

Key for Course Abbreviations

| | |
|----|---|
| MS | Mathematics |
| PB | Biochemistry |
| PC | Pharmaceutical Chemistry |
| PA | Pharmaceutical Analytical Chemistry |
| PG | Pharmacognosy |
| PM | Microbiology and Immunology |
| PO | Pharmacology and Toxicology |
| PP | Pharmacy Practice/Clinical Pharmacy |
| PT | Pharmaceutics and Pharmaceutical Technology |
| MD | Medical Courses |
| NP | Non Pharmaceutical |
| UR | University Requirements |

1. The letter 'P' means that the courses are offered to students of Pharmacy only.
2. The first digit represents the semester number.
3. The second and third digits represent the course number.

2- متطلبات الجامعة

University Requirements: As determined by each University.

3- متطلبات الكلية

Faculty Requirements: See programme curriculum (Appendix 2)

4- مقررات اختيارية

Elective Courses:

The Faculty of Pharmacy offers elective courses from which the students are free to select eight credit hours.

| Course Code | Course Title | Credit Hours | | |
|-------------|---|--------------|-----|-------|
| | | L | P/T | Total |
| PA E6 | Advanced Pharmaceutical Analysis - Spectroscopy | 1 | 1 | 2 |
| PG E8 | Alternative Medicinal Therapies | 1 | 1 | 2 |
| PG E9 | Production and Manufacture of Medicinal plants | 1 | 1 | 2 |
| PG E10 | Chromatography and Separation Techniques | 1 | 1 | 2 |
| PT E12 | Applied Industrial Pharmacy | 1 | 1 | 2 |
| PB E5 | Clinical nutrition | 1 | 1 | 2 |
| PT E13 | Cosmetic Preparations | 1 | 1 | 2 |
| PO E7 | Biological Standardization | 1 | 1 | 2 |
| PO E8 | Veterinary Pharmacology | 1 | 1 | 2 |
| PM E 8 | Antimicrobial stewardship | 1 | 1 | 2 |
| PM E 9 | Infection Control | 1 | 1 | 2 |
| PM E 10 | Bioinformatics | 1 | 1 | 2 |

L: Lecture

P: Practical

T: Tutorial

- لمجلس الكلية طرح المقررات الإختيارية من الامثلة المذكورة بالجدول السابق في كل مستوى/فصل دراسي وذلك بعد أخذ رأي مجالس الأقسام العلمية المختصة ويمكن للكلية إضافة مقررات إختيارية أخرى يشترط موافقة مجلس الجامعة بعد إبداء المبررات اللازمة.

توزيع المقررات الدراسية على الأقسام العلمية :-

1. Pharmaceutical Chemistry (PC)

| Subject | Code Number | Theoretical | Practical | Total |
|------------------------------------|-------------|-------------|-----------|-------|
| Pharmaceutical Organic Chemistry I | PC 101 | 2 | 1 | 3 |

| | | | | |
|--------------------------------------|--------|---|---|---|
| Pharmaceutical Organic Chemistry II | PC 202 | 2 | 1 | 3 |
| Pharmaceutical Organic Chemistry III | PC 303 | 2 | 1 | 3 |
| Medicinal Chemistry I | PC 504 | 2 | 1 | 3 |
| Medicinal Chemistry II | PC 605 | 2 | 1 | 3 |
| Medicinal Chemistry III | PC 706 | 2 | 0 | 2 |
| Drug Design | PC 807 | 1 | 1 | 2 |

2. Pharmaceutical Analytical Chemistry (PA)

| Subject | Code Number | Theoretical | Practical | Total |
|---|-------------|-------------|-----------|-------|
| Pharmaceutical Analytical Chemistry I | PA 101 | 2 | 1 | 3 |
| Pharmaceutical Analytical Chemistry II | PA 202 | 2 | 1 | 3 |
| Pharmaceutical Analytical Chemistry III | PA 303 | 1 | 1 | 2 |
| Instrumental Analysis | PA 404 | 2 | 1 | 3 |
| Quality Control of Pharmaceuticals | PA 005 | 2 | 1 | 3 |

3. Biochemistry (PB)

| Subject | Code Number | Theoretical | Practical | Total |
|-----------------------|-------------|-------------|-----------|-------|
| Cell Biology | PB 201 | 2 | 0 | 2 |
| Biochemistry I | PB 402 | 2 | 1 | 3 |
| Biochemistry II | PB 503 | 2 | 1 | 3 |
| Clinical Biochemistry | PB 704 | 2 | 1 | 3 |

4. Pharmacognosy (PG)

| Subject | Code Number | Theoretical | Practical | Total |
|----------------------------------|-------------|-------------|-----------|-------|
| Medicinal Plants | PG 101 | 2 | 1 | 3 |
| Pharmacognosy I | PG 202 | 2 | 1 | 3 |
| Pharmacognosy II | PG 303 | 2 | 1 | 3 |
| Phytochemistry I | PG 504 | 2 | 1 | 3 |
| Phytochemistry II | PG 605 | 2 | 1 | 3 |
| Applied & Forensic Pharmacognosy | PG 706 | 1 | 1 | 2 |
| Phytotherapy and Aromatherapy | PG 907 | 2 | 1 | 3 |

5. Pharmaceutics and Pharmaceutical Technology (PT)

| Subject | Code Number | Theoretical | Practical | Total |
|----------------------|-------------|-------------|-----------|-------|
| Pharmacy Orientation | PT 101 | 1 | 0 | 1 |
| Physical Pharmacy | PT 202 | 2 | 1 | 3 |

| | | | | |
|---------------------------------------|--------|---|---|---|
| Pharmaceutics I | PT 303 | 2 | 1 | 3 |
| Pharmaceutics II | PT 404 | 2 | 1 | 3 |
| Pharmaceutics III | PT 505 | 2 | 1 | 3 |
| Biopharmaceutics and Pharmacokinetics | PT 606 | 2 | 1 | 3 |
| Pharmaceutics IV | PT 607 | 2 | 1 | 3 |
| Pharmaceutical Technology I | PT 708 | 2 | 1 | 3 |
| Pharmaceutical Technology II | PT 809 | 2 | 1 | 3 |
| Good Manufacturing Practice | PT 910 | 1 | 1 | 2 |
| Advanced Drug Delivery Systems | PT 011 | 1 | 1 | 2 |

6. Microbiology and Immunology (PM)

| Subject | Code Number | Theoretical | Practical | Total |
|-----------------------------------|-------------|-------------|-----------|-------|
| General Microbiology and Genetics | PM 401 | 2 | 1 | 3 |
| Immunology | PM402 | 1 | 0 | 1 |
| Pharmaceutical Microbiology | PM 503 | 2 | 1 | 3 |
| Parasitology and Virology | PM 604 | 2 | 1 | 3 |
| Medical Microbiology | PM 705 | 2 | 1 | 3 |
| Biotechnology | PM 906 | 2 | 1 | 3 |
| Public Health | PM 907 | 2 | 0 | 2 |

7. Pharmacology and Toxicology (PO)

| Course | Code Number | Theoretical | Practical | Total |
|--|-------------|-------------|-----------|-------|
| Biostatistics | PO 501 | 1 | 0 | 1 |
| Pharmacology-I | PO 502 | 2 | 1 | 3 |
| Pharmacology-II | PO 603 | 2 | 1 | 3 |
| Pharmacology-III | PO 704 | 2 | 1 | 3 |
| Drug Information | PO 705 | 1 | 1 | 2 |
| Basic & Clinical Toxicology | PO 806 | 2 | 1 | 3 |

8. Pharmacy Practice/Clinical Pharmacy (PP)

| Course | Code Number | Theoretical | Practical | Total |
|---|-------------|-------------|-----------|-------|
| Clinical Pharmacokinetics | PP 801 | 2 | 1 | 3 |
| Hospital Pharmacy | PP 802 | 1 | 1 | 2 |
| Community Pharmacy Practice | PP 803 | 2 | 1 | 3 |
| Clinical Pharmacy I | PP 904 | 2 | 1 | 3 |
| Drug interaction | PP 005 | 1 | 1 | 2 |
| Clinical Pharmacy II & Pharmacotherapeutics | PP 006 | 1 | 1 | 2 |
| Clinical research, Pharmacoepidemiology and | PP 007 | 1 | 1 | 2 |

| | | | | |
|-------------------|--|--|--|--|
| Pharmacovigilance | | | | |
|-------------------|--|--|--|--|

