

Faculty of Pharmacy & Medical Technology

Pharmacy

University Requirements (21) Credit Hours			
Course No.	Course Name	Credit Hours	Prerequisite
601101	Computer Skills 1	3	
601102	Computer Skills 2	3	601101
401101	Arabic Language (1)	3	
400111	National Education	3	
402101	English Language (1)	3	
402102	English Language (2)	3	402101
900101	Military Sciences	3	
University Elective (6) Credit Hours			
100105	Science and Life	3	
203101	Introduction to Fine Arts	3	
301105	Laws in our life	3	
303103	Accounting for Non-Accountants	3	
400101	Arabic and Islamic Civilization	3	
400105	Current Affairs	3	
400106	Palestinian cause	3	
402102	Arabic Language (2)	3	401101
404100	Environmental Education	3	
407101	Introduction to Sociology	3	
409101	Principles of Communication	3	
501101	First Aid	3	
Faculty Requirements (28) Credit Hours			

101103	General Chemistry	3	
101103L	Chemistry Lab.	1	
104103	General Physics for Medical Sciences	3	
503101	Biology 1	3	
503102	Biology 2	3	503101
105103L	Biology Lab.	1	503102
103101	Calculus 1	3	
103333	Biostatistics	2	103101
101115	Organic Chemistry for Medical Students	3	101103
501241	Analytical Chemistry	3	101103
502211	Biochemistry 1	3	101115
Department Requirements (98) Credit Hours			
501242	Physical Pharmacy 1	2	101103
501211	Pharmaceutical Organic Chemistry	3+1	101115
501256	Pharmacognosy	2	503102
502212	Biochemistry 2	2+1	502211
501311	Medicinal Chemistry 1	3	501211
501312	Medicinal Chemistry 2	3	501311
501317	Phytochemistry 1	2	501211+501256
501321	Pharmacy Ethics & Jurisprudence	2	Third year
501341	Physical Pharmacy 2	2+1	501242
501342	Pharmaceutical Dosage Forms and compounding	3+1	501341
501351	Pharmacology (1)	3	502236
501413	Instrumental Analysis	2+1	501241
502235	Anatomy & Histology	2+1	503102
502236	Physiology	3+1	502235
502225	Microbiology 1	2+1	503102
502346	Microbiology 2	2	502225
501415	Medicinal Chemistry 3	3	501312

501445	Non-Prescription Drugs	3	501352+ 501346
501414	Phytochemistry 2	2+1	501317
501442	BioPharmacy	2	501346
501443	Pharmacokinetics	2+1	501442
501352	Pharmacology 2	3	501351
501525	Drug Delivery Systems	2	501421
501444	Pharmaceutical Microbiology	3	501346+ 502346
502318	Pathophysiology	3	502236
502435	Clinical Biochemistry	3	502314+ 502212
502445	Pathology & Immunology	2	502346+ 502318
501421	Industrial Pharmacy	3+1	501346
501452	Pharmacology (3)	2	501451
501524	Communication skills in Pharmacy	2	90 Ch
501531	Toxicology	3	501452
501526	Clinical Pharmacy 1	3	501452
501527	Clinical Pharmacy 2	3	501521
501528	Research Project	2	135 Ch
501513	Pharmaceutical Marketing	3	120 Ch
Departmental Electives (9) Credit Hours			
501560	Selected topics in Pharmacology	3	501452
501561	Clinical Pharmacokinetics	2+1	501443
501562	Drug Information Systems	3	501352
501563	Quality Assurance of Drugs	3	501421
501569	Cosmetics	3	501346
501570	Herbal Medicine	3	501414
501572	Advanced Industrial Pharmacy	3	501421

501574	Pharmaceutical Care	3	501526
501575	Clinical Nutrition	3	502435
501584	Methods of Drug Design	3	501312
501585	Pharmaceutical Analysis	2+1	501413
501586	Selected Topics in Pharmacy	3	135 ch
501587	Radio Pharmaceuticals	3	135 Ch
501591	Biotechnology	3	135 Ch
Free elective (3) Credit Hours			
Total Credit Hours		165	

Petra University

**ACADEMIC PLANS
DIRECTORY**

Academic Year 2008/2009

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President Letter

This is the fourth issue of the University of Petra Directory, designed to introduce the university's main features. It contains information about all the academic schools of the university and their departments, their academic plans and course offerings, including brief course-descriptions. This directory also contains information about the university, school and departmental requirements for the acquisition of a Bachelor's Degree in the different disciplines and specializations that are offered.

This directory is also intended as a guide to our prospective and current students' parents. It enables parents to keep track of their sons' and daughters' progress at the university, the requirements they have completed and those still to be fulfilled until their graduation. It furthermore offers those who are interested a general picture of academic life and the many aspects it involves, including its aspirations and goals.

The University of Petra works hard to ensure that its programs are progressive and constantly developing to stay abreast of the spirit of the age, its innovations, circumstances and developments, as well as its society's current needs especially in order to prepare its graduates for a thriving real-life involvement, with a productive and successful career. This is part of the university's vision and message.

In God's Grace and Guidance We Seek to Stand and to Remain,

President Adnan Badran

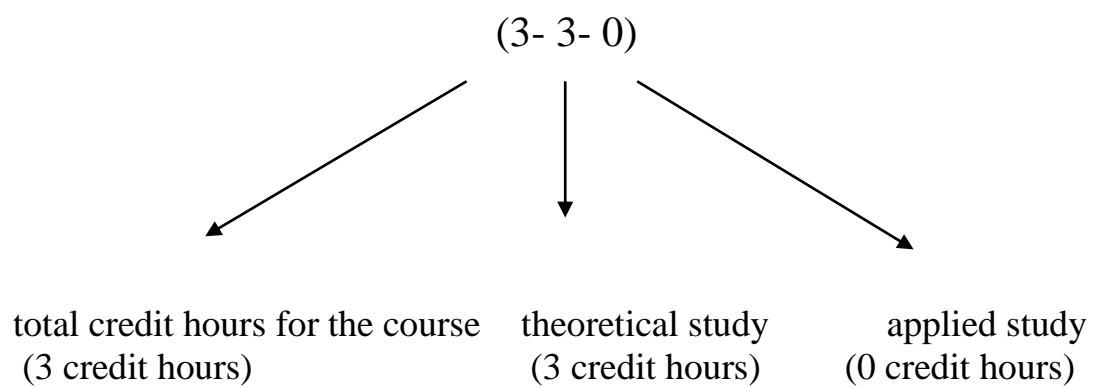
University of Petra

Directory Committee

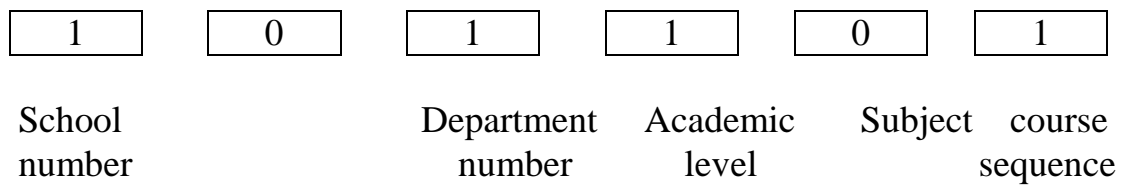
Professor Nizar Al-Rayyes	Chair
Professor Tawfiq Al-Husseini	member
Doctor Rafiq Omar	member
Doctor Muhammed Bilal Al-Jayyousi	member
Doctor Ghassan Farid Issa	member
Doctor Walid Al-Anati	member
Doctor Ahmad Al-Hasan	member
Ms. Marcelle Muasher	member
Ms. Hanada Al-Momani	trustee

Numerical Organization System

A. Credit Hours:



B. Course Number:



Overview of the University

The private University of Petra was established in 1991. It has public and private authorization from the Jordanian Board of Higher Education, is a member of the Unions of Arab Universities, and the Union of European Universities, and enjoys an esteemed reputation among all Arab nations. UOP contains five schools and offers the Bachelor's Degree in twenty different specializations and the Master's Degree in English Language and Translation.

