

C-Practical Skills:

c1. Adjust and optimize the dose and dosage regimen.
c2. Estimate of drug half life

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• **Introduction to Biopharmaceutics** • **Effect of various routes of administration on drug bioavailability** • **GIT absorption of drugs** o Mechanism of drug absorption o Physiological factors affecting oral absorption o Physical-Chemical factors affecting oral absorption o Formulation factors affecting oral absorption o Techniques for the GIT absorption assessment	12	6
2	• **Biopharmaceutics study of drugs** o Distribution o Metabolism o Elimination	12	6
3	• **Bioavailability and bioequivalence** o Definition o Method of determination of bioavailability using blood and urine excretion data. o Protocol design of bioavailability assessment. o Methods of bioequivalence determination	4	2
	total	28	14

D- TEACHING AND LEARNING METHODS

1- Lectures
2- Tutorials

E- STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES

1 Handbook of Basic Pharmacokinetics-Ritschel, W.A.,Drug Intelligence Publication,
2 Fundamentals of Clinical Pharmacokinetics-Wagner,J.C.,Drug Intelligence Publication,
3 Remington's Pharmaceutical Sciences - Gennaro A.R., ed., 19th Edition, Mack Publishing Co., Easton, PA. 1995. Clinical Pharmacokinetics - Rowland, M. & Tozer,N., 2nd,edi

Course specification of First Aid

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**First Aid**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Fourth Year / First Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1- To provide the student with knowledge, skills and attitudes in the field of environmental health & Nutrition.
2- Also to help the student to acquire knowledge, skills and attitudes in the field of health education and Family planning, enable him/her to participate efficiently in solving some of health problems affecting the community.
3- understand the constituents of the food for the daily requirements of the body in health and illness and their sources, functions and deficiencies.
4- participate effectively in the health education process & Family planning .

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Recognize health problems available in the environment that affect the community.
a2. Explain the necessary steps for solving some of health problem affecting the environment and the community.
a3.Illustrate the constituents of food, their sources, functions, deficiencies and daily. requirements in health and illness.

B-Intellectual Skills:

b1. Prepare simple Materials for the purpose of health education .
b2. Classify constituents of the food for the daily requirements of the body in health and illness and their sources, functions and deficiencies..

C-Practical Skills:

c1. Accepts Attitude on health team working.
c2- Participate in health education activities in his field.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Introduction** Concept of first aid Objective of first aider Responsibilities of fist aider	2	1
2	**Hemorrhage and cut wounds** External bleeding Cuts wound	4	2
3	**Shock** Definition Types First aid treatment of shock **Unconsciousness** Definition First aid treatment Heart massage **Epileptic fits** -first aid treatment	6	3

4	**Splint and bandage** Aims of bandaging in first aid Aim of splinting Methods of apply bandages	2	1
5	**Fractures and dislocation** A-definition of fractures Types of fractures Signs and symptoms First aid treatment **B-definition of dislocation** The first aid treatment	4	2
6	**Burns and scalds** Heat burns Chemical scalds first aid treatment	4	2
7	**Asphyxia** Artificial respiration P.R	2	1
8	**Poisoning** Types Cause Classification Treatment	4	2
Total		28	14

D-TEACHING AND LEARNING METHODS

1- Lectures
2- Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%

Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F-REFERENCES

1. Community health Nursing (Promoting & protecting the public health) Allender , Judith.
2. Use of guidelines for making pregnancy safer and family planning, W.H.O
3. Evad.Wilson and others (Principles of Nutrition) 4th edition. Wilcy & Sons - New York.
4. Kranse and Mahan (Food, Nutrition and Diet Therapy) 7th edition W.B. Saunders Company - Philadelphia.

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Course Specification of Medicinal Chemistry 1

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Medicinal chemistry 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fourth Year / First Semester				
4	**Pre –requisite (if any):**	Organic Chemistry 1 & 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. To provide the knowledge of chemistry of drugs with special references to their pharmaceutical and medicinal usage.
2. To acquire the knowledge about the relationship of chemical structure and therapeutic properties.
3. To correlate medical chemistry facts with manufacture drugs & clinical application.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Acquire knowledge on the principles of medicinal chemistry **.**

a2. Describe the basic principles of mechanism action for active groups in pharmaceutics chemistry.

a3. Recognize different reaction between active groups in pharmaceutical chemistry especially in preparations of drugs.

B-Intellectual Skills:

b1. Apply preparation (synthesis) of medical compound drugs

b2. Identify the different of medical compound drugs by assay& titration

b3. Determine medically used & roles of important medical compound drugs**.**

C-Practical Skills:

c1. Maintain the name of chemical compound &derivatives or chemical modification effects.
c2. Estimate drug half life**.**
c3. Classify medical compound drugs according to medically used & active group

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Physiochemical properties** • Pharmacokinetics • Acid-Base properties • Drug receptor interaction o Force involved, steric effects	2	1
2	**Metabolism** • Site, pathways, factors • Oxidative reactions • Reductive reactions • Hydrolytic reactions o Conjugation reactions	4	2
3	**Drug Desiyn** • Introduction • Physical and chemical properties of drugs. • Isosteres and bioisosteres- pharmacophoric groups. o Use of computer in Drug Desiyn	2	1
4	**Adrenergic agents** • Sympathomimetic agents • Sympatholytic agents as: Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use.	6	3
5	**Cholinergic agents** • Cholinergic agents • Anticholinergic agents • Ganglionic blocking agents • Neuromuscular blocking agents Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use.	6	3

6	**Immunology** Nomenclature, Antigen, Defense mechanisms, Antibody,Vaccines and toxoids Antigen.	4	2
7	**Biotechnology** • Cloning DNA • Expression of DNA • Manipulation of DNA Products.	4	2
	Total	28	14

D-TEACHING AND LEARNING METHODS

1- Lectures
2- Tutorial

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F-REFERENCES

1. Wilso; Gisvold, Doerge, 2010 Text book of organic medical pharmaceutical chemistry 12th edition – LWW, USA .
2. Remington's -1995-Pharmaceutical Sciences - Gennaro A.R., ed., 19th Edition, Mack Publishing Co., Easton, PA..

Course specification of Pathology

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Pathology**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Fourth Year / First Semester				
4	**Pre –requisite (if any):**	Physiology 1 & 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1-It provides the basic knowledge about etiology, pathogenesis & pathological changes.
2-Illustrate effects and possible complication of common disease entities along with abnormal changes .

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Acquire knowledge on the scope and importance of pathology in clinical practice.
a2. Recognize clinical manifestations of a certain disease and its underlying pathological changes.

B-Intellectual Skills:

b1. Analyze importance and the sources of marine drugs, their toxicities and their promising medicinal applications
b2. Differentiate between clinical manifestations of a certain disease

C-Practical Skills:

C1. Detect abnormalities that may indicate cancer or other diseases of tissue.
C2. Interpret microscopical changes occurring in the tissues and organs in the studied diseases.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**General pathology:** **Introduction to pathology**	2	1
2	**Tissue and cell damage and metabolic disturbance** Cell injury and tissue damage Causes of cell injury and tissue damage Degenerations: Cloudy swelling Types of degeneration Metabolic disorders, causes and types Necrosis, causes and types Inflammation Definition and etiology Spread of inflammation Local inflammation Metastatic inflammation Generalized infection Types of acute inflammations Local changes: Hyperemia exudation of leucocytes and others cells and phagocytosis Systemic effects of acute inflammation Exudative: serous, suppurative, serofibinous & haemorrhagic Chronic inflammation : Specific and non-specific Repair and Healing Healing wounds Healing by first intention Healing by second intention Complication of wound healing Healing by fibrosis Mechanism of fibrous tissue formation Factors influencing wound healing and fibrosis o Healing of bone fractures	8	4
3	***Neoplasia*** Types of cellular proliferation Non-neoplastic - metaplasia - hypertrophy Hyperplasia - dysplasia Classification of benign and malignant tumors Pathology of some benign and malignant tumors Spread of malignant tumors Prognosis and grading of malignant tumors	8	4

	Carcinogenesis & theories of origin of neoplasms ***Hypertrophy*** Types of hypertrophy Diseases associated with hypertrophy Hypertrophic cardiomyopathy Congenital hypertrophic pyloric stenosis ***Hyperplasia*** Types of hyperplasia Diseases associated with hyperplasia Prostatic hyperplasia Thyroid Hyperplasia ***Atrophy*** Types of atrophy Disorders associated with generalized atrophy Disorders associated with organ atrophy Osteoporosis Alzheimer's Disease o Pick's Disease		
4	**Tumor Pathology** General definition of tumor Benign tumors Malignant tumors Tumors of limited malignancy Tumor-like lesions **Tumor Classification** ***Nonepithelial tumors*** General definitions Benign nonepithelial tumors Malignant nonepithelial tumors Fibrous tumors Fibroma and fibrosarcoma Tumors of fatty tissue Lipoma and liposarcoma Cartilage tumors, chondroma Bone tumors Osteoma and osteosarcoma ***Benign epithelial tumors*** Papillomas Mucosal papilloma Urothelial papilloma Adenomas Solid adenoma Tubular adenoma Fibroadenoma Adenocarcinoma Highly differentiated forms Moderately differentiated forms Mucigenous carcinomas ***Carcinomas of specific organs*** Prostatic carcinomas Carcinoma of the breast Lung carcinoma Colorectal carcinoma	10	5

Total	28	14

D-TEACHING AND LEARNING METHODS

1- Lectures
2- Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F-REFERENCES

Ursus-Nikolaus Riede, Martin Werner: ***Color Atlas of Pathology: Pathologic Principles· Associated Diseases***; Thieme Stuttgart· **New York 2004**

Course specification of Pharmacology 2

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Pharmacology 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Fourth Year / First Semester				
4	**Pre –requisite (if any):**	Pharmacology 1 & Medicinal Chemistry 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Acquire a knowledge about the pharmacokinetic of drugs (absorption, distribution, metabolism and excretion).
2. Recognize Pharmacodynamic of drugs (mechanism of drug action & their biological effects on different body organs and drug-protein binding) and dosage form of drugs (advantages & disadvantages).
3. Explain uses &Adverse drug reactions & their side effects (drug toxicity, abuse, and their misuse).
4. Classify the types of drug-drug interactions.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Define the drugs affecting cardiovascular and respiratory system
a2- Identify mechanism action and indication, side effects, of the drugs.
a3- Identify various drugs used in hospitals, polyclinic and pharmacy sections. .

