

## اللائحة الداخلية

### لبرنامج

بكالوريوس الصيدلة (فارم دي)  
(صيدلة اكلينيكية)

**Pharm D (Clinical Pharmacy)**

طبقاً لنظام الساعات المعتمدة

لكلية الصيدلة – جامعة قناة السويس

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### الرؤية:

تسعى كلية الصيدلة- جامعة قناة السويس لأن تكون إحدى الكليات الرائدة فى مجال الصيدلة على المستوى المحلى و الإقليمي و العالمي وأن تحظى بقدرة تنافسية من حيث جودة التعليم و الأبحاث العلمية و خدمة المجتمع المدني.

### الرسالة:

تهدف كلية الصيدلة – جامعة قناة السويس إلى تخريج طلاب ذوى قدرة تنافسية عالية على المستوى المحلى و الإقليمي وذلك بأن توفر لطلابها تعليماً صيدلياً متميزاً و مستمراً، كما تهدف إلى المساهمة فى تنمية المجتمع المحلى و الإقليمي من خلال مواكبة منظومة البحث العلمي، وتهتم الكلية بترسيخ مبادئ و آداب و أخلاقيات مهنة الصيدلة فى خريجها.

### أهداف الكلية:

- 1- تطوير برامج و مقررات مرحلة البكالوريوس.
- 2- توفير فرص التعلم و تطوير أساليب التعليم و التسهيلات الداعمة.
- 3- اكتساب ثقة المجتمع الداخلي و الخارجي فى الكلية و الارتقاء بمستوى الطلاب و الخريجين.
- 4- الارتقاء بمستوى أعضاء هيئة التدريس و الهيئة المعاونة.
- 5- تطوير و اعتماد برامج الدراسات العليا.
- 6- الارتقاء بمستوى البحث العلمي و الأنشطة العلمية
- 7- مساهمة البحث العلمي فى دعم و تعزيز العملية التعليمية
- 8- تلبية احتياجات المجتمع و تنمية البيئة.
- 9- تطوير المنظومة الإدارية بالكلية.
- 10- تطوير البنية التحتية للكلية.

### الأقسام العلمية :

1. قسم الصيدلانيات و الصيدلة الصناعية
2. قسم العقاقير
3. - قسم الأدوية و السموم
4. قسم الميكروبيولوجى و المناعة
5. قسم الكيمياء التحليلية الصيدلانية
6. قسم الكيمياء الطبية
7. قسم الكيمياء الحيوية و البيولوجية الجزيئية
8. قسم الكيمياء العضوية الصيدلانية
9. قسم الممارسة الصيدلانية

## مواد اللائحة

### مادة (1) :

#### رؤية البرنامج

التميز العلمي والتطوير المستمر لخدمة المنظومة الصحية العلاجية والوصول لمكانة مرموقة عالميا في مجال الصيدلة الإكلينيكية.

#### رسالة البرنامج

إعداد صيادلة مؤهلين بأحدث المفاهيم الصيدلانية والطبية يمكنهم المساهمة في رفع كفاءة المنظومة العلاجية على المستوى المحلي والإقليمي من خلال التعامل مع الفريق الصحي في المستشفيات وتقديم الخدمات الصيدلانية بمستوى مهاري محترف بالصيدليات العامة والخاصة وشركات الأدوية ومعامل الرقابة الدوائية وتحليل الأغذية بالإضافة إلى العمل في مجال الإعلام والتسويق الدوائي والمشاركة بفاعلية في البحث العلمي من خلال مراكز البحوث والجامعات لخدمة المجتمع.

#### أهداف البرنامج

- التركيز على دور الصيدلي في تقديم الرعاية الصحية المناسبة للمريض بداخل المستشفيات وخارجها من خلال متابعة النظام الدوائي له ودراسة مبادئ حركية الدواء الإكلينيكية وتطبيقاتها في العلاج في الحالات المرضية المختلفة وإيجاد الأنظمة العلاجية المناسبة وذلك بالتعاون مع الطبيب المعالج مما ينتج عنه تحسين الرعاية الصحية للمرضى وتقليل مخاطر وتفاعلات الأدوية.
- تخريج صيدلي متميز مؤهل للعمل بالصيدليات العامة والخاصة وشركات الأدوية ومعامل الرقابة الدوائية وتحليل الأغذية والعمل في مجال الاعلام والتسويق والبحوث والجامعات.
- زيادة القدرة التنافسية لخريجي البرنامج على المستوى الإقليمي من خلال البرامج الدراسية والتدريبية.
- المشاركة في خدمة المجتمع وتنمية البيئة وتوفير عائد إقتصادي ملموس من خلال ترشيد إستخدام الأدوية في المستشفيات.
- الإلتزام بتحقيق معايير الجودة في التعليم الصيدلي من خلال التعليم التفاعلي والإهتمام بالتعلم الذاتي.