❖ ويشرف قسم الأدوية والسموم على تدريس المواد الآتية:

| Course | Code Number | Theoretical | Practical | Total |
|-------------------------------|-------------|-------------|-----------|-------|
| Medical Terminology | MD 101 | 1 | 0 | 1 |
| Anatomy & Histology | MD 202 | 2 | 1 | 3 |
| Psychology | MD 203 | 1 | 0 | 1 |
| Physiology I | MD 304 | 2 | 1 | 3 |
| Physiology II | MD 405 | 2 | 0 | 2 |
| Pathology and Pathophysiology | MD 406 | 2 | 0 | 2 |
| First Aid | MD 907 | 1 | 0 | 1 |

❖ ويشرف وكيل الكلية لشئون التعليم والطلاب على تدريس المواد الآتية:

| Course | Code Number | Theoretical | Practical | Total |
|--|-------------|-------------|-----------|-------|
| Mathematics | MS 101 | 1 | 0 | 1 |
| Information Technology | NP 101 | 1 | 1 | 2 |
| Human Rights and Fighting Corruption | UR 101 | 1 | 0 | 1 |
| Scientific Writing | NP 302 | 1 | 0 | 1 |
| Communication skills | NP 403 | 1 | 0 | 1 |
| Pharmaceutical Legislations and Regulatory Affairs | NP 704 | 1 | 0 | 1 |
| Marketing & Pharmacoeconomics | NP 905 | 2 | 0 | 2 |
| Entrepreneurship | NP 006 | 1 | 1 | 2 |
| Professional Ethics | NP 007 | 1 | 0 | 1 |

مرفق رقم 2 (خاص بالمادة رقم (18))

Programme Curriculum

الخطة الدراسية

Table (1)

Semester (1)

| Course Title | Course Code | Credit Hours | | | Prerequisite | Examination Marks | | | | Total Marks | Final Exam. Hours |
|---|-------------|--------------|------------|-----------|--------------|-------------------|-------------|-----|------|-------------|-------------------|
| | | Lect. | Pract./Tut | Total | | Period. | Pract./Tut. | Wr. | Oral | | |
| Pharmaceutical Analytical Chemistry I | PA 101 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmaceutical Organic Chemistry I | PC 101 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmacy Orientation | PT 101 | 1 | - | 1 | Registration | 15 | -- | 85 | -- | 100 | 1 |
| Medicinal Plants | PG 101 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| Medical Terminology | MD 101 | 1 | - | 1 | Registration | 15 | -- | 85 | -- | 100 | 1 |
| Information Technology | NP 101 | 1 | 1 | 2 | Registration | 15 | 25 | 60 | --- | 100 | 1 |
| Mathematics | MS 101 | 1 | --- | 1 | Registration | 15 | -- | 85 | -- | 100 | 1 |
| Human Rights and Fighting Corruption (UR) | UR 101 | 1 | --- | 1 | Registration | 15 | -- | 85 | -- | 100 | 1 |
| Total | | 11 | 4 | 15 | | | | | | | |

○ *Lect.* = Lecture *Period.* = Periodical

Pract./ Tut. = Practical / Tutorial *Wr.* = Written

❖ متطلب الجامعة هي مواد نجاح ورسوب ولا يضاف للمعدل الفصلي والتراكمي للطلاب ولا يحسب ضمن الساعات الكلية للبرنامج.

Table (2)

Semester (2)

| Course Title | Course Code | Credit Hours | | | Prerequisite | Examination Marks | | | | Total Marks | Final Exam. Hours |
|--|-------------|--------------|------------|-----------|---------------------------------------|-------------------|-------------|-----|------|-------------|-------------------|
| | | Lect. | Pract./Tut | Total | | Period. | Pract./Tut. | Wr. | Oral | | |
| Pharmaceutical Analytical Chemistry II | PA 202 | 2 | 1 | 3 | Pharmaceutical Analytical Chemistry I | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmaceutical Organic Chemistry II | PC 202 | 2 | 1 | 3 | Pharmaceutical Organic Chemistry-I | 15 | 25 | 50 | 10 | 100 | 2 |
| Cell Biology | PB 201 | 2 | -- | 2 | Registration | 15 | | 75 | 10 | 100 | 2 |
| Anatomy & Histology | MD 202 | 2 | 1 | 3 | Registration | 15 | 25 | 60 | - | 100 | 2 |
| Physical Pharmacy | PT 202 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmacognosy I | PG 202 | 2 | 1 | 3 | Medicinal Plants | 15 | 25 | 50 | 10 | 100 | 2 |
| Psychology | MD 203 | 1 | - | 1 | Registration | 15 | -- | 85 | -- | 100 | 1 |
| Total | | 13 | 5 | 18 | | | | | | | |

○ Lect. = Lecture

Period. = Periodical

Pract./ Tut. = Practical / Tutorial

Wr. = Written

○ مقرر Cell Biology يدرس مناصفة بين قسمي الكيمياء الحيوية والميكروبيولوجيا والمناعة.

Table (3)

Semester (3)

| Course Title | Course Code | Credit Hours | | | Prerequisite | Examination Marks | | | | Total Marks | Final Exam. Hours |
|---|-------------|--------------|------------|-----------|--|-------------------|-------------|-----|------|-------------|-------------------|
| | | Lect. | Pract./Tut | Total | | Period. | Pract./Tut. | Wr. | Oral | | |
| Pharmaceutical Analytical Chemistry III | PA 303 | 1 | 1 | 2 | Pharmaceutical Analytical Chemistry-II | 15 | 25 | 50 | 10 | 100 | 1 |
| Pharmaceutical Organic Chemistry III | PC 303 | 2 | 1 | 3 | Pharmaceutical Organic Chemistry-II | 15 | 25 | 50 | 10 | 100 | 2 |
| Scientific Writing | NP 302 | 1 | --- | 1 | Registration | 15 | 25 | 60 | -- | 100 | 1 |
| Pharmacognosy II | PG 303 | 2 | 1 | 3 | Pharmacognosy-I | 15 | 25 | 50 | 10 | 100 | 2 |
| Physiology I | MD 304 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmaceutics I | PT 303 | 2 | 1 | 3 | Physical pharmacy | 15 | 25 | 50 | 10 | 100 | 2 |
| Total | | 10 | 5 | 15 | | | | | | | |

○ *Lect.* = Lecture*Period.* = Periodical*Pract./ Tut.* = Practical / Tutorial*Wr.* = Written

Table (4)

Semester (4)

| Course Title | Course Code | Credit Hours | | | Prerequisite | Examination Marks | | | | Total Marks | Final Exam. Hours |
|-----------------------------------|-------------|--------------|------------|-----------|-------------------|-------------------|------------|-----|------|-------------|-------------------|
| | | Lect. | Pract./Tut | Total | | Period. | Pract./Tut | Wr. | Oral | | |
| Biochemistry I | PB 402 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| General Microbiology and Genetics | PM 401 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| Immunology | PM 402 | 1 | 0 | 1 | Registration | 15 | -- | 75 | 10 | 100 | 1 |
| Instrumental Analysis | PA 404 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| Pathology and Pathophysiology | MD 406 | 2 | -- | 2 | Histology | 15 | -- | 75 | 10 | 100 | 2 |
| Pharmaceutics II | PT 404 | 2 | 1 | 3 | Physical pharmacy | 15 | 25 | 50 | 10 | 100 | 2 |
| Communication skills | NP403 | 1 | -- | 1 | Registration | 15 | -- | 85 | -- | 100 | 1 |
| Physiology II | MD 405 | 2 | -- | 2 | Physiology I | 15 | -- | 75 | 10 | 100 | 2 |
| Total | | 14 | 4 | 18 | | | | | | | |

○ *Lect.* = Lecture*Period.* = Periodical*Pract./ Tut.* = Practical / Tutorial*Wr.* = Written

Table (5)