B-Intellectual Skills:

b1- Read the dive prescribed drugs.
b2- list precaution to be taken for each drug.
b3 -Explain how to deal with patient when side effect occurred

C-Practical Skills:

c1. Accepts Attitude on health team working.
c2- Participate in health education activities in his field.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Cardiovascular System (C.V.S)** • Antihypertensive agents. • Drugs used in treatment of heart failure. • Anti-anginal agents. • Anti-arrhythmic agents. • Drugs for shock ○ Hypolipidaemic agents	8	4

2	**Respiratory System (R.S)** Cough therapy Respiratory stimulants Drugs used in treatment of Bronchial Asthma. Drugs used in treatment of Rhinitis.	4	2
3	**Autocoids** • Histamine & antihistamines • Serotonin agonists & antagonists. • Eicosanoids, and their uses • PAF, bradykinin	4	2
4	**Endocrine System** • Hypothalamic & pituitary gland. • Thyroid and antithyroid drugs. • Glucagon and adrenocortical steroids • Insulin &oral hypoglycemic agents. • Sex hormones. • Female sex hormones. • Male sex hormones. • Contraceptives. • Pituitary hormones	8	4
5	**Urogenital system** • Anti-Diuretic hormone • Oxytocics and uterine relaxants	4	1
	Total	28	14
	D-TEACHING AND LEARNING METHODS		
	1- Lectures 2- Tutorials		
	E-STUDENT ASSESSMENT METHODS		

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F-REFERENCES

1- Rang, Dale and Ritter Pharmacology (2000)
2-Katzung –Basic and Clinical Pharmacology (2001)
3-Tripathi –Essential Pharmacology (2001)
4-Goodman & Gilman's- The pharmacological basic of therapeutics (1995)

Course specification of Phytochemistry 1

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Phytochemistry 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fourth Year / First Semester				
4	**Pre –requisite (if any):**	Pharmacognosy 1 & 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1- Provide the basic phytochemical knowledge.
2- Recognize the natural source, classification, extraction, detection, isolation, pharmacological and toxicological effects.
3- Illustrate chemistry of natural pesticides as well as drugs of marine origin.
4- Discuss the major pharmaceutically important secondary metabolites from natural sources (alkaloids & steroids) of pharmaceutical interest.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Acquire knowledge on the scope and importance of Phytochemistry in drug discovery and modern medicine.

a2. Recognize the chemical structure, medicinal value, natural source, detection, isolation, characterization and medicinal applications of alkaloids & steroids and their importance in orthodox medicine.

a3. Identify the medicinally important alkaloids, their chemical structure, natural sources, detection, isolation and characterization and medicinal applications.

B-Intellectual Skills:

b1. Analyze importance and the sources of marine drugs, their toxicities and their promising medicinal applications

b2. Differentiate between different types of alkaloids & steroids..

C-Practical Skills:

c1. Identify the nature, source, production, and medicinal uses of naturally occurring antibiotics.

c2. Apply chromatography in identification ,differentiation and isolation of alkaloids & steroids .

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Chromatography** • Basic concept (partition and adsorption chromatography), Separation techniques (elution, frontal, and displacement analysis), • Types of chromatographic methods: Paper chromatography, Thin layer chromatography (TLC), • Types of chromatographic methods: Column chromatography (CC), • Gas chromatography (GC), performance liquid chromatography (HPLC), Gel chromatography	8	4
2	**Alkaloids** • Introduction : Definition, history, occurrence, classification, nomenclature, physical and chemical properties, isolation, purification and detection Alkaloids derived from phenylalanine and tyrosine	10	5

	Isochinolin-alkaloids (papaverine, morphine, codeine, and emetine) • Tropolon-alkaloids (colchicine, demecolcine). Amaryllidaceen-alkaloids : (lycorine, galanthamin) • Alkaloids derived from typtophan • Indol-alkaloids (physostigmine-, carboline-, ergoline-, ajmalicine-, yohin ajmaline-, and strychnine-type) Chinoline-alkaloids (Cinchona-alkaloids). • Alkaloid deived from histidin: (pilocarpine, isopilicarpine, pilosin). • Alkaloids derived from asparagic acid: (ricinine, and Nicotiana-alkaloids). Alkaloids derived from lysin • Piperidine-alkaloids (Piper-, Lobelia-, and Pomegranate-alkaloids) Alkaloids derived from ornithine • Tropan-alkaloids (atropine, hyoscyamine, scopolamine and cocaine) Chinazoline – alkaloids (tetradoxine). • Alkaloids derived from glycine Purin –alkaloids (caffeine, theiphylline, and theobromine) • Terpen – alkaloids: (monoterpen-, sesquiterpen-, and diterpen- alkaloids). • Steroidal alkaloids: (Veratum alkaloids).		
3	**Steroids :** • Definition, classification, structures, chemical and physical properties, characterization. • Sterols (Definition, classification, structures, chemical and physical properties, Pharmacological Importance). • Vitamin D (Sources, structure, action, clinical uses) • Bile acids (Structure, action and uses) • Steroid hormones (Sexual hormones and corticoids, classification, structure, action and clinical uses	6	3
4	**Bitter principles** Definition, classification, chief drugs containing bitter principle	4	2
Total		28	14
D- TEACHING AND LEARNING METHODS			

1- Lectures
2- tutorials

E- STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES

1. Pharmacognosy, Phytochemistry, medicinal plants by Jean Brueton (1995), english edition.
2. Harmacognosy and phamacobiotechnology by James E. Robbers, Marilyn k. Speedie and Varro E. Tyler (1996). Williams and Wilkins.
3. Busse, Licia Gldberg, Joerg Gruenwald, Tara Hall, Chance E. Riggins and Robert s. Riste (1999)

Course specification of Toxicology

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Toxicology**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fourth Year / First Semester				
4	**Pre –requisite (if any):**	Pharmacology 1 & 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Acquire the basic principles of toxicology and the different disciplines of toxicology.
2. Gain knowledge regarding the supportive measures, therapeutic interventions, specific antidotes as general guidelines of treatment modalities.
3. Understand the mechanism of toxicity, toxicokinetics, clinical presentation, diagnosis and medications indicated and contraindicated in the treatment of toxicity of common drug and chemical groups.
4. Illustrate the serious consequences of exposure to therapeutic drugs and environmental and occupational chemicals.
5. Explain the special considerations with maternal, fetal, and neonatal health.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Acquire knowledge on Knowledge about the various means of possible exposure to therapeutic and non-therapeutic agents.

a2.Gain an overview of protocols for managing various toxic ingestions, and the antidotes and treatments associated with their pathology

a3. Illustrate knowledge regarding the special considerations with maternal, fetal, and neonatal health.

B-Intellectual Skills:

b1. Develop a greater awareness for the consequences of ingesting prescription medicines and other compounds with the risk of environmental and biological threats to public safety

b2. Differentiate between exposure to therapeutic drugs and environmental and occupational chemicals.

C-Practical Skills:

c1. Identify the serious consequences of toxic drugs and chemicals exposure

c2. Apply supportive measures, therapeutic interventions, specific antidotes as general guidelines of treatment modalities.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**General Principles of Toxicology: Toxicity, hazard, risk.** • Branches of toxicology: Occupational, Environmental, Ecotoxicology, Analytical and Clinical	2	1
2	**Types of exposure and toxic responses** Spectrum of toxicity. • Evaluation of safety of chemicals and drugs.).	2	1
3	**Prevention and Management of Poisoning:** • Poisoning episodes: Accidental, Suicidal, Homicidal, Nonaccidental • Prevention of poisoning:	4	2
4	**Management of Poisoning:** • Maintenance of vital functions • Antidotes: non-specific & specific	4	2

5	**Prevention of absorption of poisons** • Enhanced elimination of poisons • Supportive management	2	1
6	**Poisoning with Common Drugs: Selected OTC Products:** • Aspirin, Paracetamol, Iron	2	1
7	**CNS Depressants: Barbiturates, Benzodiazepines:**	2	1
8	**CNS Stimulants: Amphetamine & Cocaine**	2	
9	**Poisoning with Common Chemicals:** • Household Toxicants: Solvents, corrosives, gases, cleaning agents (soaps, detergents, bleaches, ammonia solution).	2	1
10	**Pesticides: Halogenated & cholinesterase inhibitor insecticides** • Rodenticides, Herbicides, Fungicides	2	1
11	**Common Heavy Metals and Chelators**	2	1
12	**Teratogenic and Toxic Effects of Drugs and Chemicals on Reproduction:** • Possible site of action of teratogens: Effects on father, mother, feto-placental unit and fetus. • Principles of teratology as applied to man: Stages of pregnancy, Drug dosage, placental transfer, use of drugs during pregnancy	2	1
Total		28	14

D- TEACHING AND LEARNING METHODS

1- Lectures
2- Tutorials

E- STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12

Assessment 3 final exam		Week 16
Weighing of Assessments		
Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES

Casarett and Doull's Toxicology: The Basic Science of Poisons. C.D. Klaassen, McGraw Hill, New York.

Fourth Year
Second Semester

Course specification of Biopharmaceutics & Pharmacokinetic 2						
A-COURSE IDENTIFICATION AND GENERAL INFORMATION:						
1	**Course Title:**	**Biopharmaceutics & Pharmacokinetic 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Fourth Year / Second Semester				
4	**Pre –requisite (if any):**	Pharmaceutics 1-4 & Biopharmaceutics & Pharmacokinetic 1				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1- Provide a conceptual and quantitative background in pharmacokinetic theory

2- Explain different pharmacokinetic models.

3- Acquire knowledge on order of drug degradation reaction and its application in half life & volume of drug distribution in the body.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Describe the use of pharmacokinetics in relation to the appropriate administration of drugs, particularly intravenous infusion and multiple dose administration.

a2-Understand the theoretical and practical issues of assessment of drug bioavailability and bioequivalence.

a3-Illustrate pharmacokinetic parameters used in clinical pharmacokinetics and biopharmaceutics using plasma and urine drug level data.