Since its establishment, UOP has striven to be a modern and dynamic academic institution equipped with outstanding academic and scientific aptitudes and talents, and is always careful to develop its various academic programs in their educational, theoretical and practical aspects in response to its students' ambition to obtain a university education compatible with the most current scientific and technological innovations and advances around the world. The University of Petra also seeks to attract an educational faculty and staff that enjoy a high degree of aptitude and are graduated from respected universities around the world. It furthermore stresses, among its priorities, the service of society in the scientific, cultural and social fields.

University Vision & Mission

Vision

We aspire to be the "University of Choice", in Jordan and the region, for learners and scholars.

Mission Statements

Our Purpose:

We aim to play a significant role in the progress of our nation through creating and disseminating knowledge & technology and preparing graduates who can contribute positively towards their communities.

Our Business:

Our mission is to create an academic, cultural and social environment that develops research opportunities; builds-up the competence of our members; provides active community service, and prepares our students to be capable of creative and critical thinking and life long learning, and are able to compete in the marketplace.

Our Values:

In conducting our work, we are guided by the following values:

- Pursue knowledge for the sake of knowledge.
- Equal opportunities to learn and excel.
- Respect for others' opinions.
- Motivate members for life long learning.
- Diversity is the essence of our existence.
- Encourage teamwork and collaboration.
- Treasure creativity and achievements.
- Advocate intellectual freedom.
- Committed to social justice and social responsibility.
- Dedicated to leadership and accountability.

Faculty of Arts & Sciences
Arabic Language and Literature
English Language and Literature
English Language / Translation
Childhood Education
Classroom Teacher
Journalism and Communication
Chemistry
Faculty of Architecture and Art
Architecture
Interior Design
Graphic Design
Faculty of Administrative & Financial Sciences
Business Administration
Marketing
Management Information Systems
Banking & Financial Sciences
Accounting
Faculty of Pharmacy & Medical Technology
Pharmacy
Nutrition
Faculty of Information Technology
Computer Science
Computer Information Systems
Software Engineering

IV. Faculty of Pharmacy and Medical Sciences

Pharmacy	(165)	hrs
Nutrition	(135)	hrs

Program of Studies Article (5)

- 5-1) The Program of Studies for awarding a bachelor's degree allocated for each school is comprised of:
- 5-1-1) The university requirements are (27) credit hours: (21) Mandatory Credit hours and 6 Elective credit hours, and these can be amended by the Council of Deans when they deem necessary.

University Mandatory Courses

601101 computer skills (1)	3
601102 computer skills (2)	3
401101 Arabic (1)	3
400111 National Education	3
402101 English Language (1)	3
402102 English Language (2)	3
900101 Military Sciences	3

University Elective (optional) Courses

401102 Arabic (2)	3
101105 Life Sciences	3
203101 Introduction to Fine Art	3
303103 Introduction to Accounting for non-accountants	3
400101 Arab Islamic Civilization	3
400105 Contemporary Issues	3
400109 Palestine Cause	3
406100 Environmental Education	3
407101 Introduction to Sociology	3
409101 Principles of Communication	3
501101 First Aid	3
301105 Law in our Life	3

5-1-2) Faculty requirements are to be approved by the Council of Deans, and upon the recommendation of each faculty council. It should be noted that the number of hours varies according to specialties of each department. The categorization of these courses whether mandatory or optional is vested in the faculty. The number of credit hours is between 21 and 28.

5-1-3) The departmental requirements vary, depending on the nature of the department, and specialization. The department itself decides whether these requirements are mandatory or elective/allied health courses

5-2) English Language Placement Test

5-2-1) All students, who are admitted to the University, are to take the English Language Placement Test to assess their basic skills. The grade for the test ranges from zero to 100%. If students attain 80% or more, they will enroll for English (2) and are considered having passed English (1) and three credit hours will be added to their academic files without credit. However, if they get 50% to 79%, they shall enroll for English (1).

5-2-2) However, if students attain less than 50% or they have not taken the test during the First Academic year, they will have to enroll for a Remedial English Language Course, whose number is 40220099, for one semester and carrying 3 credit hours, but this course is not included in their cumulative average nor is it

added to the number of credit hours required for graduation. To be qualified to enroll for English (1), the student shall have to attend classes and to sit for all tests and exams.

- 5-2-3) Students shall be exempted from the English Language Placement Test if they have had a pass score in the TOEFL test or any other equivalent tests. Three credit hours shall be added for graduation, and they are granted a pass (P) but no points or credits will be added.

5-3) Computer Skills Placement Test

- 5-3-1) All students, who are admitted to the University, are to take the Computer Skills Placement Test to assess their basic skills. The grade for the test ranges from zero% to 100%. If the students attain a pass mark, they will enroll for Computer Skills (2) and they are considered having passed Computer Skills (1) and three credit hours will be added to their files with no credit. However, if they fail the test, or they have not taken it during the first year of their enrolment, they will have to enroll for Computer Skills (1).

The student shall be exempted from Computer Skills if they possess the ICDL (International Computer Driver's License or any certificate equivalent to the preceding.

Three credit hours are to be added for graduation, and they are granted a Pass (P) but no points or credits will be counted.

- 5-4) Military Sciences: This is mandatory for Jordanian students, but optional for others.

These hours are added and counted for graduation requirements, but no points will be calculated. While non-Jordanians, who do not choose this course, are required to enroll a course from the List of University Optional Requirements of equal number of credit hours. This course is not to be computed towards their cumulative average. On the other hand, Jordanian students graduating from the Royal Military School, Cadets schools or institutions are to be exempted from enrolling for this course.

- 5-5) Students are to enroll for the pre-requisites before enrolling for the subsequent courses. However, they are to be permitted to enroll for the course and its prerequisite if they fail this course or if their graduation depends upon taking the prerequisite course.
- 5-6) Each course carries three credit hours unless it is specified, otherwise in the Program of Studies of the departments
- 5-7) All students are to enroll for the university mandatory courses during the first two years of their admissions.

Duration of Study **Article (6)**

- 6-1) The normal period of study to obtain a bachelor's degree is four years, with the exception of the Faculties of Pharmacy and Architecture, which shall be five years. An academic year consists of two semesters, and each semester contains 16 weeks including the period for the final exams, while a summer session shall be eight weeks including the final exams.