Semester (5)

| Course Title | Course Code | Credit Hours | | | Prerequisite | Examination Marks | | | | Total Marks | Final Exam. Hours |
|-----------------------------|-------------|--------------|------------|-----------|-------------------------------------|-------------------|-------------|-----|------|-------------|-------------------|
| | | Lect. | Pract./Tut | Total | | Period. | Pract./Tut. | Wr. | Oral | | |
| Biochemistry II | PB 503 | 2 | 1 | 3 | Biochemistry-I | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmaceutical Microbiology | PM 503 | 2 | 1 | 3 | General Microbiology and Immunology | 15 | 25 | 50 | 10 | 100 | 2 |
| Phytochemistry I | PG 504 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmaceutics III | PT 505 | 2 | 1 | 3 | Physical pharmacy | 15 | 25 | 50 | 10 | 100 | 2 |
| Medicinal Chemistry I | PC 504 | 2 | 1 | 3 | Pharmaceutical organic III | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmacology I | PO 502 | 2 | 1 | 3 | Physiology I | 15 | 25 | 50 | 10 | 100 | 2 |
| Biostatistics | PO 501 | 1 | - | 1 | Registration | 15 | | 85 | -- | 100 | 1 |
| Total | | 13 | 6 | 19 | | | | | | | |

○ *Lect.* = Lecture*Period.* = Periodical*Pract./ Tut.* = Practical / Tutorial*Wr.* = Written

Table (6)

Semester (6)

| Course Title | Course Code | Credit Hours | | | Prerequisite | Examination Marks | | | | Total Marks | Final Exam. Hours |
|---------------------------------------|-------------|--------------|------------|-----------|-------------------------|-------------------|-------------|-----|------|-------------|-------------------|
| | | Lect. | Pract./Tut | Total | | Period. | Pract./Tut. | Wr. | Oral | | |
| Parasitology and Virology | PM 604 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| Biopharmaceutics and Pharmacokinetics | PT 606 | 2 | 1 | 3 | Pharmaceutics I | 15 | 25 | 50 | 10 | 100 | 2 |
| Phytochemistry II | PG 605 | 2 | 1 | 3 | Phytochemistry-I | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmaceutics IV | PT 607 | 2 | 1 | 3 | Physical pharmacy | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmacology II | PO 603 | 2 | 1 | 3 | Pharmacology-1 | 15 | 25 | 50 | 10 | 100 | 2 |
| Medicinal Chemistry II | PC 605 | 2 | 1 | 3 | Medicinal Chemistry - I | 15 | 25 | 50 | 10 | 100 | 2 |
| Total | | 12 | 6 | 18 | | | | | | | |

○ *Lect.* = Lecture*Period.* = Periodical*Pract./ Tut.* = Practical / Tutorial*Wr.* = Written

Table (7)

Semester (7)

| Course Title | Course Code | Credit Hours | | | Prerequisite | Examination Marks | | | | Total Marks | Final Exam. Hours |
|--|-------------|--------------|------------|-----------|-----------------------------|-------------------|-------------|-----|------|-------------|-------------------|
| | | Lect. | Pract./Tut | Total | | Period. | Pract./Tut. | Wr. | Oral | | |
| Medical Microbiology | PM 705 | 2 | 1 | 3 | Pharmaceutical Microbiology | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmacology III | PO 704 | 2 | 1 | 3 | Pharmacology-II | 15 | 25 | 50 | 10 | 100 | 2 |
| Applied & Forensic Pharmacognosy | PG 706 | 1 | 1 | 2 | Registration | 15 | 25 | 50 | 10 | 100 | 1 |
| Medicinal Chemistry III | PC 706 | 2 | -- | 2 | Medicinal Chemistry - I | 15 | -- | 75 | 10 | 100 | 2 |
| Clinical Biochemistry | PB 704 | 2 | 1 | 3 | Biochemistry-II | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmaceutical Technology I | PT 708 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| Pharmaceutical Legislations and Regulatory Affairs | NP 704 | 1 | - | 1 | Registration | 15 | -- | 85 | -- | 100 | 1 |
| Elective | PE--- | 1 | 1 | 2 | Registration | 15 | 25 | 50 | 10 | 100 | 1 |
| Total | | 13 | 6 | 19 | | | | | | | |

○ *Lect.* = Lecture*Period.* = Periodical*Pract./ Tut.* = Practical / Tutorial*Wr.* = Written

Table (8)

Semester (8)

| Course Title | Course Code | Credit Hours | | | Prerequisite | Examination Marks | | | | Total Marks | Final Exam. Hours |
|------------------------------|-------------|--------------|------------|-----------|---------------------------------------|-------------------|-------------|-----|------|-------------|-------------------|
| | | Lect. | Pract./Tut | Total | | Period. | Pract./Tut. | Wr. | Oral | | |
| Clinical Pharmacokinetics | PP 801 | 2 | 1 | 3 | Biopharmaceutics and Pharmacokinetics | 15 | 25 | 50 | 10 | 100 | 2 |
| Drug Information | PO 805 | 1 | 1 | 2 | Registration | 15 | 25 | 50 | 10 | 100 | 1 |
| Basic & Clinical Toxicology | PO 806 | 2 | 1 | 3 | Pharmacology-III | 15 | 25 | 50 | 10 | 100 | 2 |
| Hospital Pharmacy | PP 802 | 1 | 1 | 2 | Pharmacology II Pharmaceutics IV | 15 | 25 | 50 | 10 | 100 | 1 |
| Pharmaceutical Technology II | PT 809 | 2 | 1 | 3 | Pharmaceutical Technology I | 15 | 25 | 50 | 10 | 100 | 2 |
| Community Pharmacy Practice | PP 803 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| Drug Design | PC 807 | 1 | 1 | 2 | Pharmaceutical Organic Chemistry III | 15 | 25 | 50 | 10 | 100 | 1 |
| Elective | PE --- | 1 | 1 | 2 | Registration | 15 | 25 | 50 | 10 | 100 | 1 |
| Total | | 12 | 8 | 20 | | | | | | | |

Lect. = Lecture

Period. = Periodical

Pract./ Tut. = Practical / Tutorial

Wr. = Written

Table (9)

Semester (9)

| Course Title | Course Code | Credit Hours | | | Prerequisite | Examination Marks | | | | Total Marks | Final Exam. Hours |
|-------------------------------|-------------|--------------|------------|-----------|-----------------------------|-------------------|-------------|-----|------|-------------|-------------------|
| | | Lect. | Pract./Tut | Total | | Period. | Pract./Tut. | Wr. | Oral | | |
| Biotechnology | PM 906 | 2 | 1 | 3 | Pharmaceutical Microbiology | 15 | 25 | 50 | 10 | 100 | 2 |
| Clinical pharmacy I | PP 904 | 2 | 1 | 3 | Registration | 15 | 25 | 50 | 10 | 100 | 2 |
| Public Health | PM 907 | 2 | - | 2 | Medical Microbiology | 15 | --- | 85 | --- | 100 | 2 |
| Phytotherapy and Aromatherapy | PG 907 | 2 | 1 | 3 | Phytochemistry-II | 15 | 25 | 50 | 10 | 100 | 2 |
| Good Manufacturing Practice | PT 910 | 1 | 1 | 2 | Pharmaceutical Technology I | 15 | 25 | 50 | 10 | 100 | 1 |
| Marketing & Pharmacoeconomics | NP 905 | 2 | -- | 2 | Registration | 15 | --- | 75 | 10 | 100 | 2 |
| First Aid | MD 907 | 1 | -- | 1 | Registration | 15 | -- | 85 | -- | 100 | 1 |
| Elective | PE --- | 1 | 1 | 2 | Registration | 15 | 25 | 50 | 10 | 100 | 1 |
| Total | | 13 | 5 | 18 | | | | | | | |

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Table (10)**Semester (10)**

| Course Title | Course Code | Credit Hours | | | Prerequisite | Examination Marks | | | | Total Marks | Final Exam. Hours |
|---|-------------|--------------|------------|-------|--|-------------------|-------------|-----|------|-------------|-------------------|
| | | Lect. | Pract./Tut | Total | | Period. | Pract./Tut. | Wr. | Oral | | |
| Quality Control of Pharmaceuticals | PA 005 | 2 | 1 | 3 | -Pharmaceutical Analytical Chemistry-II - Pharmaceutical Microbiology | 15 | 25 | 50 | 10 | 100 | 2 |
| Drug interaction | PP 005 | 1 | 1 | 2 | Pharmacology-III | 15 | 25 | 50 | 10 | 100 | 1 |
| Advanced Drug Delivery Systems | PT 011 | 1 | 1 | 2 | Pharmaceutics IV | 15 | 25 | 50 | 10 | 100 | 1 |
| Clinical Pharmacy II & Pharmacotherapeutics | PP 006 | 1 | 1 | 2 | Clinical Pharmacy I | 15 | 25 | 50 | 10 | 100 | 1 |
| Entrepreneurship | NP 006 | 1 | 1 | 2 | Registration | 15 | 25 | 50 | 10 | 100 | 1 |
| Clinical Research, Pharmacoepidemiology and & Pharmacovigilance | PP 007 | 1 | 1 | 2 | Registration | 15 | 25 | 50 | 10 | 100 | 1 |
| Professional Ethics | NP 007 | 1 | -- | 1 | Registration | 15 | -- | 85 | -- | 100 | 1 |