B-Intellectual Skills:

b1-Design of bioavailability and bioequivalence studies.

b2. Analyze empirical pharmacokinetic models to devise and optimize dosage regimens.

b3. Classify pharmacokinetic models.

C-Practical Skills:

c1. Adjust and optimize the dose and dosage regimen.

c2. Estimate of drug half life

c3. Identify order of each degradation reaction.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Terminology and definitions Rates and orders Kinetic of drug absorption	2	1
2	**Compartment models** • Definition • Basis of Classification • Model selection criteria **One compartment open model with first order elimination kinetics** • Pharmacokinetics of single dose as oral and intravenous (rapid/bolus). • Intravenous infusion	10	5

	• Multiple oral and intravenous administrations. • Pharmacokinetic of sustained releases formulations **Two compartment open model with first order elimination kinetics** • Pharmacokinetics of single dose as oral and intravenous (rapid/bolus). • Intravenous infusion • Multiple oral and intravenous administrations. • Pharmacokinetic of sustained releases formulation		
3	**Absorption kinetics** • Methods of Estimation of absorption rate constants • Wagner-Nelson • Method of residuals	4	2
4	**Blood level data and urinary data analysis** • Drug elimination and clearance: o Renal clearance: o Hepatic elimination of drug	4	2
5	**Non-linear pharmacokinetics(dose dependent kinetics)** • Michaels- Menten's kinetics • Pharmacokinetic characteristics. • In-vivo estimation of Km and Vm • Application in bioavailability determination	8	4
Total		28	14
D-TEACHING AND LEARNING METHODS			

1-Lectures
2- Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F-REFERENCES

1. Handbook of Basic Pharmacokinetics-Ritschel, W.A.,Drug Intelligence Publication, M Hamilton, 1977.
2. Fundamentals of Clinical Pharmacokinetics-Wagner,J.C.,Drug Intelligence Publication, M.Hamilton, 1975.
3.Remington's Pharmaceutical Sciences - Gennaro A.R., ed., 19th Edition, Mack Publishing Co., Easton, PA. 1995.
4.Clinical Pharmacokinetics - Rowland, M. & Tozer,N., 2nd,edition, Lea and Febiger, Philadelphia, 1989.

Course specification of Medicinal Chemistry 2

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Medicinal Chemistry 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fourth Year / Second Semester				
4	**Pre –requisite (if any):**	Medicinal Chemistry 1 & Pharmacology 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1- Provide the knowledge of chemistry of drugs with special references to their pharmaceutical and medicinal usage.
2- Acquire the knowledge about the relationship of chemical structure and therapeutic properties.
3- Correlate medical chemistry facts with manufacture drugs & clinical application.

2-INTENDED LEARNING OUTCOMES:

A- KNOWLEDGE & UNDERSTANDING:

a1- Describe the basic principles of mechanism action for active groups in medicinal chemistry
a2-Recognize different reaction between active groups in pharmaceutical chemistry especially in preparations of drugs
a3 -Explain of nomenclature chemically of medical chemistry.

B- INTELLECTUAL SKILLS

b1- Apply preparation (synthesis) of medical compound drugs
b2- Identify the different of medical compound drugs by assay& titration
b3- Determine medically used & roles of important medical compound drugs.

C-PROFESSIONAL AND PRACTICAL SKILLS

c1- Maintain the name of chemical compound &derivatives or chemical modification effects.

c2- Classify of medical compound drugs according to medically used& active group.

D- GENERAL AND TRANSFERABLE SKILLS

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use for **CNS stimulants as** • Methylxanthines • Psychomotor stimulants • Mao-inhibitors • Tricyclic antidepressant • Psychedelics	6	3
2	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use for **Expectorants and anti-tussive agents**	4	2
3	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use for **Local anesthetic agents as:** • Mechanism of action of LA • Classification • Clinical uses • Individual drugs	4	2
4	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use for **Antihistamines as:** • H1-antihistamines • H2-antihistamines	4	2
5	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure	4	2

	activity relationship, mode of action and therapeutic use for **Analgesics as:** • NSAID • Opioid analgesics		
6	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use for **CNS depressants:** • Anxiolytics • Muscle relaxants • Antipsychotics • Anticonvulsants • Hypnotic &sedative	6	3
Total		30 28	15 14

D-TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F-REFERENCES

1. Wilson Gisvold, Doerge, 2010, Text book of organic medical pharmaceutical chemistry 12th edition, LWW, USA.
2. Remington's -1995-Pharmaceutical Sciences - Gennaro A.R., ed., 19th Edition, Mack Publishing Co., Easton, PA..,

Course specification of Parasitology

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Parasitology**				
	Credit hours:	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fourth Year / Second Semester				
4	**Pre –requisite (if any):**	Biology				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Provide knowledge on the classification of parasites.
2. Illustrate the morphology and life cycle of parasites.
3. Explain the treatment, prevention and control of parasites.
4. Express the modes of parasitic infections and the role of vectors in disease transmission.
5. Differentiate between various stages of each parasite.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Acquire basic information on morphology and life cycle, various stages of parasites.
a2-Classify different parasites and discuss modes of parasitic infections.
a3-Identify methods of parasites transmission ,prevention & control.

B-Intellectual Skills:

b1- Differentiate between parasites**.**
B2- Diagram parasites at various stages.

C-Practical Skills:

c1-Evaluate the role of vector in disease transmission.
c2- Plan for prevention ,treatment and control procedures

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Introduction of parasitology:** Definition of parasites Types of hosts. Types of vectors and source of infections. Basic rules of classifications (Phylum, class, order, family, genus, species, genus and species name). Epidemiological terms of common use in parasitology Summery on: Host immune response Pathogenesis Diagnosis Treatment Prevention and control	8	4
2	**Trematoda:** General chaacters of trematoda. **Schistosomiasis:** Historical introduction Epidemiology and geographical distribution Description of the organism Classification of the organism S. mansoni, S. hematobium and S. japonicum Characteristics of different types of schistosomes Morphological types Transmission Life cycle Egg and meracidia, snails (types), cercaria, skin penetration, somatic migration, lifespan, egg release Intermediate hosts Pathology Egg granuloma, hepatoslenomegally, urinary bladder cancer and immunology Clinical features (symptoms and signs) Prevention and control of transmission	6	3
3	***Fasciola (hepatobiliry flukes)*** Historical introduction Epidemiology and geographical distribution Description of the organism Classification of the organism *F. hepatica and F. gigantica* Characteristics of different types of Fasciolidae	6	3

	Morphological types Transmission Life cycle Pathology and immunology Clinical features (symptoms and signs) Methods of laboratory diagnosis. Prevention and control of transmission		
4	**Cestoda (Tapeworms):** General features of cestoda. Geographical distribution., description of organism, transmission, morphology (worms, eggs & larva), life cycle, pathology, immunology of the following organisms: ***Taenia saginata*** ***Taenia solium and cysticercosis*** ***Hymenolepis nana*** ***Hymenolepis diminuta*** ***Diphyllobothrium latum*** ***Diphyllobothrium mansoni*** ***Echinococcus granulosus, hydatidosis and coenurosis*** ***Dipylidium caninum*** ***Laboratory diagnosis for each organism*** Prevention and control for each organism	8	4
Total		28	14

D-TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F-REFERENCES

1-Stephen HG, Richared DP***: Principles and Practice of clinical parasitology***, Jhon Wiely & Sons Ltd; New York **2001**.
2-Ursus-Nikolaus Riede, Martin Werner: ***Color Atlas of Pathology: Pathologic Principles· Associated Diseases***; Thieme Stuttgart· **New York 2004**
3-Stephen HG, Richared DP***: Principles and Practice of clinical parasitology***, Jhon Wiely & Sons Ltd; New York **2001**

Course specification of Pharmacology 3

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Pharmacology 3**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Fourth Year / Second Semester				
4	**Pre –requisite (if any):**	Pharmacology 2 & Medicinal Chemistry 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Give a knowledge about the pharmacokinetic of drugs (absorption,
2. distribution, metabolism and excretion).
3. Explain Pharmacodynamic of drugs (mechanism of drug action & their biological effects on different body organs and drug-protein binding)
4. Illustrate uses & adverse drug reactions & their side effects (drug toxicity, abuse, and their misuse).
5. Express the types of drug-drug interactions.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Define the drugs affecting G.I.T & R.S , and their mechanism of action **,** side effects
a2- Explain the reasons for various indication of the drugs.
a3- Identify various drugs used in hospitals and pharmacy sections**.**

B-Intellectual Skills:

b1- Read the dive prescribed drugs.
b2- list precaution to be taken for each drug.
b3 -Explain how to deal with patient when side effect occurred.