- 6-2) The period of studies at the Faculties of Pharmacy and Architecture is not less than four years, while other majors can be completed in three years. This period of study is not applicable to Transfer Students or to those who postpone their studies on legitimate grounds, in accordance with Article (14).
- 6-3) The Summer session shall not be counted for the purpose of the period of studies.
- 6-4) The period of studies is not to exceed eight years to get a bachelor's degree for the Faculties of Pharmacy and Architecture and seven years for other faculties.
- 6-5) Students are classified for the award of bachelors' degrees at four or five levels: the first year, the second year, the third year, the fourth year and the fifth year, that is, if the student has completed at least (33, 66, 99, and 135) credit hours respectively.

Course Loads

Article (7)

- 7-1) Students are allowed to register for a maximum load of 18 credits per semester and 9 credits during the summer term. Under special circumstances they are permitted to raise this load to 21 credit hours upon the Dean's approval, provided their cumulative average is not below 3.00 points
Or
If the students' graduation depends on the enrollment of 21 credit hours, or 22 credit hours provided the extra hour is for training or laboratory, they are then, permitted to do so.
- 7-2) Students may carry a minimum of 12 credit hours a semester, and it is permissible to reduce this upon the Dean's approval, who will

communicate with the Dean of Admissions and Registration in writing.

- 7-3) Students shall not be permitted to enroll for more than 9 credit hours in a summer term and it is possible that the upper ceiling to be 12 hours if students graduate during this term.
- 7-4) Students may not comply with this lower ceiling referred to in Paragraph 2 of this article.

Attendance Article (8)

- 8-1) Students' attendance is compulsory at all lectures, seminars and laboratories, or required field work for each course.
- 8-2) Absences are not permitted for more than 15% of the number of hours for each course.
- 8-3) The instructor for each course shall notify students who are about to reach the 15% of absence with no valid excuse.
- 8-4) If students absent themselves for more than 15% of the number of credits for each course, without a valid excuse, they shall be debarred from the final exams. They will have to repeat the course if compulsory and students' results are computed, accordingly, for the purpose of averaging, probation or dismissal.
- 8-5) If the students' absence exceeds the (15%) for a certain course for reasons accepted by the Dean, they shall be permitted to withdraw from the course, and the Dean shall notify the Admissions and Registration Office of his decision. A withdrawal (W) will be recorded in their files. However, students, who are representing the Kingdom or the University at official activities, are permitted to absent themselves for not more than 20%.

- 8-6) Sick leave shall be issued by the university physician or certified by him or issued by one of the hospitals recognized by the university. In exceptional cases, a sick leave report may be issued by a foreign medical party provided it is certified by the university physician. All of these reports shall be submitted to the Dean of the relevant Faculty within two weeks of the student's absence. Under extraordinary circumstances, students shall be permitted to submit their medical reports within one week.
- 8-7) Faculties deans and faculty members, lecturers, Dean of Admissions and Registration shall be responsible for the execution of the above provisions

Excuses
Article (9)

- 9-1) A justifiable excuse is the one that is approved by the university physician-in-charge, and accepted by the Dean of the Faculty, whereas an extraordinary excuse is that which is accepted by the Dean of the Faculty, and upon the course instructor's recommendation.
- 9-2) Students, who miss their final exams, will report to the Dean of the Faculty within a day from the date of the final exams, for a make-up. If approved, the students' courses are classified as incomplete (I), the instructors will be notified to hold the exams within the period announced, and if the Dean declines, the students will be given an "F", and in all cases the Dean of Admissions and Registration is notified and the appropriate grade is recorded in the students' files.

- 9-3) The dean of the relevant faculty is solely vested with the authority of giving his approval if the course is "incomplete" (I) or not.
- 9-4) Students, who miss taking tests 1 or 2, shall submit an excuse to the course instructors within three days, and they shall give a make-up test the way they deem convenient.

Rules for Examinations and Quizzes

Article (10)

- 10-1) Semester work shall consist of two written tests at least, and these tests shall be announced one week before being conducted. Test 1 shall be conducted during the fifth or sixth week of the semester. While test 2 is conducted during the 11th or 12th week of the semester. Regarding summer session, Test 1 is held during the 3rd week and Test 2 is during the 6th week. The marked test papers are given back within a week of the conduct of the test or within 72 hours during the summer session. The semester work may contain oral tests, term papers; all of these constitute a 50% of the final grade.
- 10-2) The final examination for each course is held only once at the end of the semester, and 50% is allocated to it. The final exams may contain oral exams, or term papers and a certain ratio is assigned to them. This ratio may be changed by the Faculty Council.
- 10-3) Seminars, researches, field work are not subject to paragraphs 1 & 2, but they follow departmental regulations approved by the Faculty Council. When a certain course

contains a number of sections, a unified test is conducted.

- 10-4) Course instructors are responsible for correcting exams, tests and quizzes related to the courses they teach. They are also responsible for checking and recording the results in the students' files.
- 10-5) In case of having a multiple number of sections as the case of a university requirement course, a coordinator is appointed, who will specify a unified policy for evaluation.
- 10-6) A faculty member records the final grade by using alphabet letters and numerical points, on special registers prepared for such purposes. The course instructor hands in these registers to the dean of the faculty, who certifies and forwards them to the Admissions & Registration Dean. The latter will get them entered into the computer.
- 10-7) Statistical results are provided to the Dean of the Faculty, who may discuss them with the chairperson. These statistical results consist of the number of students who has passed the course, and the number who failed it and the ratio of students getting different credits for each course.
- 10-8) The Dean of Admissions and Registration announces the final results on the Department bulletin board dropping students' names for privacy.
- 10-9) Students may submit a formal request for the review of their final exam papers, within a period, at the end of the second week of the following semester. The students have to pay a fee of two dinars for getting their papers reviewed or checked. The paper will be checked in the presence of the Dean and the

Chairperson as well as the course instructor. If an error found, in adding up or missing marking a question, etc, the final mark is rectified accordingly.

- 10-10) All exam papers, reports, and researches are handed over to the students, excluding the final exam papers, which are stored at the faculty for a period of two years.
- 10-11) Students, who obtain a dean's approval of incomplete (I), must take the makeup exams during the first three weeks of the following semester, excluding the summer session. If the students fail to take the exams, they will be given a failure (F) grade.
- 10-12) If students fail to take a final exam, with no justifiable excuse, they will be given a Failure (F) grade.
- 10-13) The student's assessment is classified and grades are registered using letters and points according to the following schedule: --

Symbols	Points
A	4.00
A-	3.67
B +	3.33
B	3.00
B-	2.67
C +	2.33
C	2.00
C-	1.67
D +	1.33
D	1.00
F	0.00
FA	0.00
P	--
NP	--

(The Minimum pass grade in a course is a "D")

A Point system is used for assessment

Cumulative G P A	Academic Standing
3.89 - 4.00	excellent with honors with Distinction
3.67 - 3.88	Excellent
3.00 - 3.66	Very Good
2.33 - 2.99	Good
2.00 - 2.32	Satisfactory
Less than 2.00	Weak

10-14)

The cumulative Average is an average of all the courses of which the students have either passed or failed. In case the students have an (I) in some courses, their average is computed without including these courses. Upon completion of these courses, these scores are re-calculated accordingly.