جامعة كفر الشيخ
اللائحة الداخلية لبرنامج بكالوريوس الصيدلة (فارم دي - Pharm D)

| | | | | | | | | | | | |
|-----------------|---------------|----------|----------|-----------|---------------------|-----------|-----------|-----------|-----------|------------|----------|
| Elective | PE --- | 1 | 1 | 2 | Registration | 15 | 25 | 50 | 10 | 100 | 1 |
| Total | | 9 | 7 | 16 | | | | | | | |

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- يشترك قسم الميكروبيولوجيا والمناعة في تدريس مقرر Quality Control of Pharmaceuticals مع قسم الكيمياء التحليلية الصيدلانية

مرفق 3

خاص بالمادة (19)

محتوى المقررات الدراسية

Course Content

PC 101 Pharmaceutical Organic Chemistry I (2+1)

The objective of this course is to provide students with the basic knowledge in pharmaceutical organic chemistry, which will serve as fundamentals for other courses offered during subsequent semesters. This course involves Electronic structure of atom, alkanes [nomenclature, synthesis and reactions (free radical reactions)], and cycloalkanes. Stereochemistry (Optical isomers, racemic modification, nomenclature of configurations). Alkenes, alkydienes and alkynes. Alkyl halides (nomenclature, preparation and chemical reactions (S_N1 , S_N2 , E_1 , E_2)). Arenes and aromatic compounds (Kekule structure, Huckel rule, Electrophilic aromatic substitution and orientation).

The practical sessions of this course help students gain skills required to purify and identify organic compounds of different classes such as aliphatic and aromatic aldehydes, ketones alcohols and hydrocarbons, halogenated hydrocarbons.

PC 202 Pharmaceutical Organic Chemistry II (2+1)

This course involves different classes of organic compounds: aryl halides, Alcohols, Phenols, ethers & epoxides, aldehydes, ketones, carboxylic acid & acid derivatives, sulphonic acids, and nitrogenous compounds.

PC 303 Pharmaceutical Organic Chemistry III (2+1)

This course involves: carbohydrates, amino acid & peptides, polynuclear and heterocyclic chemistry. In addition, it provides an introduction about the use of different spectroscopic tools, including UV, infrared (IR), nuclear magnetic resonance (NMR) and mass spectrometry (MS) for the structural elucidation of organic compounds.

PC 504 Medicinal Chemistry I (2+1)

This course is tailored to assist the students to gain the drugs affecting the autonomic nervous system (ANS), drugs acting on the cardiovascular system (CVS), Additionally, antihistamines (H1, H2 blockers and anti-ulcer PPIs), steroidal hormones and thyroid related drugs are also covered.

PC 605 Medicinal Chemistry II (2+1)

The course is tailored to assist the students to gain the drugs affecting CNS, drugs controlling pain and inflammation (NSAIDs, local anaesthetics and rheumatoid drugs), drugs affecting neurodegenerative disorders. Additionally, various anticancer therapies are also covered.

PC 706 Medicinal Chemistry III (2+0)

The course is tailored to assist the students to gain different classes of antibiotics and antimicrobials (natural and synthetic), beside other synthetic chemotherapeutic agents (including antivirals, antifungals and antiparasitics). Moreover, endocrine-related drugs (Diabetes, thyroid and calcium-regulating agents) are also handled.

PC 807 Drug Design (1+1)

The prime objective of this course is to prepare the students for professional practice by understanding the essentials of Medicinal Chemistry, and how the drugs, biological and toxicological activities are strongly correlated to their chemical structures (Structure-activity relationship; SAR), physicochemical properties and metabolic pathways. Focusing on patient-directed clinical care, the molecular aspects governing drugs' pharmacokinetics (ADME), pharmacodynamics, optimization of drug action, possible side effects, in addition to understanding drug interactions are targeted. In terms of chemistry, SAR, mechanism of action and side effects. The course is also designed to familiarize the students with drug design and molecular modelling covering structure-based and ligand-based drug design. This also includes the process of drug discovery and development from target identification until approval of a new drug. Much concern is given to lead structure identification, optimization and targeting certain receptors and enzymes active sites. Additionally, the course addresses the study of molecular docking, pharmacophore generation, and molecular modifications including prodrug design, stereochemistry alterations, isosteric replacement, drug metabolism and Quantitative Structure-activity relationship (QSAR).

PA 101 Pharmaceutical Analytical Chemistry I (2+1)

Chemical Kinetics, rate of reaction, first Order reaction, rate law , Second order and third order of reaction, molecularity , Chemical equilibrium, Theories of reaction rate, activation energy and catalysis , Photochemistry, absorbed energy, quantum yield and chemical equilibrium.

Introduction to general chemistry, Types of chemical reactions – calculations of concentrations of substances. Analysis of anions – Analysis of cations – Analysis of mixture of anions and cations.

PA 202 Pharmaceutical Analytical Chemistry II (2+1)

Acid-Base theory, titration curves, indicators, applications. Titrations in non aqueous media, classification of solvents, theory, applications. Precipitometric titrations: solubility product principle, titration curves, Mohr's method. volhard's method, Fajans' method, pharmaceutical application. Complexometric reactions, theory, reaction with EDTA, indicators, applications.

PA 303 Pharmaceutical Analytical Chemistry III (1+1)

Redox titations, theory, oxidation potentials, Nernst equation, titration curves, redox indicators, selected oxidants and reductants, applications of redox titrations . The course also covers applied pharmaceutical analysis such as water analysis (water hardness, analysis of chloride, chlorine, iron, oxidizable matter, ... in water.

Electrochemical methods, electrode potential, reference electrodes, indicator electrode, applications.

Conductometric titration : ionic conductance, definition of cell constant, conductance, applications. polarography: Ilkovic equation, dropping mercury electrodes, diffusion current, applications, derivatization polarography.

PA 404 Instrumental Analysis (2+1)

Spectroscopic methods of analysis which include uv/vis spectroscopy, principal, instrumentation, factors affecting absorption and applications in pharmaceutical analysis. Fluorimetric methods, principal instrumentation, factors affecting fluorescence intensity and applications in pharmaceutical analysis. Atomic spectroscopy; principal and instrumentation.

Chromatographic methods for analytical chemistry which includes: TLC, gel chromatography, column chromatography, HPLC, UPLC, TLC, gas chromatography, capillary electrophoresis.

PA 005 Quality Control of Pharmaceuticals (2+1)

The course is shared with departments: Microbiology & Pharmaceutical Analytical Chemistry :
I-Quality control & quality assurance of pharmaceuticals .

The **course** has to be designed for **quality control microbiology** professionals, **quality assurance** or regulatory affairs personnel who have responsibility for the performance of Bioburden, Endotoxin & Sterility Testing or for data review, pharmacists performing sterile compounding. Principles, methods and procedures of different quality control tests used for evaluation of safety, potency and palatability of pharmaceutical products of small and large molecules drugs (biologicals) including herbal drugs have to be taught. The standard pharmacopeial methods and procedures as well as international guidelines as WHO, EMA, TGA should be discussed.

II-Good Analytical Practice and Sampling: Introduction, Sampling of pharmaceuticals and related materials, Type of sampling tools, Sampling plans.

III-Documentation

IV- Validation of analytical methods according to ICH Guidelines Q2 R1. Compendial testing , Validation of analytical methods, Data elements required for assay validation.

V- drug stability, stability studies and stability indicating methods Drug stability, Stability testing , Forced degradation studies , stability indicating assay methods for drugs according to ICH Q1 R2 Guidelines. Stress conditions for drug degradation according to ICH Q1 R2 Guidelines. Factors

affecting drug degradation, Drug expiration, Drug withdrawal from the market. Pharmaceutical regulations according to FDA & EMA (European medicine agency) and ISO and BSI. Drug-excipient interactions and adduct formation; analytical techniques used to detect drug-excipient compatibility, mechanism of drug-excipient interactions, examples.