C-Practical Skills:

c1-Differentiate between the side effect and adverse effect.
c2- Identify the abbreviations used in pharmacology**.**

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Chemotherapeutic Drugs; Introduction to chemotherapy B-Lactam Antibiotics and other inhibitors of the cell wall. synthesis. Penicillins.	2	1
2	Cephalosporins , Imipenems and monolactams	2	1
3	Chloromphenicol, Tetracyclines, Macroids and Clindamycin Aminoglycosides and other drugs used to treat gram - negative infection	2	1
4	Cancer Chemotherapy; Introduction, Poly functional alkylating agents.	2	1
5	Plant alkaloids and Antibiotics.	2	1
6	Hormonal agents and Miscellaneous anticancer agents	2	1
7	Immunopharmacology; Introduction and Immunosuppresive agents.	2	1
8	Immunomodulating agents	2	1

9	Cancer immunotherapy and Gene therapy.	2	1
10	Endocrine Hormones; Pancreatic Hormones.	2	1
11	Anti-diabetic Drugs.	2	1
12	Hypothalamic, Pituitary Hormones and Synthetic analogue.	2	1
13	Thyroid and Anti-thyroid Drugs.	2	1
14	Adrenocorticosteroids & Adrenocortical antagonists.	2	1
Total		28	14

D-TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work — to assess intellectual skills
2- Midterm exam — to assess the knowledge & understanding
3-Final term exam — to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F-REFERENCES

1- Rang, Dale and Ritter Pharmacology (2000)
2-Katzung –Basic and Clinical Pharmacology (2001)
3-Tripathi –Essential Pharmacology (2001)
4-Goodman & Gilman's- The pharmacological basic of therapeutics (1995)

Course specification of Phytochemistry 2

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Phytochemistry 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fourth Year / Second Semester				
4	**Pre –requisite (if any):**	Pharmacognosy 1 & 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1-Provide the basic phytochemical knowledge.
2- Recognize the natural source, classification, extraction, detection, isolation, pharmacological and toxicological effects.
3- Illustrate chemistry of natural pesticides as well as drugs of marine origin.
4- Discuss the major pharmaceutically important secondary metabolites from natural sources (phenolics, terpinoids & glycosides) of pharmaceutical interest.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1.Acquire knowledge on the scope and importance of Phytochemistry in drug discovery and modern medicine.

a2. Recognize the chemical structure, medicinal value, natural source, detection, isolation, characterization and medicinal applications of phenolicsterpinoids, glycosides and their importance in orthodox medicine..

a3. Identify the medicinally important phenolics, steroids, terpinoids, glycosides their chemical structure, natural sources, detection, isolation and characterization and medicinal applications

B-Intellectual Skills:

b1. Analyze importance and the sources of marine drugs, their toxicities and their promising medicinal applications

b2. Differentiate between different types of phenolics, steroids, terpinoids, glycosides.

C-Practical Skills:

c1. Interpret the nature, source, production, and medicinal uses of naturally occurring antibiotics.

c2. Apply chromatography in identification ,differentiation and isolation of phenolics, terpinoids, glycosides

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures

1	**Glycosides** Introduction : (Definition, classification, distribution extraction and isolation, pharmacological properties). • **Cardioactive glycosides** : (cardenolides, bufadienolids, sugars, structure- activity-relationship, distribution, extraction, chemical and physical properties, hydrolysis of cardiac glycoside, biogenesis, pharmacological properties, mechanism of action, chemical tests, chief drugs containing cardiac glycosides, Digitalis, Strophanthus, Adonis, Convalaria and Squill).	6	3
2	**Glycosides** • **Saponin-glycosides** : (Definition, distribution, classification, structures, biogenesis, extraction, chemical and physical properties, Characterization biological and pharmacological properties, drugs as expectorant and antitusive, anti-exudative, Adaptogens and as diuretic). • **Anthracen glycosides** : (distribution, classification, structures, biosynthesis, extraction, chemical and physical properties, characterization, pharmacological properties, Senna, Rhamnus, Rhabarub and Aloe). • **Flavonoid glycosides** : (Classification, biosynthesis, chemical structur, physico-chemical properties, extraction, characterization, biological properties, rutin, hesperidin and Flavonoid containing drugs). • **Cyanogentic glycosides** : (Cynogenesis, distribution, structure, biogenesis properties, detection, extraction, pharmacological activities, and cyanogenetic plants). Glucosinolates (Thioglycosides) : (Definition, distribution, structure, biogenesis, Hydrolysis, toxicity and drugs containing glucosinolates).	6	3
3	**Terpenoids**:	6	3

	• Introduction (definition, classification, biosynthesis and distribution).Monoterpens: (regular- and irregular monoterpenoids, irodoids, structures, chemical and physical properties and drugs containing monoterpenoids). • Sesquiterpens and sesquiterpen lactones: (structures, chemical and biological properties, and drugs containing sesquiterpenes and sequiterpene lactones). Diterpenes : (structures, chemical and biological properties, and drugs containing diterpenes o Triterpenes : (classification, structures, and drugs containing triterpenes). • Tetraterpenes : (chemical and biological properties, vitamin A, and drugs containing tetraterpenes) .		
4	**Tannins** • Definition, classification, structure, hydrolyzable- and condensed-, complex- and pseudo-tannins, distribution, biosynthesis, physico-chemical properties characterization, extraction, biological properties and drugs containing tannins).	2	1
5	**Phenylpropane-derivatives** • Introduction : (definition, classification, and biogenesis). • Phenols and phenolic acids : (Structures, physico-chemical properties. • characterization, extraction, pharmacological properties and drugs containing Phenols and drugs conraining phenols and phenolic acids).	2	1
6	**Coumarins** : Definition, chemical structures, classification, biosynthesis, physico-chemical properties, characterization, extraction, pharmacological	2	1

	properties and uses, drugs containing coumarines, furocoumarin, pyranocoumarines).		
7	**Lignan**s : (definition, classification, distribution, biological and pharmacological properties, and drugs containing lignans). **Lignin** : (definition, structure, biological and pharmacological properties of some lignins).	2	1
8	**Volatile** oils : • Definition, classification, distribution and occurrence • Preparation : distillation methods and solvent extraction. • Chemical and physical and pharmacological properties • Drug containing volatile oil used as counter-irritating agents, expectorants, and diuretic and as stomachic and carminative	2	1
Total		28	14

D-TEACHING AND LEARNING METHODS

1-lectures
2- tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F-REFERENCES

1- Pharmacognosy, Phytochemistry, medicinal plants by Jean Brueton (1995), english edition.
2-PHarmacognosy and phamacobiotechnology by James E. Robbers, Marilyn k. Speedie and Varro E. Tyler (1996). Williams and Wilkins.
3-Busse, Licia Gldberg, Joerg Gruenwald, Tara Hall, Chance E. Riggins and Robert s. Riste (1999)

Course specification of Public Health

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Public Health**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Fourth Year / Second Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1- provide the student with knowledge, skills and attitudes in the field of environmental health & Nutrition.
2- Acquire knowledge, skills and attitudes in the field of health education and Family planning, enable him/her to participate efficiently in solving some of health problems affecting the community.
3- Understand the constituents of the food for the daily requirements of the body in health and illness and their sources, functions and deficiencies.
4- participate effectively in the health education process & Family planning .

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Identify health problems available in the environment that affect the community.
a2. Undertake the necessary steps for solving some of health problem affecting the environment and the community.
a3. Understand knowledge in proper nutrition, recognize the constituents of food, their sources, functions, deficiencies and daily requirements in health and illness.

B-Intellectual Skills:

b1. Construct simple Materials for the purpose of health education.
b2. Differentiate between sanitary methods of waste disposal.

C-Practical Skills:

c1- Accepts Attitude on health team working.

c2- Participate in health education activities in his field.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Introduction** Definition: importance to practicing pharmacists. Epidemiology; quarantinable diseases; international public health programs.	4	2
2	**A. Health conception** of health. • Public health. • Environment. • Environmental health B**. Personal health** :- • Food and drink. • Clothing.- cleanliness. • Physical exercises. • Rest and sleep. - habits. • Personal protection against infectious diseases. • Periodic medical examination	6	3
3	**Water and Food Hygiene** **A. Water ;** • Importance of water. • Composition of water. • Water requirement for man. • Sources of water. • Hard and soft water. • Contamination of water. • Diseases transmitted by water. • Steps for treating water. **B. <u>Food hygiene :</u>**	10	5

	• Definition of food • Definition of food hygiene. • Preservation of food. • General requirements relating to food premises. • Cleanliness of equipment		
4	**<u>Disposal of Human wastes</u>** • Sanitary principles of waste disposal • Methods of disposal	8	4
	Total	28	14

D-TEACHING AND LEARNING METHODS

1-Lectures
2-Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F-REFERENCES

1- Community health Nursing (Promoting & protecting the public health) Allender , Judith.
2- Use of guidelines for making pregnancy safer and family planning, W.H.O
3- Evad.Wilson and others (Principles of Nutrition) 4th edition. Wilcy & Sons - New York.
4- Kranse and Mahan (Food, Nutrition and Diet Therapy) 7th edition W.B. Saunders Company - Philadelphia.

Fifth Year
First Semester

Course specification of Applied Pharmacognosy

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Applied Pharmacognosy**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fifth Year / First Semester				
4	**Pre –requisite (if any):**	Pharmacognosy 1 & 2 and Phytochemistry 1 & 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Formulation of herbal mixtures
2. Quantitative and qualitative evaluation of medicinal plants
3. Identification of major constituents

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Giving the knowledge about formulation of suitable herbal drug
a2- Recognize different methods used to detect adulterants of natural products
a3- Identify the types of major active constituents who isolated through chromatography

B-Intellectual Skills:

b1. Plan for solving problems
b2- Search for suitable method for herbal drug administration
b3- Establish a suitable method for herbal drug analysis

C-Practical Skills:

c1-Carry out simple and adequate method for identification of major herbal drug constituents.
c2- Find methods for isolation of some herbal a drug constituent
c3- Detect adulteration of any supplied natural drugs.
c4- Determine the Pharmacopeial constants of herbal drugs

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Production of medicinal plants	2	1
2	**Evaluation of medicinal crude drugs**	2	1
3	**Biosynthesis of natural products**	2	1
4	**Methods of Pharmacognosy used in quality control** Droplet Counter Current Chromatography Ash value Moisture content Radioimmunoassy Derivatization in HPLC	4	2
5	**Structure elucidation:** Physical properties, chromatograpic data (GC, HPLC, Ion exchange), determination of molecular formula, spectroscopic data (UV, IR, mass NMR).	6	3
6	**Drugs of biological origin:** Traditional medicine and medicinal plants : traditional medicine and methods utilized in traditional medicine, herbal medicine, vertues and shortcomings, the scientific basis of herbal medicine, treatment of constipation, asthma, inflammation and peptic ulcer, therapeutic effects of ginseng.	6	3
7	**Tissue culture and molecular biology** Basic principles of plant tissue culture, techniques, callus culture, cell culture, organ culture, meristem culture, protoplast culture biotransformation using cell culture, cryopreservation of germplasm, plant cell immobilization	6	3
Total		28	14

D-TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F-REFERENCES

1. Pharmacognosy, Phytochemistry, medicinal plants by Jean Brueton (1995), english edition.
2. Harmacognosy and phamacobiotechnology by James E. Robbers, Marilyn k. Speedie and Varro E. Tyler (1996). Williams and Wilkins.
3- Busse, Licia Gldberg, Joerg Gruenwald, Tara Hall, Chance E. Riggins and Robert s. Riste (1999).