- 10-15) Students, who obtain a withdrawal (W) because of extraordinary circumstances, their cumulative average will not include these courses. The cumulative average is calculated as follows: the points for each course are multiplied by the sum of the products and then divided by the number of the credit hours which the students have studied. This is in compliance with paragraph 11 of this Article.
- 10-16) The cumulative average is calculated to the nearest of two decimals.
- 10-17) The number of credit hours, for some courses, which the students are studying, is not included in the cumulative average for graduation. The students will just get in these courses a Pass (P) without points or (credit) or Failure (F) with no points or (credit) (NP). These courses are (1) Military Sciences, (2) Typing, (3) Field Trip for the Faculty of Architecture & Art students, (4) Lab Training, (5) Field Training Courses.
- 10-18) To be placed on the University Honor List at the end of a given semester, a student must:
1. Be carrying at least 15 credits of courses
 2. Not be on probation.
 3. Have attained an overall average of 3.89 or more.
 4. Not have been subjected to any Disciplinary action within the University.

To be placed on the Faculty Honor List at the end of a given semester, a student must:

1. Be carrying at least 15 credits of courses
2. Not be on probation.
3. Have attained an overall average of 3.69 or more.
4. Not have been subjected to any Disciplinary action within the University.

Repeating Courses

Article (11)

- 1-11) Students shall repeat mandatory courses if they fail them; whereas if they fail optional courses, they may repeat them or enroll for another in accordance with the Program of Studies of the Department.
- 11-2) If the students repeat a course, the highest grade will be recorded in their files.
- 11-3) The number of credit hours is counted only once in case a course is repeated.

Placement on Academic Probation

Article (12)

- 12-1) Students will be placed on probation if they obtain a cumulative average of less than 2.00.
- 12-2) The students shall remove their probation within a maximum period of two normal semesters by raising their cumulative average to 2.00 or more.
- 12-3) The students shall be dismissed from their majors (specialization) if they fail to remove their probation, with the

exception of those who have successfully completed 99 credit hours.

12-4) Students shall not be placed on academic probation at the end of the first semester of their enrolment at the university or at the end of the first semester of changing their majors. The students' academic adviser shall notify them if their cumulative average gets low.

12-5) Students shall not be placed on academic probation during summer sessions.

12.6) Students who are dismissed from their majors owing to the fall of their cumulative average below 2.00 may be admitted to a Special Remedial Program, which will be based on the following grounds.

12-6-1 If the students' cumulative average gets below 1.67, they are given four semesters to raise their average to 2.00, but if they fail, they will be permitted to do a Special Remedial Program unless they have completed 99 credit hours of their Program of Studies at an average of not below 1.90. in this case students will have to study 2 semesters at most, and they will be dismissed if they fail to raise their cumulative average to 2.00.

12-6-2) If the students' cumulative average is between 1 & less than 1.67 points, they will have to do this program of studies for one semester to raise their average to (1.67), if they manage, they will have to

do three additional semesters to raise their average to 2.00. If they fail, they will not be permitted to continue the Special Remedial Program unless they have completed 99 hours at a cumulative average of 1.99. In this case they will have to do two semesters at most.

Afterwards, they will be finally dismissed if they fail to raise their cumulative average to 2.00

12-6-3) During the Special Remedial Program, the students will be allowed to carry 12 credit hours at most, and they may carry 13 credit hours in case of an hour assigned to a lab.

12-6-4) During the Special Remedial Program, the students shall not be dismissed if their average gets below 1.00 during summer sessions.

Drop & Add Period Article (13)

13-1) Students are permitted to drop or add a course during the first week of the two semesters and within 3 days of the beginning of the summer session. The courses which the students have dropped will not be recorded in their academic files.

13-2) If students want to drop one or more courses after the end of drop and add period, they have to submit a special application issued by the Admissions and Registration Office of which the Dean of the relevant Faculty has to approve. If the drop takes place between the 2nd and 3rd week of the beginning of the semester, 75% of the tuition fee is refunded to the student, but if the drop occurs between the 4th and 5th week,

50% is refunded, of the fee, and in both cases the course(s) are not recorded in the students' files. But if the students drop a course during the 6th and 12th week, a withdrawal (W) will be recorded in their files and no money is refunded. If the students drop a course between the 4th day and the 2nd week of the beginning of the summer session, 50%, of the tuition fee, is refunded, but if the drop takes place between the 4th and 6th week of the summer session, a withdrawal (W) is recorded, and no refund will be made.

- 13-3) If students drop all the courses owing to extraordinary circumstances, they are considered to having withdrawn from their studies, and this semester is regarded as an allowed postponement of studies according to Article 2-14, and this is recorded in their academic files.

Dismissal and Readmission Article (14)

- 14-1) Students shall comply with registration procedures, drop & add period in accordance with the timetable announced by the University for each semester. The university shall have the right to consider regular students discontinuing their studies if they do not comply with the university schedule.
- 14-2)** If students wish to postpone their studies for a semester, they will fill out a special form issued by the Office of Admissions and Registration before the deadline for the drop and add period of the semester they intend to postpone, the Dean will forward his decision to the Dean of Admissions and Registration and this decision will be recorded in the students' academic files.

- 3-14) Students may postpone their studies for not more than four semesters, whether at one interval or intermittently. The Council of the University may postpone students' studies for a period not exceeding six semesters.
- 14-4) The new or transfer students are not permitted to postpone their studies until one semester passes of their registration.
- 14-5) The postponement period shall not be calculated for the period required for graduation. If the drop and add period has elapsed, and the students have not registered and nor have they applied for postponing their studies, they are regarded as having discontinued their studies, and this will be recorded in their file "discontinued" unless they give a rationale explaining their delay within a period at the end of the 3rd week of the beginning of a semester, and the end of the second week of the beginning of a summer session. The Curriculum Committee will look into the cases and if approved to register, late registration fees shall then be applicable.
- 14-6) If students wish to withdraw from the university, they will have to fill out a form, and "withdrawal" will be recorded in their academic files.
- 14-7) Students, who have withdrawn from the university, may apply for re-admission at the Admissions and Registration Office on condition that no more than five years have passed of their withdrawal. The Academic Committee will look into the case or cases, if re-admission is approved, they will retain their academic record on condition they complete all the graduation Program of Studies, which was effective at his time of admissions, and the tuition fees will be the same as when he was enrolled at first. However, if they do not want to keep their academic files, they will be re-admitted as new

students, and all the current existing fees and policies for admissions will then be applicable.