VI- Official methods of analysis applied to raw materials and end products.

PA E6 Advanced Pharmaceutical Analysis - Spectroscopy (1+1)

Advances spectroscopic methods of analysis which include Mass spectroscopy, principal, instrumentation, factors affecting absorption and applications in pharmaceutical analysis. LC – MSMS, Ion trap MS and QTOF high resolution Mass spectrometry.

Advanced chromatographic methods for analytical chemistry which includes: capillary electrophoresis, Micellar electrokinetic chromatography, high performance capillary electrophoresis, capillary isotachopheresis and capillary electrochromatography.

PB 201 Cell Biology (2+0) يدرس هذا المقرر مناصفة بين قسمي الميكروبيولوجيا والمناعة والكيمياء الحيوية

The cell theory and cell structure of prokaryotic and eukaryotic cells (Microbial cells , membranous and non-membranous organelles - cell inclusions and the nucleus - macromolecules of the cell) - DNA and genetic code - Cell cycle and control of cell number – From gene to protein (transcription, protein synthesis, folding of peptides) – Transport of biomolecules across membranes – Cellular energetics - Ions and voltages – Intercellular communication.

PB 402 Biochemistry I (2+1)

Proteins (protein structure, biologically important peptides – fate of proteins) – Amino acids as precursors for biosynthesis of biomolecules (e.g. neurotransmitters , nucleotides, ...) – Carbohydrates (glycoproteins and proteoglycans - glucose transporters) – Lipids (physiologically important lipid molecules – cholesterol and steroids – lipoprotein metabolism) – Enzymology (enzyme kinetics – regulation – enzyme inhibitors as drugs) - Hemoglobin and porphyrins (Hb derivatives and types– metabolism of Hb and regulation) – Biological oxidation and ATP synthesis – Clinical correlations.

PB 503 Biochemistry II (2+1)

Energy production from dietary fuels (carbohydrates, lipids and proteins) – Integration of metabolism (Feed/fast cycle – diabetes mellitus – obesity) – Nitrogen metabolism and nitrogen balance – Hormonal regulation of metabolism – Biosignaling – Inborn errors of metabolism – Biochemistry of cancer - Biochemistry of aging – Food biochemistry (milk – probiotics) – Free radicals and antioxidants.

PB 704 Clinical Biochemistry (2+1)

Biochemical/pathophysiological changes and laboratory diagnostic markers for disorders of (Endocrine glands – renal function – hepatic function – gastric function – bone and mineral metabolism - plasma proteins and lipoproteins) – Clinical enzymology and myocardial infarction - Electrolytes, blood gases and acid-base balance - Handling, preservation, storage and analysis of biological samples – Homeostasis and biochemical aspects of hematology and blood analysis – Urine analysis – Tumor markers - Recent diagnostic biomarkers.

PB E5 Clinical Nutrition (1+1)

Measures of healthy life-style – Macronutrients and calculation of calories – Basal metabolic rate (BMR) - **Rcommended daily allowance (RDA)** – Nutritional requirement for pediatrics and geriatrics - Vitamins and minerals (role in metabolism – clinical significance) – Gut microbiota and human health – Enteral and parenteral nutrition - Dietary care for patients with obesity, diabetes mellitus, cardiovascular, renal and hepatic disorders – Dietary care for cancer patients - Dietary care for sports` men - Dietary care for pregnant and lactating women – Nutrigenomics.

PG 101 Medicinal Plants (2+1)

The aim of the course is to provide students with knowledge necessary to identify and prepare a crude drug from the farm to the firm. Students should acquire knowledge concerning dusting powders, plant cytology, physiology and medicinal leafy plants and their taxonomy. In this course, the student will study: importance of natural products, preparation of natural products-derived drugs including collection, storage, preservation and adulteration. The course will introduce the students to the different classes of secondary metabolites. In addition, the course will discuss and address the variability in occurrence of pharmacologically active substances in certain official medicinal leafy plants according to their WHO monographs.

PG 202 Pharmacognosy I (2+1)

Based on the Egyptian flora and other floras of wild and cultivated medicinal plants that are used in the pharmaceutical, cosmetic and food industries in the global & Egyptian market. The course introduces students to some botanical drugs of leaves, flower, seeds, bark and wood origin. During the lectures and practical sessions, students learn to identify examples of these drugs in their entire and powdered forms. Student will learn about the major constituents, folk uses, clinically proven uses, benefits, precautions of those medicinal plants. possible herbal-drug interactions of selected examples of these drugs and to have an overview over their phytopharmaceuticals available on the market specially the Egyptian market.

PG 303 Pharmacognosy II (2+1)

After completion of the course the student should have the knowledge and skills that enable the student to differentiate between different organs of through their monographs. The course comprises the study of identification of different organs through their monographs. (fruits,herbs, Subterranean organs, unorganized drugs in addition to drugs of marine and animal origin) , including identify their active constituents and adulterants describe micro- and macro-morphological characteristics, benefits and precautions of their medicinal uses., side effects and contraindications and to have an overview over their phytopharmaceuticals available on the market specially the Egyptian market.

PG 504 Phytochemistry I (2+1)

Based on complementary medicine and Egyptian medicinal plants that can be used as natural extracts, bioactive raw materials and phytochemical standards to serve the pharmaceuticals, cosmetics and food industries in Egypt. The course aims to gain students the knowledge and skills that enable them to understand, describe and deal with the chemistry of volatile oils, resins, miscellaneous terpenoids, bitters of plant or animal origin, carbohydrates and glycosides of plant or animal origin and different techniques used for their preparation, identification and determination. Also, the students should become aware of different chromatographic methods used for isolation and analysis of different plant constituents and their pharmacological actions and medicinal uses.

PG 605 Phytochemistry II (2+1)

In continuation with Pharmacognosy I, this course aims to enable students to demonstrate the knowledge and experience that enables her/ him to understand, describe and deal with the chemistry of alkaloids, tannins and antioxidants of plant, fungi or animal origin as well as techniques for their isolation, identification and determination in their respective sources. Finally, the course focuses on the structure activity relationships (SAR) of these natural products derived compounds and their pharmacophoric features.

PG 706 Applied & Forensic Pharmacognosy (1+1)

The course aims to provide pharmacy students with sufficient knowledge concerning quality control from herbal aspects, Sampling, structural, physical and analytical standards, purity, safety and adulteration of drugs and their detection. It also covers the modern chromatographic techniques employed for the evaluation of natural product and their products. It also provide the student with basic knowledge about the application of plant biotechnology for the production of pharmaceutically active materials.

The course also include an overview on forensic pharmacognosy including plants and their natural products that constitute health hazards, or intended for criminal uses to produce, abortion, loss of mental control, hallucination, heart arrest.. Also it includes the study of drug dependents, narcotics,

analgesics psych energetics, euphoric. Mycotoxin as a serious threat to general health and safety of community, contamination of food material with poisonous fungi.

PG 907 Phytotherapy and Aromatherapy (1+1)

Upon successful completion of this course, the students should be able to know guidelines for prescribing herbal medicinal drugs on the basis of the pharmacological properties of these drugs including therapeutic uses, mechanism of action, dosage, adverse reactions, contraindications & drug interactions. The course also allows students understand pharmacotherapeutic principles applied to the treatment of different diseases, pharmacovigilance and rational use of drugs. Also the student should understand the basis of complementary and alternative medicine with emphasis on herbal remedies, nutritional supplements, homeopathies, aromatherapy & their effect on maintaining optimum health and prevention of chronic diseases. It includes studying of medicinal plants portfolios in relation to Phytopharmaceuticals in Egyptian Market.

PG E8 Alternative medicinal therapy(1+1)

This course aims to introduce different alternative medicine systems around the world such as traditional Chinese medicine (TCM), Ayurveda and Graco-Arabic (Unani) medicine, also it will allow the students to learn how to evaluate different practices to treat different ailments in such systems using evidence based approaches.

PG E9 Production and manufacture of medicinal plants (1+1)

This course aims to guide the students through different instructions, procedures and guidelines to extract and prepare different phytochemical classes for therapeutic, food or poultry purposes, also it will emphasize on methods of quality control of raw materials and proper methods for storage before and after production.