Course specification of Clinical Pharmacy 1

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Clinical Pharmacy 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fifth Year / First Semester				
4	**Pre –requisite (if any):**	Pharmacology 1 - 3				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Give knowledge about the diagnosis of disease.
2. Analyze the all information about patient's state according the patient history, clinical features and laboratory findings.
3. Solve the given case according to the correct therapeutic way.
4. Detect the complications of the diseases.
5. Recognize the safety of drugs in special groups like children, elderly and pregnancy.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Define the Epidemiology, Etiology, Risk factors for particular condition under study, recognize the Clinical features , laboratory tests for each case study and the correct diagnosis of diseases..

a2- Identify Mechanism of the drugs , reasons of clinical complications and drug interaction. and their uses therapeutically concerning their, safety, optimum use in medication and contraindications

a3-Recognition of disease state, pathology and management of symptoms, List the therapeutic approaches, both pharmacological, non-pharmacological in details,

B-Intellectual Skills:

b1- list precaution to be taken for each prescribed drugs individually or in combination.

b2 -Explain how to deal with patient when side effect occurred.

b3-The student can diagnose disease according to their manifestations, investigations and physical examinations with Interpret the clinical features.

b4-Solve the case studies according to the therapeutic way, &Interpret patient and clinical data, including patient records held within practice settings.

C-Practical Skills:

c1-Acquire skills to diagnosed the case studies precisely.

c2-Evaluate critically observations and measurements, in terms of their significance and theory underlying them.

c3-Give advises for the patients and others on the safe and effective use of medicines

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**General introduction to Therapeutics:** will be studied in each individual disease state Definition, Etiology, Pathology, Pathophysiology, Epidemiology, History, Clinical features,	4	2

	Investigations diagnosis, Management Drug selection ... Etc;.		
2	**The Cardiovascular System.** Hypertension. Angina pectoris. Congestive heart failure. Acute myocardial infraction. Thromboembolic diseases	8	4
3	**Respiratory System.** Cough therapy Bronchial asthma Chronic obstructive pulmonary disease (COPD) Upper respiratory infections (URI)	8	4
4	**Gastrointestinal System.** Peptic ulcers. Hepatitis.	2	1
5	**The Endocrine System.** Diabetes mellitus Thyroid and Parathyroid disease	4	2
6	**Renal System.** Renal failure. Urinary tract infections.	2	1
Total		28	14

D-TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F-REFERENCES

1- Walker and Edwards (eds). Clinical Pharmacy and Therapeutics Third edition (2003).
2- Applied Therapeutics: The Clinical Use of Ddrugs. Koda-kimble.

Course specification of Community Pharmacy

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Community Pharmacy**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fifth Year / First Semester				
4	**Pre –requisite (if any):**	Pharmacology 1 - 3				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Provide the student with roles of community pharmacist
2. Learn the student with the methods of patient assessment and care as they relate specifically to the drug and non-drug management of minor ailments.
3. Assess the pathogenesis, clinical features, management and treatment outcomes of some disorders.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Explain the roles of community pharmacist and non-prescription drugs.
a2- Understand the method of patient assessment and care.
a3- Apply in practice setting the knowledge and understanding required to assess the pathogenesis, clinical features, management and treatment outcomes of some disorders

B-Intellectual Skills:

b1- Differentiate the symptoms of different causing diseases.
b2- Identify the drug manufacturing relating problems and solve

b3-Apply in practice setting the knowledge and understanding required to meet the needs of patient and other health professionals
b4 Apply in practice setting the knowledge and understanding required to asses the pathogenesis, clinical features, management and treatment outcomes of some disorders

C-Practical Skills:

c1- Diagnose and treatment of some minor illnesses.
c2- Dispense the drug prescription.
c3- Manage the drug adverse effect or drug interaction

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	The practice of community pharmacy • Definitions • Roles of community pharmacist	2	1
2	Non-prescription drugs: • Introduction • Types	2	1
3	• Community pharmacy organization • Structure of retail and wholesale drug store- • Types of drug stores and design • Legal requirements for establishment • Maintenance of drug store • Dispensing of proprietary products • Maintenance of records of retail and whole sale	8	4
4	Methods of patient assessment and care as they relate specifically to the drug and non-drug management of minor ailments, including ○ Infestations; ear, nose and throat conditions ○ Genitourinary tract infections ○ Skin disorders ○ Hemorrhoids'. ○ Insomnia ○ Allergy ○ Cough ○ Diarrhea ○ Constipation ○ Common cold	8	4

5	• A review of pain management ○ Wound care ○ Immunization Adverse drug reactions and drug interactions,as well as the pathogenesis, clinical features, management and treatment outcomes of major disorders of ○ Respiratory ○ Rheumatological ○ Neurological ○ Dermatological ○ Ocular diseases and disorders ○ Diabetes mellitus.	8	4
	Total	28	14

D-TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F-REFERENCES

Paul Rutter :Community Pharmacy;symptoms ,Diagnosis & treatment 1st,Churchill living stone .

Course specification of Quality Control

G- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Quality Control**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fifth Year / First Semester				
4	**Pre –requisite (if any):**	Analytical Chemistry 1- 4				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

H- PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1- Recognize the sources of quality variation

2- Understand the testing Programs and methods for assuring quality and compliance with official standards and specifications.

3- Appreciate the tremendous professional, social and legal responsibilities associated with the assurance of product quality.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Acquire knowledge on general principles of drug quality control and assurance systems and Identify Sources of impurities in pharmaceutical substances
a2. Recognize organization, functions of a Quality Control Department.
a3. Illustrate analytical techniques use in purity determination & drug identification..

B-Intellectual Skills:

b1. Analyze Monographs and specifications for drugs and drug products
b2. Differentiate between chemical and physicochemical analytical techniques in purity.

C-Practical Skills:

c1. Interpret the evaluation of sterile and non-sterile pharmaceutical products.

c2. Classify chemical and physicochemical analytical techniques in purity determination & identification and quantitation of drugs**.**

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

I- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• General principles of drug quality control and assurance systems	2	1
2	• Structural organization and functions of a Quality Control Department	2	1
3	• Sources of impurities in pharmaceutical substances, sources of quality variation of pharmaceutical products	4	2
4	• Environmental control of manufacturing area	4	2
5	• Monographs and specifications for drugs and drug products. Critical evaluation of the Pharmacopoieas	6	3

	including the African Pharmacopoiea and the role of WHO in drug quality assurance.		
6	• Application of chemical and physicochemical analytical techniques in purity determination, identification and quantitation of drugs in pharmaceutical and radiopharmaceutical preparations, including multicomponent formulations from a regulatory and quality control standpoint	6	3
7	• Evaluation of crude drugs	2	1
8	• Microbiological evaluation of sterile and non-sterile pharmaceutical products	2	
Total		28	14

J- TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorials

K- STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%

Final-term Examination	60	%
Practical Examination	10	%
Total	100	%

L- REFERENCES

1-Anthony Luttrell, Robert Kirsch, 2005, Pharmaceutical Quality Control. USA, Lab,DanielFarb.

2- Leon Lachman , Herbert A. Lieberman, Joseph L. Kanig, 1986,The Theory and Practice Industrial Pharmacy, 4th edition, USA, Lea and Febiger.

Course specification of Industrial Pharmacy 1

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Industrial pharmacy 1**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fifth Year / First Semester				
4	**Pre –requisite (if any):**	Pharmaceutics 1- 4 and Biopharmaceutics &Pharmacokinetic 1 & 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1-To provide a basic specialized knowledge in the areas of analytical techniques, research and development, production and quality assurance with reference to industrial pharmacy
2. Explore in detail the types of equipment &instruments used in the preparation, separation, extraction & sterilization.
3. Carryout a good manufacturing practice.
5. Develop the basic scientific research skills as well as effective communication and team work attitudes.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Acquire knowledge on steps of manufacturing of injections, tablets, capsules &drops .
a2. Recognize all the lines of drugs industry
a3. Illustrate the methods of drug separations.

B-Intellectual Skills:

b1. Interpret the most important unwanted drug changed that may occur after preparation e.g.: contamination, separation.
b2. Comment on suitable methods evaporation, filtration, crystallization, evaporation, filtration, crystallization, &extraction.
b3. Integrate industrial pharmacy with other pharmacy sciences e.g. pharmaceutics, medicinal chemistry.

C-Practical Skills:

C1. Perform the most important separations tests: evaporation, filtration, crystallization, &extraction.
C2. Apply the GMP regulations in pharmaceutical manufacturing .

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Particle size reduction:** Mechanism of size reduction Factors influencing size reduction Pharmaceutical application Energy requirements Types of mills Closed circuit grinding	4	2
2	**Particle size separation** Size separation standard screens Oscillating tray sitter grating sifters Cyclone separators Sedimentation Elutriation Handling of powders	2	1

3	**Filtration:** Mechanism of Filtration Factors affecting filter selection Filter media Filter selection Filter aids Classification of filters Leaf filters Rotator continuous Meta filters Membrane filters :	4	2
4	**Packaging** Packing materials Glass & Glass containers Metal & Metal containers plastics & Plastic containers Paper & Board Films, foils & laminates Rubber - Based compounds Closures Filling Labeling	4	2
5	**Centrifugation** centrifuge theoretical consideration Laboratory equipment Large scale equipment Low temperature centrifuge for biological work.	2	1
6	**Extraction** Extraction leaching process Factors affecting the efficiency of leaching process. Diffusion batteries Continuous diffusion batteries Continuous counter current extraction Cragg's apparatus	4	2
7	**Crystallization** Crystallization classification Batch crystallizers Simple vacuum crystallizers Nucleation and crystal growth Critical humidity prevention of caking	2	1
8	**Mixing** Mechanism of mixing Mixing equipments Mixing selection Solid-solid, solid-liquid and liquid –liquid mixers used in pharmaceutical industry.	4	2

9	**Drying** Classification of dryers Compartment Tunnel Rotary Cylindrical Vacuum Spry driers Fluidized bed dryers. Theory of drying loss on drying and moisture content. Equilibrium moisture content Principles of freeze drying and freeze dryers.	2	1
Total		28	14

D-TEACHING AND LEARNING METHODS

1-lectures
2- tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F-REFERENCES

1. Theory and Practice of Industrial Pharmacy-Lachman,Lieberman and Kanig
2. Bentley's Text Book of Pharmaceutics - Rawlin.
3. Tutorial Pharmacy - Cooper and Gunn.
4. An introduction to Chemical Engineering - Badger and Banchero.