### مادة (2) :

#### الدرجة العلمية التي تمنح للخريجين

يمنح مجلس جامعة قناة السويس بناءً على طلب مجلس كلية الصيدلة درجة بكالوريوس الصيدلة (فارم دي- صيدلة اكلينيكية) (Pharm D-Clinical Pharmacy) طبقاً لنظام الساعات المعتمدة.

### مادة (3) :

#### التأهيل للدرجات الأكاديمية الأعلى:

درجة بكالوريوس الصيدلة (فارم دي- صيدلة اكلينيكية) (Pharm D-Clinical Pharmacy) هي الدرجة الجامعية الأولى في مجال الصيدلة اللازمة للحصول على ترخيص ممارسة المهنة في جميع المجالات الصيدلانية المتاحة ، كما تؤهل الخريج للتسجيل لدرجة الماجستير في أي من الأقسام العلمية في الكلية.

### مادة (4) :

#### نظام الدراسة

مدة الدراسة بالبرنامج خمس سنوات دراسية ( خمس مستويات على عشر فصول دراسية ) طبقاً لنظام الساعات المعتمدة وسنة تدريب متقدم ( امتياز ) في مواقع العمل (1+5). بالإضافة إلى عدد 100 ساعة تدريب ميداني فعليه في الصيدليات الأهلية والحكومية وصيدليات المستشفيات تتم خلال الأجازات الصيفية لسنوات الدراسة بعد نهاية المستوى الثالث و قبل البدء في سنة الامتياز.

ينقسم كل مستوى (عام) دراسي إلى فصلين دراسيين (الخريف والربيع) ومدة كل فصل دراسي خمسة عشر أسبوعاً. ويجوز طرح بعض المقررات في فصل دراسي صيفي مدته من ستة إلى ثمانية أسابيع من الدراسة المكثفة.

الساعة المعتمدة هي وحدة قياس دراسية وتعادل ساعة دراسية أسبوعية نظرية أو درساً عملياً لا تقل مدته عن ساعتين أسبوعياً وتدرس على مدى فصل دراسي واحد.

### مادة (5) :

#### تصميم البرنامج الدراسي

يتم تصميم البرنامج الدراسي بحيث يكون التعلم عن طريق المحاضرات النظرية وحلقات النقاش والدروس العملية و الإكلينيكية و ورش العمل والتدريبات الميدانية و إجراء بحوث و تقديم العروض بالإضافة إلى التعاون مع المجتمع المحيط بالجامعة.  
و يتم تصميم البرنامج الدراسي بحيث:

**أولاً :** عدد الساعات المعتمدة 176 ساعة معتمدة ، بالإضافة إلى إجتياز ما تقرره الجامعة من متطلبات التخرج علي ألا يتضمنها حساب المعدل الفصلي أو التراكمي للطالب .

**ثانياً :** عدد المقررات الإختيارية أربعة مقررات (8 ساعات معتمدة) يتم اختيارها من قائمة المقررات الإختيارية. هذا بالإضافة إلى 100 ساعة فعليه تدريب صيفي يبدأ بنهاية المستوى الثالث قبل البدء في سنة الإمتياز.

**ثالثاً :** المقررات الاختيارية للطالب في المستويين الآخرين يفضل ان تحقق له جدارات و مهارات تساعده على التوجيه المهني والتخصص. وأن يكون أحد المقررات الإختيارية فى إحدى المجالات الصيدلية الدوائية (التصنيع الدوائى- الرقابة الدوائية...إلخ) .