Transfer from other Universities Article (15)

- 15-1) Transfer applicants to Petra University is allowed if there is a vacancy and in accordance with the following conditions:
 - 15-1-1) That the applicant meets the requirements for admission to Petra University.
 - 15-1-2) That the student transferring from a university or a college, which is recognized by Petra University.
 - 15-1-3) That the applicant's average in the General Secondary Education Certificate is accepted by the Department in which the students intend to join.
- 15-2) The Dean of Admissions and Registration will forward approved applications to the relevant faculty for comparable courses to Petra University to be transferred, and they will be given transfer credit. However, not more than 50% of the courses shall be computed, and it shall not be possible to transfer any courses that had been studied seven years before. One semester shall be discounted from the maximum number of semesters for graduation.
- 15-3) The grades will not be calculated in the cumulative average for transfer courses and the word "Transfer" (T) will be recorded in the students' files.
- 15-4) The students shall study at least (50%) of the credit hours of their majors at Petra University.

Studies at another University

Article (16)

Students shall be allowed, with the approval of the deans of their faculties, to study 36 credit hours at another university, and the courses will be accepted according to the following conditions.

- 1) That the student has completed at least (36) credit hours at Petra University.
- 2) That the student is registered as a full time student at the other university.
- 3) That the students receive the approval of their departments.
- 4) That they have passed the courses and these courses are recorded as transfer (T) in their academic files.

Students may transfer to another major according to the following conditions:

- 1) That there is a vacancy in the relevant Department to which the students intend to transfer.
- 2) That the average in the General Secondary Education Certificate qualifies them to do the major they intend.
- 3) That they submit a request to the Dean of Admissions, during the time specified by the Office. The applications will be forwarded to the relevant faculties to look into them. All the courses will be counted, provided the students have passed them and in compliance with the Program of Studies to which the students intend to transfer.
- 4) That the students are subjected to all provisions of probation, dismissal and the Program of Studies of the department.
- 5) That the students may apply in writing to the Office of Admissions and Registration to cancel their academic files completely and to be readmitted as new students. In this case all current policies for admissions and tuition fees

shall be applicable. No students may be readmitted to the majors from which they were dismissed.

Requirements for a Bachelor's Degree

Article 18

To be eligible for graduation with a bachelor's degree, a student must:

- 1) Pass all the courses as defined by the department's Program of Studies and attain a cumulative average of **(2.00)**.
- 2) **Be** in accordance with the provisions of Article (6).
- 3) Comply with the period of study and credit hours as defined by transfer policy to Petra University.
- 4) be regular during the last two semesters including the semester of graduation.

Special Studies

Article (19)

- 19-1) Persons not currently enrolled at Petra University, who hold a recognized secondary school certificate or equivalent may apply to enroll for **a special** study for the purpose of getting an official transcript. This study is applied to the following categories:
- 19-1-1) Students who are studying at local or foreign universities or institutes, wish to study for one or two semesters at Petra University.
- 19-1-2) Students wish to widen and deepen their knowledge of specialization in order that they may excel themselves in business or the jobs they are undertaking.
- 19-1-3) Students wish to enrich their cultural or academic knowledge.

- 19-2) It is required that the students be admitted to the special courses to fulfill the following provisions:
- 19-2-1) to have a Jordanian high school diploma or equivalent, and to have an average of not less than the minimum required for admission to Petra University.
 - 19-2-2) To have studied the prerequisites to the courses they intend to do.
 - 19-2-3) To have vacancies available in the courses they intend to enroll and priority is given to full-time students of Petra University

General Provisions
Article (20)

Degrees are awarded at the end of the semester and the congregation or commencement shall be according to the university calendar as approved and announced by the University Council of Deans.

Article (21)

If the students' graduation depends on the completion of the study of one course, and this course is not offered or in conflict with their timetable, the Dean of relevant faculty may give his approval to studying an equivalent course, upon the Chairperson's recommendation. This approval will be forwarded to the Dean of Admissions and Registration.

Article (22)

The Program of Studies is the sole responsibility of the relevant department, and that the Dean of Admissions and Registration verifies their compliance with graduation requirements.

Article (23)

The University President shall decide upon cases that have no provisions in these instructions.

Article (24)

The University President, Deans of Faculties, the Dean of Admissions and Registration shall be responsible for the execution of these instructions

401102

Arabic Language (2)

(3.3.0)

Prerequisite: 401101

Follow-up and development of language skills acquired in Arabic Language 101 Course; emphasis on oral and written expressions, advanced study of selected texts, study of syntactic of morphological rules , word function.

Course Description

Prerequisites: None.

Atoms, molecules and moles; chemical reactions and the mole concept; the periodic table and some properties of the elements; chemical reactions in aqueous solutions; energy and energy changes; thermochemistry; electronic structure and the chemical bonding.

L Prerequisites: 101101 (or Concurrently).

This course involves safety laboratory rules, and introduction to laboratory equipments. Experiments for determination of density, empirical and molecular formula of compounds. Experiments involving stoichiometry, limiting reactants, and calorimetry. Volumetric analysis and quantitative analysis involving chemicals in every day life and chemicals tests for anions and cations.

101102 General Chemistry (2) (3-3-0)

Prerequisites: 101101

Covalent bonding and molecular structure, properties of gases, states of matter and intermolecular forces, physical properties of solutions. Chemical thermodynamics. Chemical equilibrium in gaseous and in aqueous solutions.

101102 L General Chemistry Laboratory (2) (1-0-1)

Prerequisites: 101101L and (101102 Or concurrently).

This course involves experiments on determination of principal constants e.g. molar volume of a gas, molecular mass of a substance, molar solubility and K_{sp} , Faraday's constant, equilibrium constant ... etc. It also involves titration experiments such as Redox titration, and potentiometric titration. It also involves experiments on electrochemistry and kinetics.

101103 Chemistry Laboratory for Medical Sciences (1-0-1)

L

Prerequisites: 101102 or Concurrent

The course includes: Safety and laboratory rules; Chemical investigations; Empirical formula of a compound; Stoichiometry; Limiting reactants; Volumetric analysis; Chemical tests for some anions; Chemical tests for some

cations; Avogadro's number; Molecular mass determination; Molar volume of oxygen; Molar solubility and K_{sp}; Determination of rate law.

105101 Biology (1)

An introductory courses to the science of life . It covers a the basic concepts and Principle of general biology, in particular , The general characteristics of life, The cell structure and function , cell membranes, photosynthesis , cellular respiration . cell division, Tissues , biotechnology , and laws of genetics .

105101 L Biology Laboratory (1)

This course complements Biology (1) , and it involves a set of 12 experiment and practices on the basic concepts of introductory biology ; Such as the microscope , the cell, the membrane , solutions and tonicity , enzymes , cellular respiration , fermentation , tissues , cell division , and genetics .

105102 Biology (2)

This is a general course that complements the previous introductory course in biology , (biology 101) . it concentrates on the study of human systems and their disorders. It is desgned to cover the study of structure and function of various levels of organization in plan , animal and human system .

105102 L Biology Laboratory (2)

This course complements biology (2) , and it involves a set of 12 experiments and practices on the basic concepts of biology , such as classification , dissection of the rabbit , and the developmental stages in some representative organisms . it also covers the plant structures .

101105 Science and Life (3-3-0)

Prerequisites: None

Historical introduction, scientific method, scientific thinking, invention of technical tools, the relation between science (S) and technology (T). The role of science and technology in our life, e.g. food and nutrition, textile industry, drugs, transport, communication, genetic engineering energy.....etc. Interaction between S and T and modern society, future perspectives.