Course specification of Medicinal Chemistry 3

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Medicinal chemistry 3**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fifth Year / First Semester				
4	**Pre –requisite (if any):**	Medicinal Chemistry 1 & Pharmacology 3				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Provide the knowledge of chemistry of drugs with special references to their pharmaceutical and medicinal usage.
2. Acquire the knowledge about the relationship of chemical structure and therapeutic properties.
3. Correlate medical chemistry facts with manufacture drugs & clinical application.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Understand the principles of medicinal chemistry

a2. Describe the basic principles of mechanism action for active groups in pharmaceutics chemistry.

a3. Explain the different reaction between active groups in pharmaceutics chemistry special in preparations of drugs and nomenclature chemically of medical chemistry.

B-Intellectual Skills:

b1. Apply preparation (synthesis) of medical compound drugs

b2. Identify the different of medical compound drugs by assay& titration

b3. Determine medically used & roles of important medical compound drugs**.**

C-Practical Skills:

c1. Maintain the name of chemical compound &derivatives or chemical modification effects.
c2. Estimation of drug half life**.**
c3. Classify of medical compound drugs according to medically used & active group

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use of **Cardiovascular drugs** as: • Anti anginal agents and vasodilators • Anti arrhythmic drugs • Antihypertensive drugs • Anti hyper lipidemic drugs • Anticoagulant drugs	10	5
2	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use of **Diuretics as** • Carbonic anhydrase inhibitors • Thiazides diuretics • Loop diuretics	6	3
3	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use of **Steroids hormones as:** • Steroidal Hormones, their semisynthetic analogs and antagonists • Female sex hormones • Male sex hormones	6	3
4	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use of **Vitamins** as: • Water soluble vitamins	6	3

	• Water insoluble vitamins Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use.		
Total		28	14

D-TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorial

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F-REFERENCES

1. Wilso; Gisvold, Doerge, 2010 Text book of organic medical pharmaceutical chemistry 12th edition – LWW, USA .
2. Remington's -1995-Pharmaceutical Sciences - Gennaro A.R., ed., 19th Edition, Mack Publishing Co., Easton, PA..

Course specification of Pharmacology 4

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Pharmacology 4**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Fifth Year / First Semester				
4	**Pre –requisite (if any):**	Pharmacology 1 & Medicinal Chemistry 3				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & Drugs for endocrine glands disorders& drug posology of drugs affecting central nervous systems and analgesic drugs.
2. Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of Drugs for endocrine glands disorders and drugs affecting central nervous systems and analgesic drugs.
3. Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.
4. Classify drugs affecting central nervous systems and analgesics into various categories
5. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
6. Relate drug indications to MAO of drugs & Predict drug limitations on the basis of Drug MOA.
7. Select an appropriate drug for patients based on drug benefits and limitation

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1.Determine pharmacokinetics (absorption, distribution, metabolism and excretion) and drug benefits (therapeutic actions, indications, efficacy and potency) & Drugs for endocrine glands disorders& drug posology of drugs affecting central nervous systems and analgesic drugs.

a2. Discuss drug limitations (side effects, contraindications, precautions, use in special patent categories and drug interactions) of Drugs for endocrine glands disorders and drugs affecting central nervous systems and analgesic drugs

a3. Comprehend his/her role as a pharmacist in providing correct information on rational use of medications.

B-Intellectual Skills:

b1. Classify drugs affecting central nervous systems and analgesics into various categories

b2. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations

b3. Relate drug indications to MAO of drugs

b4. Predict drug limitations on the basis of drug MOA **,** select an appropriate drug for patients based on drug benefits and limitation

C-Practical Skills:

C1. Calculate accurately drug's dosage, bioavailability, plasma half-life and volume of distribution in different patient populations.

C2. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.

C3. Carry out appropriate techniques and measurements in experimental pharmacology.

C4. Identify the common laboratory animals, laboratory equipment and conduct analytical procedures, appropriate to pharmacology, in a safe, accurate and precise used in experimental pharmacology.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Drugs for endocrine glands disorders (Hormones)** • Introduction to the Hormones in the body and explain how to work and illustration the Pharmacokinetics, Pharmacodynamics [drug	10	5

	benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of sub topics of drugs for endocrine glands: • Anterior and posterior pituitary hormones • Antidiabetic drugs: insulin, oral hypoglycemic • Drugs for thyroid gland disorders • Corticoteroids • Estrogens, progesterons, hormonal contraceptives and antiestrogens • Androgens and antiandrogens		
2	**CNS drugs** • Introduction to the chemical neurotransmitter in the central nervous system • Illustration the pharmacokinetics, pharmacodynamics [drug benefits: MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of the sub topics of CNS • General anaesthetics • Local anesthetics • Sedatives, hypnotics • Antiepileptics	10	5

3	**Analgesics** • Pharmacokinetics, Pharmacodynamics drug benefits : MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of Analgesic • Narcotic analgesics& opioids and hypnotics.	8	4
Total		28	14

D-TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F-REFERENCES

1. Richard A. Harvey. Lippincott's pharmacology, 2000, Lippincott William and Wilkins.
2. Udaykumar. Text book of medical pharmacology.

Fifth Year
Second Semester

Course specification of Clinical Pharmacy 2

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Clinical Pharmacy 2**				
	Credit hours:	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fifth Year / Second Semester				
4	**Pre –requisite (if any):**	Pharmacology 1 - 4				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Acquire knowledge about the diagnosis of disease.
2. Analyze the all information about patient's state according the patient history, clinical features and laboratory findings.
3. Solve the given case according to the correct therapeutic way.
4. Detect the complications of the diseases.
5. Recognize the safety of drugs in special groups like children, elderly and pregnancy..

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Define the epidemiology, etiology, Risk factors for particular condition under study**,** understand the principals of Anatomy, histology, pathology and physiology that relevant to clinical pharmacokinetic of drugs.

a2- Recognize the Clinical features & laboratory tests for each case study & the correct diagnosis of diseases..

a3- acquire knowledge about drugs, their uses concerning their identities, safety, optimum use, contraindications, recognition of disease state, pathology and management of symptoms.

B-Intellectual Skills:

b1- list precaution to be taken for each prescribed drugs individually or in

combination.

b2 -Explain how to deal with patient when side effect occurred, solve the case studies according to the therapeutic way.

b3-The student can diagnose disease according to their manifestations, investigations and physical examinations.

b4-Interpret the clinical features and the diseases related to them.

C-Practical Skills:

c1-Acquire skills to diagnosed the case studies precisely.

c2-Evaluate critically observations and measurements, in terms of their significance and theory underlying them.

c3-Give advises for the patients and others on the safe and effective use of medicines

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	• Providing instructions and supervised clinical experience.	4	2
2	• Training emphasizes effective monitoring of drug therapy, preventing, detection and correcting drug related problems, and managing and optimizing drug therapy.	6	3
3	• In-patient services including therapeutic drug monitoring utilizing clinical pharmacokinetic tools and knowledge	6	3
4	Consultations, communication with other members of the health care team as well as with patients	6	3
5	• Drug histories and discharge consultation are required as well as attending rounds with medical teams in o general medicine o pediatrics	6	3

	○ and / or general surgery.		
Total		28	14

D-TEACHING AND LEARNING METHODS

1-Lectures
2-Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 2 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F-REFERENCES

1- Walker and Edwards (eds). Clinical Pharmacy and Therapeutics Third edition (2003).
2- Applied Therapeutics: The Clinical Use of Ddrugs. Koda-kimble.

Course specification of Drug Desiyn

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Drug Design**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Fifth Year / Second Semester				
4	**Pre –requisite (if any):**	Medicinal Chemistry 1 - 4				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Recognize the basic principles of drug discovery, design and development.
2. Illustrate the concepts of fragments, drug likeness and drugs properties and importance of combinatory and parallel synthesis in finding a drug likeness.
3. Discuss the basic concepts of drug targets.
4. Demonstrate the essential knowledge and understanding about the properties of drug likeness in designing new chemical entities of potential biological activities.
5. Explain the preclinical and clinical studies that proceed the getting drug to the market.
6. Determine the methods used to calculate the properties of drug molecules
7. Identify the 3D pharmacophore of drug and the binding sites

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Recognize the basic principles of drug discovery, design, development and basic concepts of drug targets.

a2- Illustrate the concepts of fragments, drug likeness and drugs properties and importance of combinatory and parallel synthesis in finding a drug likeness.

a3- Demonstrate the essential knowledge about the properties of drug likeness in designing new chemical entities of potential biological activities and preclinical and clinical studies that proceed the getting drug to the market.

B-Intellectual Skills:

b1- Determine the methods used to calculate the properties of drug molecules

b2- Identify the 3D pharmacophore of drug and the binding sites

b3- Diagram the schemes that describe the types Drug Desiyns.