PG E10 Chromatography and separation techniques (1+1)

This course will shed the light on different applications of chromatographic techniques in isolation and standardization of natural products such as Flash column chromatography, High performance column chromatography, High speed counter current chromatography and gas chromatography, special types of separation techniques such as size exclusion, ion exchange and affinity chromatography will be also addressed

PT 101 Pharmacy Orientation (1+0)

This is a course to acquaint the beginning pharmacy student with the multiple aspects of the profession of pharmacy, including the mission of pharmacy, role of pharmacist in society and pharmacy careers, classification of medications, interpretation of prescriptions and medication orders, general dispensing procedure and factors affecting drug dosage, sources of drugs, different dosage forms and various routes of administration. In addition to the history of pharmacy practice in various civilizations

PT 202 Physical Pharmacy (2+1)

This course provides students with knowledge of physicochemical principles essential for the design and formulation of pharmaceutical products. Students are introduced to the fundamental concepts of states of matter, Phase equilibrium, colligative properties, isotonicity solubility, dissolution, partition coefficient, surface and interfacial phenomena, surface active agents, adsorption and its application in pharmacy and rheological behaviour of dosage forms

PT 303 Pharmaceutics I (2+1)

This course is a study of the system of weights, measures, mathematical expertise and pharmaceutical calculations requisite to the compounding, dispensing, and utilization of drugs in pharmacy practice. It is also concerned with all manufacturing formulations aspects, packaging, storage and stability of liquid dosage forms including solutions (aqueous and non-aqueous), suspensions, emulsions and colloids with emphasis on the technology and pharmaceutical rationale fundamental to their design and development . The incompatibilities occurring during dispensing are also considered

PT 404 Pharmaceutics II (2+1)

This course covers the structure and function of the skin, target area of treatment after topical application to skin, basic principles of diffusion through membranes and factors affecting percutaneous absorption, enhancement of skin penetration, transdermal drug delivery systems (TDDS). It also describes the principles and techniques involved in the formulation and manufacturing of traditional dermatological semisolid dosage forms (creams, ointments, gels and pastes) and cosmetic products

PT 505 Pharmaceutics III (2+1)

The course introduces the students to the kinetics of drug decomposition including rate and order of the reaction, determination of the half-life, expiry date and shelf-life by different methods, stability testing, and in-vitro possible drug/excipients interactions . It also describes the principles and techniques involved in the formulation, and manufacturing of solid dosage forms including powders, granules, tablets, capsules and suppositories.

PT 606 Biopharmaceutics and Pharmacokinetics (2+1)

This course aims to provide students with an understanding of the relation between the physicochemical properties of the drug and its fate in the body. The course explores the principles of biopharmaceutics and strategies for enhancing drug delivery and bioavailability. Integration of knowledge gained from other courses is emphasized to design and assure the quality of drug products. Students will also be introduced to the principles of pharmacokinetics (absorption, distribution, metabolism and elimination). The concepts of bioequivalence, biowaivers and *in vitro-in vivo* correlations (IVIVC's) will be discussed along with different models of drug disposition. The course prepares students for their evolving role in utilizing pharmacokinetics to guide formulation, dosage-regimen design and optimizing drug usage.

PT 607 Pharmaceutics IV (2+1)

This course involves principles of formulation, development, sterilization, packaging and quality control testing of pharmaceutical sterile drug products. Principles for calculation and manipulation of parenterals, ophthalmic preparations, vaccines and blood products are emphasized. The course also covers the basic principles of formulation, sterilization, packaging and applications of radiopharmaceuticals in pharmacy and medicine. An in depth study on the formulation, manufacturing, quality control testing and applications of aerosols and other inhalation products is also accentuated.

PT 708 Pharmaceutical Technology I (2+1)

The course provides students with an introduction to industrial pharmacy. It deals with the principles of various unit operations such as heat transfer, evaporation, drying, distillation, filtration, centrifugation, crystallization and extraction. It focuses on the application of these unit operations in pharmaceutical industry with emphasis on the equipment and machines used during the production of different dosage forms.

PT 809 Pharmaceutical Technology II (2+1)

This course is a continuation of the study of the various unit operations in pharmaceutical industry with emphasis on size reduction, size separation, size analysis and size enlargement involved in the process development, scale-up and manufacturing of pharmaceutical drug products in industry (conventional / advanced nanotechnology based). In addition to the container/closure systems, some of the packaging processing methods are covered. Moreover, the vision about designing a quality product and its manufacturing process to consistently deliver the intended performance of the product to meet patient needs is discussed by applying Quality-by-Design principles.

PT 910 Good Manufacturing Practice (1+1)

This course involves the principles of the Current Good Manufacturing Practices (cGMP). It exposes students to all aspects of validation, calibration, inspection and the requirements for manufacturing facilities. It also provides students with a review of the process engineering, technology transfer, personnel management, training and hygiene, premises and contamination control, documentation

and auditing, process deviation with emphasis on risk management, complaint handling and product recall theory.

PT 011 Advanced Drug Delivery Systems (1+1)

The course aims to provide students with insights and competencies related to the principles of pharmaceutical pre-formulation as a gateway to dosage forms design and formulation . Emphasis is placed on developing formulations based on the physical and chemical properties of the drug substance and the intended use of the drug product. The course also introduces the students to the formulation principles and applications of novel and targeted drug delivery systems by transforming proteins, genes, and other biotechnology driven compounds into therapeutic products. In addition to formulation aspects of biotechnology derived pharmaceuticals, it also covers the application of polymers and excipients to solve problems/issues concerning the optimization of absorption, selective transport, and targeting.

PT E12 Applied Industrial pharmacy (1+1)

Size reduction, size separation, size enlargements, filtration, centrifugation emulsification, Refrigeration, distillation and extraction.Packaging materials.

PT E 13Cosmetic Preparations (1+1)

Definition, classification, anti-dandruff preparations, fragrance preparations, nail lacquers, skin care products (emollients and tanning), antiperspirants and deodorants preparations, shampoo, dentifrices preparations, eye, make-up preparations, acne preparations, hair dyes preparations, rouge preparations, lipstick preparations and quality control tests and evaluation of cosmetic preparations.

PM 401 General Microbiology and Genetics (2+1)

The course provides students with a combination of laboratory and theoretical experience exploring the general aspects of microbiology. It includes knowledge of microorganisms, their morphology, diversity, cell structure and function, cultural characteristics, growth, metabolism, role of microorganisms in infectious diseases and microbial pathogenesis. It also clarifies different mechanisms of transport across bacterial cell membrane, metabolic pathways and physiology of bacteria. The course also covers the principles of genetic characters including DNA and RNA structures, replication, different forms of mutation and mutagenic agents. It also explores the basic concepts microbial growth , cultivation and reproduction.It also provides the student with the concept of genetic engineering and its applications.

PM 402 Immunology (1+0)

The course provides students concepts of medical immunology, with an emphasis on host parasite relationship, Non-specific and specific immunity, Mechanism of protective immunity. Molecular and cellular immunology, including antigen and antibody structure, function and reaction between them, effector mechanisms, complement, and cell mediated immunity. Active and passive

immunization. Hypersensitivity and in vitro antigen antibody reactions, Immuno-deficiency disorders, Autoimmunity and auto-immune disease, organ transplantation.

PM 503 Pharmaceutical Microbiology (2+1)

This course describes in detail the physical and chemical methods of bacterial eradication and how to effectively control microbial growth in the field of pharmaceutical industry / hospitals. It further describes the means of preservation of pharmaceutical products, as well as cosmetics. Sterilization, sterilization indicators, sterility testing, aseptic area. Moreover, it explains the different groups of antimicrobials, their mechanism of action and resistance of microbes to biocides. Microbiological evaluation of antiseptics, disinfectants and preservatives. Antibiotics, classification and mechanism of action, Antiviral and antifungal agents, different classes of antibiotics including the new categories and new approaches to overcome bacterial resistance & antibiotics clinical abuse.

PM 604 Parasitology and Virology (2 +1)

Part of this course will focus on parasitic infections of humans with knowledge concerning biological, epidemiological and ecological aspects of parasites causing diseases to humans. It concerns with different parasitological related diseases in in Egypt causing serious health problems.

This part of the course will discuss medical helminthology, protozoology and entomology concerning their morphological features, life cycle, pathogenesis, clinical manifestations, different diagnostic techniques, the most recent lines of treatment and prevention with control strategy for each parasitic infection. Moreover, it also cover laboratory diagnosis of human parasitic infections.