## **مادة (6) :**

### **التسجيل**

تحدد الكلية لكل مجموعة من الطلاب مرشداً أكاديمياً من أعضاء هيئة التدريس يقوم بمهام الرعاية والإرشاد ويكون مسئولاً عن الطالب في الشئون العلمية والإجتماعية والنفسية وتوجيهه في كل ما يتعلق بحياته الجامعية ويقوم بمساعدة الطلاب في اختيار المقررات من قائمة المقررات التي تطرحها الكلية في كل فصل دراسي. وعلى كل طالب أن يقوم شخصياً بتسجيل المقررات التي يرغب في دراستها في كل فصل دراسي مع ضرورة أن يتم اختيار المقررات وعدد الساعات المعتمدة بالتشاور والاتفاق مع المرشد الأكاديمي. ويشترط لتسجيل المقرر أن يكون الطالب قد اجتاز بنجاح متطلب التسجيل لهذا المقرر.

ويجوز لمجلس الكلية في حالات الضرورة القصوى وبعد موافقة اللجنة المختصة بالإشراف على البرنامج السماح للطالب بتسجيل بعض المقررات بالتوازي مع متطلباتها التي لم يجتازها الطالب بنجاح إذا قل العبء الدراسي المتاح للطالب عن 12 ساعة معتمدة (أنظر التالي – فقرة أ – العبء الدراسي) ، على أن يتم كتابة إقرار بمعرفة ولي أمر الطالب بأنه لن يتم اعتماد نجاحه في هذا المقرر إلا بعد اجتياز متطلبه الذي سمح له بالتسجيل فيه بالتوازي.

وينبغي أن يملأ الطالب نموذج تسجيل المقررات في الأوقات المحددة حسب التقويم الجامعي المعلن لكل فصل دراسي ولا يجوز الانتظام في الدراسة إلا بعد انتهاء عملية التسجيل. لا يسمح للطالب بالتسجيل المتأخر عن الأوقات المحددة إلا بعذر قهري يقبله عميد الكلية على ألا تزيد مدة التأخير عن أسبوع من نهاية فترة التسجيل.

### **أ) العبء الدراسي :**

العبء الدراسي هو عدد الساعات المعتمدة التي يقوم الطالب بتسجيلها في الفصل الدراسي الواحد ويجب مراعاة ألا يقل العبء الدراسي المسجل للطالب في أي فصل دراسي عن 12 ساعة معتمدة وألا يزيد عن 22 ساعة معتمدة على الا يزيد العبء الدراسي للطالب المتعثر عن 12 ساعة معتمدة (أنظر مادة 12) .

العبء الدراسي خلال الفصل الصيفي بحد أقصى 10 ساعات معتمدة.

ويجوز لمجلس الكلية بعد موافقة اللجنة المختصة بالإشراف على البرنامج السماح للطالب في آخر فصلين دراسيين بزيادة العبء الدراسي عن الحد الأقصى وبما لا يتجاوز عدد 3 ساعات معتمدة (يستفيد منها الطالب لمرة واحدة)،.

## **(ب) الإضافة والحذف والانسحاب :**

يجوز للطالب بعد إستكمال إجراءات التسجيل أن يضيف أو يحذف إلى ساعاته المعتمدة مقررأ أو أكثر في أي فصل دراسي على أن يكون ذلك في خلال الفترات المحددة حسب التقويم الجامعي المعلن لكل فصل دراسي مع مراعاة الحد الأدنى والحد الأقصى للعبء الدراسي.

كما يجوز للطالب بعد تسجيله الانسحاب من مقرر أو أكثر في أي فصل دراسي دون أن يعتبر راسباً في هذا المقرر وذلك إذا تقدم بطلب الانسحاب خلال الفترات المحددة حسب التقويم الجامعي المعلن لكل فصل دراسي. ومن ينسحب بعد هذه الفترة المحددة يعتبر راسباً.

## **مادة (7) :**

### **(أ) المواظبة**

على الطالب أن يواظب على حضور المحاضرات النظرية وحلقات النقاش والدروس العملية والتدريبات الميدانية والإكلينيكية ، ولمجلس الكلية بناءً على طلب مجالس الأقسام العلمية المختصة أن يحرم الطالب من التقدم لامتحان التحريري النهائي إذا تجاوزت نسبة غيابه 25% من إجمالي الساعات المعتمدة لكل مقرر.

### **(ب) حضور الامتحانات والتغيب عنها والإخلال بنظامها**

يجب على الطالب أداء الامتحانات التحريرية النهائية في المواعيد المقررة لها حسب التقويم الجامعي المعلن لكل فصل دراسي ، ويعتبر الطالب المتغيب عن الامتحان التحريري النهائي راسباً في المقررات التي تغيب عن أداء الامتحان فيها. لا يعتبر الطالب راسباً في حالة التغيب بعذر قهري يقبله مجلس الكلية.