C-Practical Skills:

c1- Apply the docking procedures for design of some enzyme inhibitors

c2- Practice the Drug Desiyn using some computer program

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Introduction to Drug discovery, design and development** -Terminology related to Drug discovery, design and development - Stages of drug discovery, primary goals and major activities	4	2
2	**-Integral Part of Drug Discovery: from fragments, lead, drug-like molecule to drug molecule** **Lead compound and drug-like molecule** Finding a fragment and lead compound, What is a drug-like molecule Lipinski's Rule Veber Rules **-Basic concepts about drug targets** **What is drug molecule** **Structural Integrity of a Drug Molecule:** Pharmaceutical, Pharmacokinetic and Pharmacodynamic Phases	8	4

	-Structural fragments of a drug molecule: pharmacophore, toxicophore, metabophore **-The properties of drug molecules:** solubility and partition coefficient Shape (steric, conforma□onal, topological) proper□es Stereochemical proper□es Electronic properties **- Combinatorial and parallel synthesis in medicinal chemistry projects**		
3	**-Basic concepts of drug targets** Protein as drug targets Enzymes as drug targets Receptors as drug targets Nucleic acids as drug targets -Miscellaneous drug targets	6	3
4	**Drug discovery, design, and development** **Molecular and quantum mechanics** Molecular mechanics Quantum mechanics Energy minimization **-Molecular properties:** Partial charges, Molecular electrostatic potentials, Molecular orbitals , Spectroscopic transitions , The use of grids in measuring molecular properties **-Conformational analysis** **-Structure comparisons and overlays** **-Identifying the active conformation** X-ray crystallography Comparison of rigid and non-rigid ligands **-3D pharmacophore identification:** X-ray crystallography Structural comparison of active compounds Automatic identification of Pharmacophores **-Docking procedures** **-Types of Computer aided Drug Desiyn** Structure-based Drug Desiyn (direct design) strategy (SBDD) Ligand –based Drug Desiyn (indirect design) strategy (LBDD) **-Docking procedures** **-Examples for drug modelling** **-Optimizing target interactions** Drug optimization: strategies in Drug Desiyn **Optimizing access to the target**	8	4

5	**-Getting the drug to market** **-Preclinical and clinical trials** Toxicity testing Drug metabolism studies Pharmacology, formulation, and stability tests Clinical trials	2	1
	Total	28	12

D-TEACHING AND LEARNING METHODS

1-Lectures
2-Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F-REFERENCES

1- Povl Krogsgaard-Larsen, Tommy Liljefors and Ulf Madsen, 2002 , "Textbook of Drug Desiyn and Discovery" Third edition, Taylor & Francis, London.
2- Jhoti H and Andrew R. L, 2007, "structure-based drug discovery" Springer, Dordrecht.
3- Thomas Nogrady, Donald F. Weaver, 2005,Medicinal Chemistry A Molecular and Biochemica Approach, 3rd edition, Oxford University Press, Inc., New York.

Course specification of Hospital pharmacy

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Hospital Pharmacy**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Fifth Year / Second Semester				
4	**Pre –requisite (if any):**	Clinical Pharmacy 1 & 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1- Develop an understanding of the complete process of the drug distribution system, from the purchasing and receipt of drugs by the hospital including their administration to the patient.
2- Understand of an intravenous admixture service, including total parenteral nutrition and chemotherapy
3- Provide student with a detailed knowledge and understanding concerning the responsibilities of a hospital pharmacist.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1-Explain hospital organization/committee functions, interpret and enter patient orders, prepare intravenous admixtures, total parenteral nutrition, chemotherapy and role of drug distribution.
a2-Understand steps involved in drug therapy monitoring demonstrate proper aseptic technique in IV admixture compounding and demonstrate appropriate and accurate use of calculations in all aspects of intravenous admixture preparation
a3-Describe the role of drug distribution as a component of the provision of pharmaceutical care, benefits, limitations of using a profile for pharmacotherapy monitoring, drug distribution and explain the process of adverse drug reaction reporting and analysis

B-Intellectual Skills:

b1- Calculate the medicine doses and dosage regimen.
b2-Interpret patient and clinical data, including patients records held within practice settings.
b3-Interpret of prescription and other orders of medicines.
b4-Identify potential drug- related problems that could occur as result of the hospital's distribution system and identify ways to prevent their occurrence.

C-Practical Skills:

c1- Design and evaluate therapeutic regimens to optimize drug use.
c2-Interpret and process of medical orders.
c3-Dispense medicines, advice patients on correct and rational use of medicines and cosmetics.
c4-Interpret patient scientific data to help evaluate and optimizing prescribing in primary care.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	**Introduction** • Organization and Structure Organization of a hospital and hospital pharmacy • Responsibilities of a hospital pharmacist • Pharmacy and therapeutic committee Hospital formulary Contents, preparation and revision of hospital formulary.	2	1
2	**Drug Store Management and Inventory Control:** • Organization of a drug store • Types of materials stocked Storage conditions	2	1
3	**Inpatient pharmacy services** • Dose adjustment. • Intravenous admixture (TPN). • Understand the basic principles of aseptic technique, as well as policies and procedures for parenteral drug administration • Practice the appropriate aseptic technique used in the preparation of intravenous	10	5

	admixtures (liquid-liquid transfer, powder reconstitution, ampule transfer…) • Perform all calculations associated in all aspects of intravenous admixture preparation appropriately and accurately • Use information resources to locate and provide information on, or solve problems related to incompatibilities, drug stabilities, rates and routes of administration… • Therapy drug monitoring (TDM) • Unit dose Interpret/ check medication orders for completeness, appropriateness, and accuracy; • Evaluation of medication orders for drug allergy, interactions, and contraindications according to specific patient profiles • Correct dosage calculation problems Process of adverse drug reaction reporting and analysis **Outpatient pharmacy services**		
4	**Drug Distribution Systems in Hospitals:** • Outpatient dispensing - methods adopted. • Dispensing of drugs to inpatients. • Types of drug distribution systems. • Charging policy – labeling • Dispensing of drugs to ambulatory patients. Dispensing of controlled drugs	4	2
5	**Central Sterile Supply Unit and its Management** • Types of materials for sterilization • Packing of materials prior to sterilization • Sterilization equipments Supply of sterile materials	2	1
6	**Manufacture of Sterile and Non-sterile Products** • Policy making on manufacturable items • Demand and costing – • Master formula Card, • Production control, • Manufacturing records.	2	1
7	**Drug Information Service Sources Information on drugs, disease,** • Treatment schedules • Procurement of information • Computerized services (e.g. MEDLINE) • Computer systems for prescription filing • Drug profile	4	2

	• Patient medication profile • Cases on drug interaction and adverse reactions, radiosynchrotic cases, etc. • Retrieval of information • Medication error		

8	• Pharmaceutical services
	  ○ Quality control
	  ○ Clinical pharmacokinetics.
	  ○ Drug investigation
	• Educational activities.
	Clinical trials and good clinical research practice
		2	1

Total		28	14

D-TEACHING AND LEARNING METHODS

1-Lectures
2-Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quiz	10	%
Total	100	%

F-REFERENCES

1- Rang, Dale and Ritter Pharmacology (2000)
2-Katzung –Basic and Clinical Pharmacology (2001)
3-Tripathi –Essential Pharmacology (2001)
4-Goodman & Gilman's- The pharmacological basic of therapeutics (1995)

Course specification of Industrial Pharmacy 2

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Industrial Pharmacy 2**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fifth Year / Second Semester				
4	**Pre –requisite (if any):**	Pharmaceutics 1 - 4 and Biopharmaceutics &Pharmacokinetic 1 & 2				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Outline the design and mechanism of action of the instruments included in the unite operation in pharmaceutical practice.
2. Point out the principles of each unites operation in pharmaceutical processes.
3. Support the equipment used for each unite operation in relation to its advantages, disadvantages and mechanism of action.
4. Define the physical principle of each unite operation in industrial pharmacy.
5. Acquire knowledge the concepts of pharmaceutical operations as per cGMP including the industrial plant layout design and packaging technology.
6. Rationalize the use of the equipment for a specific application in pharmaceutical industry.
7. Predict the relationship between the equipment design and product characteristics. Explain and discuss the use of different equipment to achieve certain operation in pharmaceutical industry.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Identify the concept and scope of Industrial Pharmacy.

a2- Acquire knowledge about the design of different equipment and unite operation used in the field of manufacturing of different dosage forms as per the characteristics of crude drugs used.

a3- Explain the stages of pharmaceutical manufacturing and packaging of products as per cGMP, packaging technology and method sterilization

.

B-Intellectual Skills:

b1- Distinguish the stages of pharmaceutical manufacturing and packaging **.**

b2- Apply pharmaceutical operations as per cGMP .

C-Practical Skills:

c1- Use the laboratory instruments and devices required in the preparation .

c2- Demonstrate the formulation, manufacturing and dispensing sterilized drugs and carry out the quality control test according to GMP.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Granulation	4	2
2	Pharmaceutical powder compaction technology	2	1
3	Force displacement and network measurements	2	1
4	Characterization of packing geometry and Consolidation mechanisms of powder	2	1
5	Porosity-pressure functions Porosity-pressure equations.	2	1
6	Tablet Coating & Sustained Release Tablets.	4	2
7	Encapsulation.	4	2
8	Materials of fabrication and corrosion	2	1
9	Sterilization Technology in industrial pharmacy.	2	1

10	Current Good Manufacturing Practice (c.G.M.P).	4	2
Total		28	14

D-TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F-REFERENCES

1. Theory and Practice of Industrial Pharmacy-Lachman,Lieberman and Kanig
2. Bentley's Text Book of Pharmaceutics - Rowlin.
3. Tutorial Pharmacy - Cooper and Gunn.
4. An introduction to Chemical Engineering - Badger and Banchero.

Course Specification of Medicinal Chemistry 4

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Medicinal chemistry 4**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fifth Year / Second Semester				
4	**Pre –requisite (if any):**	Medicinal Chemistry 1 & Pharmacology 4				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. To provide the knowledge of chemistry of drugs with special references to their pharmaceutical and medicinal usage.
2. To acquire the knowledge about the relationship of chemical structure and therapeutic properties.
3. To correlate medical chemistry facts with manufacture drugs & clinical application.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Understand the principles and nomenclature of medicinal chemistry
a2. Describe the basic principles of mechanism action for active groups in pharmaceutics chemistry.
a3. Explain the different reaction between active groups in pharmaceutics preparations.