101211 Organic Chemistry (1) (3-3-0)

Prerequisites: 101102

Hybrid orbitals; structure and properties; chemistry of alkanes, alkenes, alkynes and cycloalkanes; multiple bond reactions; chemistry of benzene and arenes.

101212 Organic Chemistry (2) (3-3-0)

Prerequisites: 101211

Basic chemistry of organic halides, mono-and polyhydroxyl alcohols, ethers

and epoxides, aldehydes and ketones, carboxylic acids and derivatives , mono and poly aromatics, amines and phenols, α , β -unsaturated carbonyl compounds.

101213 Organic Chemistry Laboratory (1) (2-0-2)

Prerequisites: 101211

Separation and purification of organic compounds ; synthesis using various techniques; identification of functional groups by different organic methods.

101231 Inorganic Chemistry (1) (3-3-0)

Prerequisites: 101102

Atomic structure; ionic and covalent bonds; bond energy, molecular structure, chemical energy, chemistry of acids and bases in aqueous and nonaqueous solutions.

101232 Inorganic Chemistry (2) (3-3-0)

Prerequisites: 101231

Classification, stereochemistry and nomenclature of coordination compounds, bonding in metal complexes, thermodynamic and kinetic properties of

coordination compounds.

101241 Analytical Chemistry (3-2-1)

Prerequisites: 101102

Introduction to Analytical Chemistry : Quantitative Analysis including: Errors and the treatment of analytical data; titrimetric and gravimetric methods of analysis; review of chemical equilibrium; acid-base titrations; acid-base equilibria in complex systems; complex formation titrations.

The practical part of the course includes experiments in gravimetric and volumetric analysis, acid-base reactions and oxidation-reduction reactions.

101311 Organic Chemistry (3) (3-3-0)

Prerequisites: 101212

Selected topics in Organic Chemistry: Spectroscopy; carbanions; polynuclear aromatic hydrocarbons; mono-and poly- saccharides; heterocyclic compounds, peptides and proteins.

101312 Organic Chemistry Laboratory (2) (2-0-2)

Prerequisites: 101213

Multistep syntheses of organic compounds; identification of functional groups by both chemical and spectroscopic methods.

101313 Biochemistry (3-3-0)

Prerequisites: 101212

Chemistry of biologically important chemicals as : carbohydrates, lipids, amino acids and proteins and nucleic acids.

101323 Physical Chemistry Laboratory (1) (2-0-2)

Prerequisites: 101321

Experiments on noble gases; thermodynamics and chemical reactions in solutions.

Physical Chemistry (1) (3-3-0)

Prerequisites: 101102 and 103102

Thermodynamics; free energy ; Gibbs , Helmholtz , Clasius, Raoult and Henry's laws; phase equilibria.

101454 Organic Industries (1) (3-3-0)

Prerequisites: 101212

Basic organic industries, other organic industries including soap and

detergents, oils and fats, dyes, pesticides and paper industry

103101 Calculus (1) (3-3-0)

Prerequisite: None.

This course deals with functions of one variable, limits and continuity, differentiation and its applications. It also introduces the Mean Value Theorem and its applications, definite integral and the fundamental theorem of calculus, exponential functions, their derivatives and integrals, logarithmic functions and their derivatives.

400101 Arabic and Islamic Civilization (3.3.0)

Prerequisite:

Introduction to Arabic and Islamic Civilization in its universal human context, focusing on the Arab and Muslims scholars achievements in science and humanities, the effect of Arab/ Islamic Civilization on Western Civilization.

401101 Arabic Language (1) (3.3.0)

Prerequisite:

Emphasis on the development of language skills, giving special attention to the listening and reading skills, selection of texts for appreciation and analysis; study of sentence and word structure, use of dictionary.

- 103333 Biostatistics (2-2-0)**
Prerequisite 103101
Frequency distributions. Measures of centrality and dispersion. Binomial distribution, Poisson distribution, normal distribution. Confidence intervals, testing hypothesis about the mean and the population based on large samples. Person and Spearman correlation coefficients. Chi square tests and tests of independence. Vital statistics.
- 104101 General Physics (1) (3-3-0)**
Prerequisite : None
Vectors, Kinematics of point particles, Dynamics of point particles (Newton's Laws), Circular Motion, Work, Energy and Power, Linear momentum, simple Harmonic Motion, Fluid Mechanics, Heat and Ideal Gas and First Law of Thermodynamics.
- 104101 General Physics Laboratory (1) (1-0-1)**
L Prerequisite : 104101 (or simultaneously)
Experiments of measurements and errors, vectors and forces, kinematics of rectilinear motion, force and motion. Linear Momentum and Kinetic energy (two-body collision in two dimensions), simple harmonic motion (simple pendulum), spiral spring, Boyle's Law, Viscosity and specific heat capacity.
- 104102 General Physics (2) (3-3-0)**
Prerequisite : 104101
Electrostatics, direct current, magnetism, theories in electricity and magnetism, wave motion, sound, wave properties of light, geometrical optics, and particle properties of light (the photon).
- 104102 General Physics Laboratory (2) (1-0-1)**
L Prerequisites : 104101 L and (104102 or simultaneously)
Experiments of Ohm's Law, Wheatstone Bridge, electric field mapping, the potentiometer, measurement of capacitance, specific charge of copper ions, Joule's Law, Kirchoff's Laws, measurement of the Earth's Magnetic field, and Electromagnetic Induction.

104103 General Physics for Medical Sciences (3-3-0)
Prerequisite : None
Vectors, Kinematics of one and two dimensional motions. Dynamics of point particles (Newton's Laws of motion), Circular Motion, Elasticity, Work, Energy and Power, Linear momentum, Fluid, Mechanics and viscosity, Electrostatics, electric field, potential and energy, direct current magnetism, wave motion and acoustic waves; waves, geometrical and particle properties of light.

104103 General Physics Laboratory for Medical Sciences (1-0-1)
L Prerequisites: 104103 (or concurrently)
Experiments of measurements and errors, vectors and forces, force and motion, kinematics of rectilinear motion,
Linear Momentum and collision, simple harmonic motion (simple pendulum), viscosity , Ohm's law, mapping of electric field, Kirchhoff's laws, Joules' law, magnetism.

Course Description

Pharmacy

- 501101 First Aid (3-3-0)**
No Pre-Requisite: None
This course enables the students to understand the basic information of first aid in cases of emergency. It aims at preserving life, reduce suffering, preventing deterioration of the injured. By having some first aid training and cardiopulmonary resuscitation (CPR), the student can have a major impact on the successful outcome of a medical emergency.
- 501211 Pharmaceutical Organic Chemistry (4-3-1)**
Pre-Requisite: 101115
This course covers the basic principles of organic chemistry, allowing the student understand the language of organic chemists. A broad overview of the properties and characteristics of organic molecules is provided, and several key reactions and reaction mechanisms are discussed.
- 501241 Analytical Chemistry for Medical Sciences (3-2-1)**
Pre-Requisite: 101103
This course is designed to recognize the importance of analysis in pharmaceutical industry, to understand the titration as principle for quantitative analysis, to understand chemical principles of the quantitative analysis of medicinal products and to be familiar with the laboratory practice that has to be considered for accurate analytical work.
- 501242 Physical Pharmacy 1 (2-2-0)**
Pre-Requisite: 101103
This course aims at introducing the student to the different physical aspects related to drugs in different forms such as solid, liquid, gas, or disperse systems.
- 501256 Pharmacognosy (2-2-0)**

Pre-Requisite: 503102

The course includes taxonomical classification, morphological, anatomical description of natural drugs; the methods for collection, drying and preparation, storage and preservation, the chemical constituents and uses.