## **مادة (8) :**

### **لغة الدراسة**

الدراسة في البرنامج باللغة الانجليزية. ويجوز مع ذلك تدريس بعض المقررات باللغة العربية بناءً على توصية القسم العلمي المختص وموافقة مجلسي الكلية والجامعة.

## **مادة (9) :**

### **(التدريب الميداني الأولى وسنة الأمتياز) (التدريب الميداني المتقدم)**

▪ على الطالب أن يكمل فترة تدريب ميداني في الصيدليات الأهلية والحكومية وصيدليات المستشفيات تتم خلال الأجازات الصيفية لسنوات الدراسة بعد نهاية المستوى الثالث بواقع عدد 100 ساعة ، بالإضافة إلى العام السادس من الدراسة الذي يخصص للتدريب الميداني بواقع 36 اسبوعاً و تنقسم الى ست دورات تدريبية بواقع أربع دورات على الأقل داخل مستشفيات تقوم بتطبيق الممارسة الصيدلية الإكلينيكية ، وتخصص دورة واحدة للتدريب في المجال الدوائى ( التصنيع -الرقابة الدوائية- ..الخ)

كما يوضح فى البرنامج التدريبي الذى يشمل برنامج تدريبي متكامل وممنهج بطريقة دورية تناوبية مسجلة بالساعات والمهام التدريبية وتحت إشراف دقيق من الكلية وجهة التدريب. كما يقدم مشروع تخرج فى تخصص معين يساهم فى تمهيد وإعداد الطالب للتوجه لهذا التخصص. ويمكن للخريج العمل فى هذا المجال لمدة سنتين ليصبح بعدها صيدليا متخصصا قادرا على تقديم خدمات صيدلية إكلينيكية أو الممارسات الصيدلانية المختلفة .

يتم تصميم البرنامج التدريبي فى تخصصات إكلينيكية مختلفة (مثل: امراض القلب – السرطان – الامراض النفسية و العصبية – التغذية – العناية الفائقة – وحدة معلومات الدواء - اقتصاديات الدواء - والأبحاث السريرية.....) حسب إمكانات الجامعة واحتياج المجتمع فى نطاق الجامعة (يتم إعداد لائحة تفصيلية خاصة ببرنامج تدريب سنة الامتياز).

## مادة (10) :

### شروط القبول

يشترط فىمن يتقدم للالتحاق بالبرنامج أن يستوفى كافة الشروط التى يحددها المجلس الأعلى للجامعات. يجوز قبول تحويل الطلاب المقيدى ببرنامج مماثل فى إحدى كليات الصيدلة بالجامعات المصرية أو الأجنبية بشرط استيفاء الطالب لمتطلبات القبول بالكلية وتحتسب للطالب المقررات التى درسها فى الكلية المحول منها وفقاً للقواعد التى يحددها مجلس الكلية.

## مادة (11) :

### نظام التقييم

تتكون الدرجة النهائية للمقرر من مجموع درجات الأعمال الفصلية والعملية والتحريرية والشفهية كما هو موضح بجداول الخطة الدراسية. الحد الأدنى للنجاح فى أى مقرر هو 60% من مجموع درجات هذا المقرر ، ولا يكون الطالب ناجحاً فى أى مقرر إلا إذا حصل على 30% من درجة الامتحان التحريري النهائي ، وتكون النسبة المئوية للدرجات النهائية والتقدير كما هو مبين بالجدول التالي.

### نظام التقييم

التقدير	الرمز	عدد النقاط	النسبة المئوية
ممتاز	A <sup>+</sup>	4	95 فأكثر
	A	3,85	90 لأقل من 95
	A <sup>-</sup>	3,7	85 لأقل من 90
جيد جدا	B <sup>+</sup>	3,3	82,5 لأقل من 85