The other part of the course provides students with the essential knowledge to recognize the epidemiology, mechanisms of pathogenesis, clinical picture, methods of laboratory diagnosis, treatment, prevention and control measures of RNA and DNA viral infections in humans.

PM 705 Medical Microbiology (2+1)

The course aims at studying microorganisms causing infectious disease in human beings. The infectious diseases, their etiology and clinical manifestation, routes of transmission, treatment and techniques in detection and identification of pathogenic microorganisms caused by Gram positive cocci & bacilli, Gram negative cocci & bacilli and mycobacteria of major significance to public health will be studied

PM 906 Biotechnology (2+1)

The course aims to provide students with fundamentals, scope and applications in biotechnology through studying fermentation technology, upstream, downstream, scaling up and down processes, use of molecular techniques for production of recombinant products and other major biotechnological products, biotransformation, bioremediation, bioleaching, bioinsecticides, biosurfactants and biopolymer production.

PM 907 Public Health (2+0)

This course aims at understanding all scientific disciplines required for health education and promotion directed to the community health. How epidemiology acts as the bases of public health actions will be taught. Detailed scientific information and practices programs will be provided for control of communicable, non-communicable diseases, improving mental, social, environmental, occupational, geriatric and family health, use of sufficient and balanced food and nutrition, supplying safe drinking water, treating and disposing wastes and proper intervention during disasters

PM E8 Antimicrobial Stewardship (1+1)

Principles of antimicrobial use, optimal management of common infections, essential functions of ASP, antimicrobial stewardship interventions in the inpatient setting, convincing the C-Suite, quantifying antimicrobial use and its effects. Advanced ASP activities, antimicrobial stewardship in cancer and hematopoietic cell transplant patients, antimicrobial stewardship in long-term care, antimicrobial stewardship at the end of life. Expanding stewardship into the small community hospital setting and antimicrobial resistance from a global perspective.

PM E9 Infection Control (1+1)

Disinfection and sterilization, prevention of multi-drug resistant organism (MDRO) in healthcare setting. Specimen collection, the importance of hand hygiene. hospital laundry & waste management. Prevention of urinary tract infection, prevention of surgical site infection, nosocomial pneumonia and prevention of catheter associated blood stream infection. Isolation precautions and use of personal protective equipment (PPE). Healthcare worker immunization program and management of occupational exposure.

PM E10 Bioinformatics (1+1)

Introduction to bioinformatics & online resources, working with single sequences (nucleotide & protein), sequence comparison & similarity searching, protein structures. RNA structures, SNPs and haplotypes, phylogenetics & comparative genomics, data manipulation and presentation

PO 501 Biostatistics (1+0)

This course provides basic concepts of biostatistics and data analysis.

It includes introduction to descriptive and inferential statistics, interpretation of estimates, confidence intervals and significance tests, elementary concepts of probability and sampling; binomial and normal distribution, basic concepts of hypothesis testing, estimation and confidence intervals, t-test and chi-square test, linear regression theory and the analysis of variance.

PO 502 Pharmacology-I (2+1)

The general principles of pharmacology are presented; such as pharmacokinetics, pharmacodynamics, receptor theory, drug interaction and principle of therapeutics.

This course integrates principles of pharmacology with conceptual knowledge of physiology and pathophysiology to disease processes regarding the autonomic, cardiovascular systems and hematologic disorders. Antihyperlipidemic drugs are also included. neuromuscular and autacoids.

PO 603 Pharmacology-II (2+1)

This course integrates principles of pharmacology with conceptual knowledge of physiology and pathophysiology disease processes regarding drugs acting on central nervous system, gastro-intestinal tract, and pulmonary systems. The anti-inflammatory, analgesics as well as gout treatments are also included.

PO 704 Pharmacology-III (2+1)

This course integrates principles of pharmacology with conceptual knowledge of physiology and pathophysiology disease processes regarding drugs acting on endocrine system. Chemotherapeutic drugs including antimicrobials, anticancer and immunosuppressant are within the scope of the course. Stem cell therapy is also included

PO 705 Drug Information (1+1)

This course introduces the student to the concept and need of drug information, types of drug information resources (primary, secondary and tertiary literature), computerized and online drug information, literature evaluation and critical appraisal, retrieval of information. It also aims at providing the students with the professional skills required to effectively and accurately answer medication- related questions in a systematic and evidence based approach.

PO 806 Basic & Clinical Toxicology (2+1)

This course provides basics and concepts of toxicology including the mechanism of toxicity, target organ and treatment of toxicity. Toxic groups including heavy metals, toxic gases, animal, plant and marine poisons, pesticides and radiation hazards are covered. Environmental, occupational, reproductive and genetic toxicology as well as drug abuse are included. Postmortem sampling for detection of poisons, methods of detection, interpretation of results and writing of a report are also covered.

PO E7 Biological standardization (1+1)

General introduction, Screening of para-sympathomimetics, Screening of muscarinic receptor blockers and neuromuscular blockers, Screening and bioassay of histamine, serotonin and antihistaminics, Screening and bioassay of cardiac glycosides, Screening and bioassay of

antihypertensive drugs, Screening and bioassay of analgesics & antiinflammatory drugs, Screening and bioassay of tranquilizers and anticonvulsant, Screening and bioassay of local, anesthetics and anti-bilharzial drugs, Screening and bioassay of drugs acting on, gastrointestinal tract, Pharmacology of hormones and Bioassay of hormones

PO E8 Veterinary pharmacology(1+1)

The course deals with the pharmacology of veterinary drugs focusing on drug used in treating zoonotic disease as well as poultry disease . the course will also provide students with sufficient knowledge about antiparasitic agent.

MD 101 Medical Terminology (1+0)

Introduction to medical and pharmaceutical terminologies, medical abbreviations, medical idioms, suffixes and prefixes, medical terms pertaining to major body systems.

MD 202 Anatomy & Histology (2+1)

Histology:

Cytology, various tissues (epithelial, connective, muscular, and nervous), heart, blood vessels, lymphatic organs, skin and its appendages, systems (digestive and associated glands, respiratory, urinary, reproductive, and central nervous system), endocrine glands, and eye.

Anatomy :

Introduction to skeletal, muscular, and articular systems, fascia, nervous, cardiovascular, and lymphatic systems, digestive, respiratory, and urogenital systems, endocrine glands. Cytology: blood, liver, spleen, lung, kidney, lymph node, cardiac muscle, aorta, stomach, and intestine.

MD 203 Psychology (1+0)

The course introduces different principles, theories and vocabulary of psychology as a science. The course also aims to provide students with basic concepts of social psychology, medical sociology and interpersonal communication which relate to the pharmacy practice system that involves patients, pharmacists, physicians, nurses and other health care professionals.

MD 304 Physiology I (2+1)

Introduction to body water, homeostasis, transport of materials, nervous systems, neuron structure and function (reflex arc), cardiovascular system, blood.

MD 405 Physiology II (2+0)

Respiratory cycle, gastrointestinal, reproductive, and renal systems, endocrine glands and body temperature regulation

MD 406 Pathology and Pathophysiology (2+0)

The main aim of Pathology course is to provide the second year student with knowledge and skills for common diseases affecting body organs and system. It helps the student to understand the causes (**etiology**) of disease, the mechanisms of its development (**pathogenesis**) and the associated alterations of structure (**morphologic changes**) and function (**clinical manifestations and complications**) to be able to **determine the most likely diagnosis** of the disease.

Pathophysiology

Introduction to pathophysiology, cell injury, inflammation and immune response, autonomic nervous system in health and disease, endocrine disorders, pancreatic disorders, fluid and electrolyte imbalance, vascular and haematological disorders, disease of urinary, pulmonary and digestive systems.

MD 907 First Aid (1+0)

The course covers topics of basic life support and medical emergency of different situations including bleeding, shock, poisoning, bone fractures, soft tissue injuries, rescue and transportation. It includes: introduction to first aid ABCs, medical emergencies, effect of temperature, transportation of an injured casualty & first aid kit, respiratory emergencies, fractures and dislocations, bleeding and surgical emergencies, burns and scalds, animal bites or stings and poisoning.