502211 Biochemistry1 (3-3-0)

Pre-Requisite: 101113

This course is designed to teach students chemical and physical properties of bio-molecules, understand the concept of bioenergetics and the pathways of central metabolism and their major function of the biological system, to know the fundamental aspects of enzymes and their regulation. This, in turn, is necessarily preceded by lectures on protein structure and to understand the structure and functions of nucleotides and more specifically the nucleic acids. A brief introduction to DNA metabolism to and its regulation and RNA transcription and regulation of gene expression.

502212 Biochemistry 2 (3-2-1)

Prerequisite: 502211

Based on Biochemistry 1, this course is designed to introduce the basic concept of anabolic reactions of the major bio-molecules; carbohydrates, lipids, proteins and nucleotides and their metabolism.

502225 Microbiology 1 (3-2-1)

Prerequisite: 503102

This course aims at introducing students to the world of microorganisms. Microbial morphology, growth, and physiology. Microbial control including physical and chemical methods will be in dealt which. The genetics of microorganisms and its applications are illustrated.

502235 Anatomy & Histology (3-2-1)

Pre-Requisite: 503102

The objective of this course is to provide the student with the body parts, organs, and tissues. Basic components and functions of cells and tissue types studied.

- 502236 Physiology (4-3-1)**
Pre- Requisite: 502235
This course aims to cover the physiological concepts of all organs/tissues and their functions with emphasis on the relationship of structure to function and how links & interaction between body systems contribute to homeostasis of the body as a whole. The student develops an understanding of normal physiological processes with special reference on situations in which diseases or disorders impair these processes.
- 502346 Microbiology 2 (2-2-0)**
Pre-Requisite: 502225
This course aims at familiarizing pharmacy students with fungi and human parasites: their morphology, life cycle, mode of transmission and pathogenesis of parasitic diseases and their treatment.
- 502318 Pathophysiology Pre- (3-3-0)**
Pre-Requisite: 502232
This course is designed to study concepts of altered health with emphasis on wound healing, cell differentiation, neoplasm, body defenses, temperature regulation, blood flow and cardiac function. Metabolism and gastrointestinal disorders, fluid and electrolytes, respiratory & renal altered functions are discussed.
- 501311 Medicinal chemistry (1) (3-3-0)**
Pre-Requisite: 501211
The course introduces the student to the role of physical and chemical properties in relation to biological activity. Also it explains the various metabolic processes that drug (s) undergo in our biological system. We deal with Autonomic nervous system (cholinergic, adrenergic, agonist and antagonists). Diseases like Alzheimer, Asthma and glaucoma are included.
- 501312 Medicinal chemistry (2) (3-3-0)**

Pre-Requisite: 501311

The course deals with the chemistry, structural activity relationships, drug receptors or enzymes interaction to induce pharmacological activity (ies) in the area of antihistaminic, diuretics, cardiovascular system, central nervous systems endocrine and others.

501317 Phytochemistry 1 (2-2-0)

Pre- Requisite: 501256 & 501211

This course intends to study the principles of medicinal plants, to furnish the chemical bases of the modern phytotherapy underlining the steps, the fundamental techniques of phytochemical screening, the biosynthesis and the chemical and chemical-physics properties of the principal classes of natural mixtures used in therapy

501351 Pharmacology (I) (3-3-0)

Pre-Requisite : 502212

This course deals with the general & basic pharmacological principles that enable the student to evaluate and use drugs effectively and safely. The autonomic and the central nervous systems in addition to other systems are discussed.

501352 Pharmacology 2

Pre-Requisite: 501351

This course is a continuation to pharmacology 1 with emphasis on anti microbial agents, anti inflammatory drugs, respiratory & gastrointestinal agents along with other topics are also encountered.

501321 Pharmacy Ethics and Jurisprudence (2-2-0)

Pre-Requisite: Third Year

This course enables the student to understand the basic legislation which controls his/her work as pharmacist in various pharmaceutical areas, and the ethics which formulates the pharmacist relationship with the patient, colleagues, and other health personnel to deliver his pharmaceutical services in good way.

501345 Physical Pharmacy 2 (3-2-1)

Pre- Requisite: 501242

The student will be further introduced to the different physical aspects related to materials whether solids, liquids, gases, solutions or disperse systems. Building this kind of knowledge is vital to having the proper foundation to prepare rationally designed and well made stable dosage forms. It is also essential to build the capacity to understand, to deal with and attempt to avoid causes of instability.

501346 Pharmaceutical Dosage Forms and Calculation (4-2-1)

Pre-Requisite: 501345

This course aims to introduce the student to the different pharmaceutical dosage forms including their way of preparation, properties and stability whether during formulation or during storage and dispensing. Different types of calculations which can be encountered in compounding a prescription will be addressed and examples will be solved. An attempt to relate information taken in Physical Pharmacy 2 to those dealt with in this course will be made in order to try and connect the pure scientific aspects of the topic to its implementation in practice during formulation and dispensing of a certain dosage form.

502445 Pathology and Immunology (2-2-0)

Pre-Requisite: 502346 & 502318

This course enables the student to understand the basic mechanism of pathological diseases with the understanding of the concepts and components of the immune system, antigens recognition molecules, physiology of the immune system, innate immunity, and how the immune system plays part in the cure and/or pathogenesis of diseases.

501414 Phytochemistry 2 (3-2-1)

Pre- Requisite: 501317

This course is a continuation of Phytochemistry 1.

- 501415 Medicinal Chemistry 3 (3-3-0)**
Pre-Requisite: 501312
The course deals with the chemistry, mechanism of action(s), stability and structural aspects of drugs used in treatment of cancer and bacterial and viral infections.
- (3-1-2) Instrumental Analysis (3-2-1)**
Pre-Requisite: 501241
The student should be able to differentiate between quantitative and qualitative analyses. Understand the applications and the use of instrumental techniques in purity analysis, assay methodology and structural elucidation.
- 501421 Industrial Pharmacy (4-3-1)**
Pre-Requisite : 501346
This course is designed to familiarize the student with the design, development, manufacturing, processing problems and evaluation of stable and bioavailable various uncoated and coated tablets, hard and soft capsules, microcapsules using up-to-date technology and modern excipient. The course also covers some pharmaceutical operations used in pharmaceutical industry, such as mixing, drying, milling and particle size analysis.
- 501445 Non-Prescription Drugs (3-3-0)**
Pre-Requisite: 501346 & 501352
This course is designed to provide the student with basic information on the most common self diagnosed conditions, recognize the active ingredients utilized in various over the counter (OTC) drugs, assist the self medicating patient in selecting the most suitable drug or the most appropriate course of action, Ensure that the patient is aware of the necessary information for safe and effective use of the drugs, Describe the side effect and precautions of OTC drugs. Recommend the proper dosage and instructions related to use of OTC drugs.
- 501442 Biopharmacy (2-2-0)**

Pre-Requisite : 501346

Biopharmaceutics deals with the study of the interrelationship of the physico-chemical properties of the drug, the dosage form and the route of administration with the clinical response observed after the administration of the drug.