التقدير	الرمز	عدد النقاط	النسبة المئوية
	B	3	77,5 لأقل من 82,5
	<sup>-</sup> B	2,7	77,5 لأقل من 77,5
جيد	<sup>+</sup> C	2,3	75 لأقل من 72,5
	C	2	72,5 لأقل من 67,5
	<sup>-</sup> C	1,7	67,5 لأقل من 65
مقبول	<sup>+</sup> D	1,3	65 لأقل من 62,5
	D	1	62,5 لأقل من 60
راسب	F	0,00	أقل من 60
منسحب	W	-	منسحب
غير مكتمل	I*	-	غير مكتمل
غائب	Abs E**	-	غائب

I\* : يحصل الطالب على هذا الرمز إذا كانت نسبة الحضور مستوفاة وتعذر عليه دخول الإمتحان التحريري النهائي والشفهي (إن وجد) لمقرر دراسي أو أكثر في ذات الفصل الدراسي لأسباب قهرية يقبلها مجلس الكلية ، وعليه أداء الإمتحان التحريري النهائي والشفهي (إن وجد) فقط في موعد أقصاه الأسبوع الثاني من الفصل الدراسي التالي مع الإحتفاظ بالتقدير.

Abs E\*\* : يحصل الطالب على هذا الرمز إذا لم يتمكن من دخول الإمتحان التحريري النهائي والشفهي (إن وجد) في الموعد السالف ذكره في الفقرة السابقة (I) لعدم زوال السبب القهري ويتحتم على الطالب التسجيل في هذا المقرر عند طرحه مرة أخرى ودراسته كاملاً مع الإحتفاظ بالتقدير.

توجد رموز أخرى للتقييم لا تقابلها نقاط – تستخدم في بعض متطلبات التخرج - وهي:

S: مستوى مرضي

U: مستوى غير مرضي

T: درجات حصل عليها طالب محول من كلية صيدلة أخرى

يتم حساب المعدل الفصلي للطالب (GPA) والمعدل التراكمي (cGPA) على النحو التالي:

أ- يتم ضرب قيمة تقدير كل مقرر دراسي (النقاط الموضحة في الجدول السابق) في عدد الساعات المعتمدة لهذا المقرر لنحصل على عدد النقاط الخاصة بكل مقرر في الفصل الدراسي.

ب- يتم جمع نقاط كافة المقررات الدراسية التي سجل فيها الطالب في الفصل الدراسي الواحد.

ج- يتم قسمة مجموع نقاط كافة المقررات الدراسية على إجمالي الساعات المعتمدة المسجلة للطالب في الفصل الدراسي الواحد وذلك بغرض الحصول على المعدل الفصلي كما يلي:

$$\text{المعدل الفصلي (GPA)} = \frac{\text{مجموع نقاط كافة المقررات الدراسية في الفصل الدراسي الواحد}}{\text{إجمالي الساعات المعتمدة المسجلة في الفصل الدراسي الواحد}}$$

ويتم حساب المعدل التراكمي كما يلي:

$$\text{المعدل التراكمي (cGPA)} = \frac{\text{مجموع نقاط كافة المقررات الدراسية لكافة الفصول الدراسية}}{\text{إجمالي الساعات المعتمدة المسجلة في كافة الفصول الدراسية}}$$

### **مادة (12) :**

#### **الرسوب في المقررات**

- في حالة تغيب الطالب بدون عذر يقبله مجلس الكلية عن أداء الامتحان التحريري النهائي.
- إذا حصل الطالب على أقل من 30% من درجة الامتحان التحريري النهائي.
- عدم تحقيق 60% على الأقل من مجموع درجات المقرر.
- إذا رسب الطالب في أي مقرر إجباري في أي فصل دراسي فعليه دراسة ذات المقرر والالتزام بالموظبة على الحضور والامتحان فيه عند طرحه مرة أخرى ، أما إذا رسب في مقرر إختياري فبإمكانه إعادة دراسته أو دراسة مقرر إختياري آخر بديل لإكمال متطلبات التخرج ، وذلك بعد موافقة المرشد الأكاديمي واعتماد لجنة الإشراف.

### **مادة (13) :**

#### **التعثر الأكاديمي**

- يعتبر الطالب متعثر أكاديمياً إذا حصل على معدل فصلي (GPA) أقل من "1".
- الطالب الذي يحصل على معدل فصلي (GPA) أقل من "1" لمدة ستة فصول دراسية متصلة أو في عشرة فصول دراسية غير متصلة يفصل من الكلية وذلك بعد العرض والموافقة من مجلس الكلية ولا يؤخذ في الإعتبار الفصول الصيفية إن وجدت.
- يسمح للطالب المتعثر أن يعيد دراسة المقررات التي اجتازها بتقدير D وذلك لتحسين المعدل التراكمي وتحسنب الدرجة الأعلى التي يحصل عليها الطالب.