B-Intellectual Skills:

b1. Apply preparation (synthesis) of medical compound drugs
b2. Identify the different of medical compound drugs by assay& titration
b3. Determine medically used & roles of important medical compound drugs**.**

C-Practical Skills:

c1. Maintain the name of chemical compound &derivatives or chemical modification effects.

c2. Estimation of drug half-life**.**

c3. Classify of medical compound drugs according to medically used & active group

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.

d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use for **Anti-infective agents as:** • Alcohols, phenols, oxidizing agents • iodine, chlorine comp, cationic surfactants Antihypertensive drugs • dyes, mercury comp, preservatives.	6	3
2	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use for **Antifungal agents: as:** Carbonic anhydrase inhibitors • Azoles, allylamines, fatty acids, phenols, • nucleosides, polyenes, others	4	2
3	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use for **Synthetic antibacterial agents:as:** • Quinolones, nitrofurans, methenamine • urinary analgesics. • Antitubercular agents • Antiprotozoal agents • Anthelminthics • Antiscabious and antipedicular agents • Sulfonamides	6	3

	Anti malarials		
4	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use for **Antibiotics as:** • □-lactams, aminoglycosides, tetracyclines • macrolides, lincomycins, polypeptides. Antiviral agents	6	3
5	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use for **Antineoplastic agents: as:** • Alkylating agents, antimetabolites • antibiotics, plant products, hormones immunotherapy, miscellaneous.	4	2
6	Nomenclature, classification, synthetic procedures of compounds mentioned under each category, structure activity relationship, mode of action and therapeutic use for **Diagnostic agent**	2	1
Total		28	14

D-TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorial

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%

Total	100	%

F-REFERENCES

3. Wilso; Gisvold, Doerge, 2010 Text book of organic medical pharmaceutical chemistry 12th edition – LWW, USA .
4. Remington's -1995-Pharmaceutical Sciences - Gennaro A.R., ed., 19th Edition, Mack Publishing Co., Easton, PA..

Course specification of Drug Marketing

A-COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Drug Marketing**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Fifth Year / Second Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	Pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B-PROFISIONAL INFORMATION

1-AIMS OF THE COURSE:

1. Explain the importance of pharmaceutical marketing in business
2. Identify different types of pharmaceutical marketing analysis
3. Describe the balance sheet and operating income management.
4. Recognize and control pharmacy business
5. Assess Marketing plan and planning & stock management skills.
6. Employ good selling and negotiation skills.
7. Retrieve curriculum vitae.
8. Develop good relationships with the customers.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Explain the importance of pharmaceutical marketing and importance of promotional activities in healthcare.
a2. Identify different types of pharmaceutical marketing analysis.
a3. Describe the balance sheet, operating income management **and** different types of marketing analysis

B-Intellectual Skills:

b1. Illustrate market needs.
b2. Analyze and control pharmacy business.
b3. Manage the relationship with customers.

C-Practical Skills:

c1. Handle of balance sheet and operating income management.
c2. Interpret product life cycle .
c3. Assess Marketing plan and planning & stock management skills.
c4. Employ good selling and negotiation skills.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C-COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Introduction to pharmaceutical marketing	2	1
2	Marketing definition and importance	2	1
3	Pharmaceutical Marketing promotional mix and promotional activities.	2	1
4	Element of pharmaceutical marketing plan and planning	2	1
5	Pharmaceutical Marketing analysis	2	1
6	Management of product life cycle	2	1
7	Finance and accounting – relationship between marketing and finance	2	1
8	Managing profitability of business/brand	2	1
9	Balance sheet and operating income management	2	1

10	Pharmacy management- category management	2	1
11	Merchandizing and stock management	2	1
12	Skills development- selling and negotiation skills	2	1
13	Interviewing skills	2	1
14	Writing Curriculum Vitae	2	1
	Total	28	12

D-TEACHING AND LEARNING METHODS

1-Lectures
2- Tutorials

E-STUDENT ASSESSMENT METHODS

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 Quiz	Week 4
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	30	%
Final-term Examination	60	%
Seminar & Quizzes	10	%
Total	100	%

F-REFERENCES

1- Mickey C. Smith., 1991, Pharmaceutical Marketing: Strategy and cases. Haworth Press Inc .
2- Kotler, Philip, and Gary Armstrong., 2010, Principles of marketing. Pearson Education.

Course specification of Cosmetics preparations

A- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Cosmetics preparations**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2	**2**			**3**
3	**Study level/ semester at which this course is offered:**	Fifth Year / Second Semester				
4	**Pre –requisite (if any):**	Pharmaceutics 1- 4				
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

B- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1. Provide students with an in-depth understanding in principles of drug delivery systems.
2. Acquire knowledge about the concept of cosmetic and dermatologic preparation.
3. Describe the Preparations of different types of cosmetic preparations.
4. Identify the safety concept of cosmetic preparation.
5. Interpret the new trends in cosmetic/dermatologic industry.

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1- Discuss the formulation, manufacture, and evaluation of cosmetics for the different body parts like skin, hair, nail and lips.

a2- Describe the morphology, physiology and structure of skin and hair, the problem associated with disorders, precaution and the suitable cosmeceuticals

a3- Illustrate the formulation, manufacture, and evaluation of drugs obtained from natural and synthetic sources used for face cosmetics; cleansing preparations, aftershave, anti-acne products, and tooth and mouth care preparations.

B-Intellectual Skills:

b1- Analyze the need for cosmetics in modern society

b2- Describe the different methods, techniques and instruments used in formulation of cosmetics.

b3- Discover the rationale behind different cosmetics formulations and their quality control.

b4. Create the safety issues related to the use of cosmetics

C-Practical Skills:

c1.Apply in practice setting the need and working principle for different cosmetic ingredients required to meet the needs of patient and other health professionals

c2.Demonstrate the excellent accomplishment of extraction, formulation and pharmacological action of different cosmetic ingredients and carry out the quality control test according to GMP.

c3. Offer advices to patients and community on safe and effective use of cosmetics.

D-General Skills and Attitudes:

d1-Work separately or in a team to research and prepare a scientific topic.

d2-Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

C- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Skin structure and function & Skin disorder	2	1
2	Hair structure and function	2	1
3	Skin care products	2	1
4	Sunscreen preparations and skin bleaches	2	1
5	Skin cleansing preparations	2	1

6	Antiperspirants & deodorants	**2**	**1**
7	Anti-wrinkle preparations, vanishing and emollient creams	**2**	**1**
8	Shaving preparations	**2**	**1**
9	Anti-acne products	**2**	**1**
10	Mouth and oral care problems & products	**2**	**1**
11	Toothpaste	**2**	**1**
12	Hair cosmetic	**2**	**1**
	Total	**28**	**14**

D- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion.
3. Tutorials.
4. Lab. Work.

E- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

F- REFERENCES:

1-R. Schueller and P. Romamouski, 1999, Cosmetics and Personal Care, 1st edition, USA Allured's Publishing Corp, ISBN 0931710685.
2-M. S. Balsam and Edward Sagarin, 1992, Cosmetics: Science and Technology, 2nd Ed., Vols.
3- M. S. Balsam & Edward Sagarin (Eds.), 1992, Cosmetic Science and Technology, 2nd edition, Vol. 1-3, Florida, Krieger Publishing company.
4-Mac Chesney, J. C., 1974, Packaging of Cosmetic and Toiletries, 1st edition, London, Newness- Butterworth, ISBN-13 978-0408001250.

Course specification of Research Methodology

M- COURSE IDENTIFICATION AND GENERAL INFORMATION:

1	**Course Title:**	**Research Methodology**				
2	**Credit hours:**	**C.H**				**Total**
		Theoretical	Practical	Training	Seminar	
		2				**2**
3	**Study level/ semester at which this course is offered:**	Fifth Year / Second Semester				
4	**Pre –requisite (if any):**					
5	**Co –requisite (if any):**					
6	**Program (s) in which the course is offered:**	Bachelor of Pharmacy				
7	**Language of teaching the course:**	English				
8	**The department in which the course is offered:**	pharmacy				
9	**Location of teaching the course:**	Faculty of medical scientists – AL-Yemenia University				
10	**Prepared by:**					
11	**Date of approval:**					

N- PROFISIONAL INFORMATION:

1-AIMS OF THE COURSE:

1.Create academic work with integrity in Research Methodology and Application.
2. Apply efficiently research methodology .

3. Acquire knowledge of research methodology and application in industry
4. Systemically analyze problems and propose solutions in research methodology and application via research methodology
5. Work as a team with other disciplines related to research methodology and application
6. Communicate and select suitable method for presentation in research methodology and application

2-INTENDED LEARNING OUTCOMES:

A-Knowledge and Understanding:

a1. Acquire knowledge of basic concepts of research and its methodologies in research methodology
a2. Describe the various types of research.
a3. Illustrate various parts, types, methods and techniques of academic research.

B-Intellectual Skills:

b1. Analyze various methods of sampling, data collection, analysis and interpretation of qualitative and quantitative data.
b2. Differentiate between analytical & empirical research.

C-Practical Skills:

c1. Demonstrate knowledge of qualities of a good research/researcher and the ethics of research.
c2. Select proper research topic, design, instruments and sample for their proposal.

D-General Skills and Attitudes:

d1. Work separately or in a team to research and prepare a scientific topic.
d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day.

O- COURSE CONTENTS:

NO	TOPICS	NO OF HOURS	No of Lectures
1	Introduction	2	1
2	Select a Research topic	2	1
3	Selecting and defining a research problem	2	1
4	Types of research	2	1
5	Literature review	2	1

6	Finding supporting Documents	**2**	**1**
7	Choosing your research methods and instruments	**2**	**1**
8	Choosing your participants	**2**	**1**
9	How to prepare a research proposal	**2**	**1**
10	How to construct questionnaires and tests	**2**	**1**
11	Collecting data through interviews, focus groups and observation	**2**	**1**
12	Collecting data through interviews, focus groups , observation & report your findings	**2**	**1**
	Total	**28**	**14**

P- TEACHING AND LEARNING METHODS:

1. Lectures.
2. Discussion.
3. Tutorials.
4. Lab. Work.

Q- STUDENT ASSESSMENT METHODS:

1- Participation& semester work	to assess intellectual skills
2- Midterm exam	to assess the knowledge & understanding
3-Final term exam	to assess the knowledge & understanding
4- Practical exam	to assess the practical skills.

Assessment Schedule

Assessment 1 midterm exam	Week 6
Assessment 2 practical	week 12
Assessment 3 final exam	Week 16

Weighing of Assessments

Mid-Term Examination	20	%
Final-term Examination	60	%
Practical Examination	20	%
Total	100	%

R- REFERENCES:

Dawson, C. (2007). Practical research Methods: A user-friendly guide to mastering research. UK: How To Books Ltd.