501452 Pharmacology 3 (2-2-0)

Pre-Requisite: 501352

This course is a continuation to pharmacology 2.

501444 Pharmaceutical Microbiology (3-3-0)

Pre-Requisite 501342 & 502342

This course is designed to provide the student with the basic information of the pharmaceutical aspect of microbiology which include: commonly used disinfectants antiseptics and preservatives, methods of sterilization, microbial contamination and spoilage of pharmaceutical products, aseptic area and aseptic processing and employing microorganisms in different assays.

501513 Pharmaceutical Marketing (3-3-0)

Pre-Requisite: 120 credit hours

By the end of this course the student should have a better understanding of sale concepts and techniques, with special emphasis on pharmaceutical detailing & selling in pharmacies. This course will introduce also the principles and concepts of marketing.

501526 Clinical Pharmacy 1 (3-3-0)

Pre-Requisite: 501452

This course deals with principles of drug therapy, factors modifying dosage of drugs, drug-drug interactions, management of common diseases such as hypertension, angina pectoris, atherosclerosis diabetes, asthma, pain.

501527 Clinical Pharmacy 2 (3-3-0)

Pre-Requisite: 501527

This course is a continuation of Clinical Pharmacy 1 and It illustrates certain diseases such as management of peptic ulcer, Parkinson, epilepsy and the chemical mediators of the central nervous system and their relation to these diseases.

501524 Communication Skills in Pharmacy (3-3-0)
Pre-Requisite: Fourth Year

Pharmacy Communications is a course designed to teach prospective pharmacists the skills of effective communication with patients including medications and health.

501528 Graduation Project (2-0-2)
Pre-Requisite: Fifth Year

This project aims to get the student acquainted with the scientific method and how to develop a research project. The aim is to train students to carry out independent research in Pharmacy. The project can be theoretical or practical in nature.

501531 Toxicology (3-3-0)
Pre- Requisite: 501452

This course offers an authoritative introduction to the modern science of toxicology. The study covers the general principles of toxicology, Its historical aspects, classification of toxic substances, chemical disposition of drugs and toxic xenobiotics in biological systems, organ toxicology, specific topics in toxicology, risk management & risk assessment, and finally the clinical toxicology, which involves poisoning cases with proper treatments.

501560 Selected Topics in Pharmacology (3-3-0)

Prerequisite: 504452

This course is designed to describe certain topics in pharmacology such as immuno-pharmacology, prenatal and pediatric pharmacology, geriatric and dermatological pharmacology and basic and clinical evaluation of new drugs.

501561 Clinical Pharmacokinetics (3-2-1)

Prerequisite: 501443

This course emphasizes is on monitoring of drug therapy, using serum drug concentrations as a guide. The plasma drug concentrations as well as the changes in plasma drug concentrations which occur over time can be predicted by using pharmacokinetics and biopharmaceutics principle. The monitoring process must be applied rationally to specific patients.

501562 Drug Information System (3-2-1)

Prerequisite: 501451

The course deals with the application and the use of computers in retrieving information related to drug substances, in addition to the information related to toxic substances especially those related to drug products.

501563 Quality Assurance of Drugs (3-3-0)

Prerequisite: 501421

The course includes studying Good Manufacturing Practice (GMP), pharmaceutical industry, GMP and the law, documentation, labels, cleanliness, cross contamination, elements of Quality Control, personnel and instrumentation control new possible modifications.

501569 Cosmetics (3-3-0)

Pre-Requisite: 501346

This course deals with different cosmetic preparations while addressing the method of preparation, the purpose of the product is drawing attention to any stability problems that can be encountered during manufacturing. The course emphasizes the benefits of cosmetic products while differentiating between their real values and those which are claimed to exist for marketing purposes.

- 501570 Herbal Medicine (3-3-0)**
Pre-Requisite: 501313
The course includes the study of the therapeutic effects of the natural constituents in plants and the relation between the chemical structure of these constituents and the therapeutic actions on diseases.
- 501572 Advanced Industrial Pharmacy (3-3-0)**
Pre-Requisite: 501421
This course is designed to familiarize the students with organization structure of pharmaceutical manufacturing companies, duties and responsibilities of various departments, such as, research & development, production, quality affairs and marketing. The course also covers the stages of new drug development and approval process by FDA. In addition, it includes the design and development of various dosage forms, advanced drug delivery systems and packaging of these dosage forms.
- 501574 Pharmaceutical Care (3-3-0)**
Pre-Requisite: 501521
This course is designed to understand what pharmaceutical care means? And how the practitioner takes responsibility for a patient's drug therapy needs and to be held accountable for this commitment with emphasis on the provision of education which facilitates development of pharmaceutical care expertise and practice at a local level. The student will understand how to communicate effectively with patients and their families, as well as professional medical personnel and to develop personal skills in the use of technology in the educational processes.
- 501575 Clinical Nutrition (3-3-0)**
Pre-Requisite: 502435
This course is designed to provide the pharmacy student with a useful orientation to pharmacology in order to give the basic information concerning general principles, theories & facts about drugs in terms of specific effects on bodily systems, clinical uses, and adverse effects.
- 501584 Drug Design (3-3-0)**
Pre-Requisite: 501312

The course covers the various physical, chemical, biochemical and receptors, concepts that are utilized in the construction of a drug. The students are stimulated to think of certain.

501585 Pharmaceutical Analysis (3-3-0)
Pre-Requisite: 501413

This advanced course focuses on methods development based mainly on isolation and/or chromatography separation (HPLC, GC), coupled to suitable detection method, to proceed in qualitative and quantitative analyses. The course presents an overview of modern techniques used widely in pharmaceutical industry for analysis of drug substances and drug products.

501586 Selected Topics in Pharmacy (3-3-0)
Pre-Requisite: Fifth year

This course covers selected topics in pharmacy that are not fully covered in other courses. This covers the new trends in pharmaceutical sciences.

501587 Radio-Pharmaceuticals (3-3-0)
Pre-Requisite: Fifth year

This course covers the basics of radiation biology followed by the application of radiopharmaceuticals in diagnosis and therapy of diseases. In addition, topics include the preparation, handling, disposition, and quality control of clinically useful radiopharmaceuticals.

501591 Biotechnology (3-3-1)
Pre-Requisite: Fifth Year

Pharmaceutical Biotechnology is a science for developing new pharmaceutical products using number of different disciplines such as molecular biology, molecular genetics, biochemistry, immunology, and pharmaceutical sciences. This course should promote and familiarize the student with biotechnology techniques, products and gene manipulation