PP 801 Clinical Pharmacokinetics (2+1)

This course provides basic principles of pharmacokinetics and their application to the clinical setting. Single Intravenous bolus and oral kinetics, IV infusion, multiple IV bolus, short infusion & oral dosing, non-linear pharmacokinetics, pharmacokinetic models. Sources of variability in pharmacokinetics, dosage regimen and dosage adjustment in children, obese, elderly patients and chronic disease states. Therapeutic drug monitoring and pharmacogenomics approaches.

PP 802 Hospital Pharmacy(1+1)

The course aims to introduces students to hospital pharmacy organization, structure, management and related activities on both technical and administrative levels in accordance with national and international established guidelines. Administrative services include: the pharmacy, the pharmacy and therapeutic committee and policy making, the hospital formulary, medication purchasing, distribution and dispensing systems. The pharmaceutical (technical) services include: preparation of Intravenous (IV) admixtures, total parenteral nutrition (TPN) fluids, renal dialysis fluids, dispensing and safe handling of radiopharmaceuticals, cytotoxic drugs, and medical gases.

PP 803 Community Pharmacy Practice (2+1)

The course provides students with competencies and knowledge for the provision of quality pharmaceutical care in a community pharmacy setting aiming at improving use of medicines and therapeutic outcomes. The course covers differentiation between minor and major ailments and responding to minor ailments with over-the-counter products. It also provides concepts of patient assessment, counselling, and monitoring in community pharmacy and in outpatient care settings and

introduces students to pharmaceutical care services for chronic-diseased outpatients and to psychosocial aspects in patient care. In addition, the course provides the students with competencies to promote the public health role of pharmacist including health promotion and disease prevention activities

PP 904 Clinical Pharmacy I (2+1)

Definition and concepts of clinical pharmacy and pharmaceutical care, and qualification to become a clinical pharmacy. Patient history, medication reconciliation, therapeutic planning and drug-related problems. Interpretation of clinical laboratory data and physical examination. Providing Medication Therapy management services. Principles of special care populations (geriatric, pediatric, renal and hepatic patients, obesity & pregnancy & lactation). The course also introduces the student to the principles of management and supportive care of oncological diseases, blood disorders and nutritional deficiencies.

PP 005 Drug interaction (1+1)

The course is shared between 2 departments : Pharmacology & Pharmacy Practice

This course provides the knowledge and skills enabling them to develop professional competencies in the recognition and discussion of the pharmacological aspects of drug-drug, drug-chemical, drug-herb or drug-food interactions and their clinical significance as well as the application of that knowledge to minimize the risk and outcome of interactions.

It covers different types of drug interaction including pharmaceutical interactions, pharmacokinetic interactions, pharmacodynamic interactions, herbal & food drug interactions, alcohol and smoking drug interactions, CNS drug interactions, interactions of cardiovascular acting drugs, interactions of anticoagulants, interactions of anti-infectives, interactions of antihistaminics & immune-based therapies, interactions of hormones, and drug-disease interactions.

The course is designed to familiarize students with the major types of drug interactions (Pharmacokinetic, pharmacodynamic and pharmacogenetic interactions) in the clinical setting, in addition to drug food and drug disease interactions. The course comprises digitalis drug interactions, anticoagulants, hypoglycemic interactions, antineoplastic drug interactions, antihypertensive interactions and anticonvulsant Interactions. Students will be expected to determine whether a given interaction is clinically significant or required pharmacist intervention, make rational, scientifically recommendations for management of drug interactions.

PP 006 Clinical Pharmacy II & Pharmacotherapeutics(1+1)

The course introduces the student to the principles of pharmacotherapeutics & management of the common disease states (e.g. cardiovascular diseases, gastrointestinal diseases, respiratory diseases, endocrine diseases, obstetrics and gynecology, rheumatic diseases, renal diseases, CNS diseases).

PP 007 Clinical research, Pharmacoepidemiology and Pharmacovigilance(1+1)

This course introduces the student to the basic principles of clinical research, design of research studies, types of research studies, clinical trials, statistical presentation of research data and ethical guidelines in drug research. This course addresses a range of study designs and analytic techniques for observational studies on the utilization, safety, and effectiveness of pharmaceuticals. Students

will develop an understanding of how to plan, implement, analyse, and criticize pharmacoepidemiological studies. This course also provides the student's with understanding of pharmacovigilance importance, concept, processes, systems, global safety standards and regulations and reporting systems

MS 101 Mathematics (1+0)

Functions and graphs, limits and continuity, differentiation, exponential, logarithmic, and trigonometric functions, integration, basic differential equations, functions of several variables and problems related to them, probability and random variables, and hypothesis testing.

NP 101 Information Technology (1+1)

This course tends to provide students of all university's faculties with a brief introduction to the world of computers and the concept of information technology including: number systems and data representation, computer system components: hardware & software, storage and input/output systems, Operating systems and Utility Systems, software applications. Also it gives an overview about computer networks and internet: data communication, transmission modes, transmission media, computer networks, internet protocol, and internet services. It addresses some computer applications in the laboratory such as Internet Access, word processing and power point and sheds the light on the importance of artificial intelligence in the field of Pharmacy. It gives students a practical experience on developing projects related to the specialty of each faculty.

UR 101 Human Rights and Fighting Corruption (1 + 0)

يغطي هذا المقرر الموضوعات التالية: حقوق الإنسان في القانون الجنائي, حق الإنسان في تغيير جنسيته أو التخلي عن إحدى جنسياته, المواثيق الدولية المتعلقة بحماية حقوق الإنسان, علاقة العولمة والتنمية بالحقوق الاقتصادية والاجتماعية والثقافية, الحقوق الاقتصادية والاجتماعية والثقافية للإنسان, حقوق الإنسان في الشريعة الإسلامية, حقوق المرأة في قانونى العمل والتأمين الاجتماعى, حقوق الإنسان فى التقاضى, الحقوق المدنية والسياسية للإنسان

NP 302 Scientific Writing (1 + 0)

This course is designed to introduce students to the principles of good scientific writing, to be familiar with basic structure of scientific reports and research articles. It covers methods of paraphrasing, common mistakes in scientific writing, different writing styles, how to write a scientific report, proposal and manuscript, appropriate use of tables and figures in data presentation and evaluation of literature and information sources.

NP 403 Communication skills (1+0)

The course will help students develop necessary written and oral communication and presentation skills to improve inter- and intra-professional collaboration and communication with patients and other health care providers

NP 704 Pharmaceutical Legislations and Regulatory Affairs (1+0)

A detailed presentation of law that governs and affects the practice of pharmacy, legal principles for non-controlled and controlled prescriptions, OTC drug requirements, opening new pharmacies, opening medical stores, opening factories, opening scientific offices, medicine registration, pharmacies and medicine stores management. Pharmacist duties and responsibilities, pharmacist-patient relationship, patient's rights and ethical principles and moral rules.

NP 905 Marketing & Pharmacoeconomics (2 + 0)

the basic concepts of health economics, learning basic terms of health economics and understand key principles. Topics cover the economic mechanisms of health care markets as market failures, and government intervention. The course covers the key components of health care financing, and some methods of how to contain health care expenditure. Alongside the major definitions in health technology assessment, students should have an overview about different types of economic evaluation, budget impact analysis and their uses. Moreover, students should get familiar with different methods of pricing among which value-based pricing.

Marketing

The objective of this course is to introduce students to the concepts, analyses, and activities that comprise marketing management, and to provide practice in assessing and solving marketing problems. The course is also a foundation for advanced electives in Marketing as well as other business/social disciplines. Topics include marketing strategy, customer behavior, segmentation, market research, product management, pricing, promotion, sales force management and competitive analysis.

NP 006 Entrepreneurship (1+1)

This course is designed to enhance a student's knowledge in leadership, business, and financial skills in pharmacy practice while learning *the traits of an entrepreneur, current topics in entrepreneurship with a specific focus on pharmacy practice and patient care programs. This course will teach the participants a comprehensive set of critical skills needed to develop a profitable business project.* This course is designed to provide the students the personal and business tools including risk-taking, strategic planning, marketing, competitiveness, and social responsibility to make the transition from the academic environment to the daily practice of pharmacy now and in the future, with an emphasis on entrepreneurship.

NP 007 Professional Ethics (1 + 0)

Professional ethics provides general principles and history of pharmacy ethics, general principles of medical ethics, conflicts of interests and its management pharmacists relationship with society and family, ethics in disaster, medication error, research ethics and animal ethics.