## مادة (14) :

### **الانقطاع عن الدراسة**

يعتبر الطالب منقطعاً عن الدراسة إذا لم يسجل في فصل دراسي أو انسحب من الفصل سواء ذلك بعذر أو بدون عذر. ويجوز أن ينقطع الطالب فصلين دراسيين متتاليين أو ثلاثة فصول دراسية غير متتالية كحد أقصى بشرط الحصول على موافقة مجلس الكلية ، وفي حالة انقطاعه مدة أطول من ذلك بدون عذر يقبله مجلس الكلية ويوافق عليه مجلس الجامعة يطبق عليه النصوص الواردة باللائحة التنفيذية لقانون تنظيم الجامعات.

## مادة (15) :

**متطلبات الحصول على درجة بكالوريوس الصيدلة (فارم دي- صيدلة اكلينيكية) -**

### **(Pharm D-Clinical Pharmacy)**

يتطلب الحصول على درجة بكالوريوس الصيدلة (فارم دي- صيدلة اكلينيكية) ( Pharm D-Clinical Pharmacy ) طبقاً لنظام الساعات المعتمدة ما يلي:

**أولاً :** دراسة واجتياز إجمالي عدد الساعات المعتمدة **176** ساعة معتمدة موزعة على عشرة فصول دراسية وتشمل متطلبات الكلية الإلزامية بحد أدنى 168 ساعة معتمدة (جدول توزيع المقررات) ومتطلبات الكلية الاختيارية وتمثل عدد **8** ساعات معتمدة ، على ألا يقل المعدل التراكمي عن واحد.

**ثانياً :** اجتياز فترة تدريب ميداني أولى باجمالي عدد 100 ساعة تدريب فعلية في الصيدليات الأهلية والحكومية وصيدليات المستشفيات التي يقرها مجلس الكلية وذلك تحت إشراف عضو هيئة تدريس و يتم التدريب خلال الأجازات الصيفية لسنوات الدراسة بعد نهاية المستوى الثالث وأن يكمل سنة الأمتياز (عام أكاديمي- 9 أشهر) بعد الانتهاء من سنوات الدراسة ، طبقاً للائحة التفصيلية الخاصة ببرنامج تدريب سنة الامتياز والتي تشمل مشروع التخرج في إحدى التخصصات المطروحة.

**ثالثاً :** اجتياز ما قد تقررره الجامعة من متطلبات للتخرج على ألا يتضمنها حساب المعدل الفصلي أو التراكمي للطالب.

## مادة (16) :

### **نظام تأديب الطلاب**

الطلاب المقيدون بالبرنامج خاضعون للنظام التأديبي المبين في قانون تنظيم الجامعات المصرية ولائحته التنفيذية.

## مادة (17) :

**كود الأقسام ومتطلبات البرنامج الدراسي ( أنظر مرفق رقم 1)**

## مادة (18) :

الخطة الدراسية (أنظر مرفق 2)

## مادة (19) :

محتوى المقررات الدراسية ( أنظر مرفق 3)

## مادة (20) :

تحديث المقررات الدراسية

يجوز لمجلس الجامعة الموافقة على تحديث نسبة لا تتجاوز 20% من محتوى المقررات الدراسية بناء على اقتراح مجلس الكلية وذلك بعد موافقة اللجنة المختصة بالإشراف على البرنامج ومجلس القسم العلمي المعني وبعد إبداء المبررات اللازمة.

## مادة (21) :

برنامج التدريب لسنة الإمتياز

يتم وضع برنامج مفصل للتدريب للسنة النهائية (الامتياز) فى شكل دورات تناوبية فى ملحق به لائحة برنامج التدريب التناوبى بصورة ممنهجة تفصيلية.

# مرفق 1

## خاص بالمادة (17)

كود الأقسام ومتطلبات الجامعة والكلية والمقررات الإختيارية

### 1- كود الأقسام

#### 1-Key for Course Abbreviations

MS	Mathematics
PB	Biochemistry
PC	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 professional

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

**2. University Requirements:** As determined by each University.

### 3- متطلبات الكلية

**3. Faculty Requirements:** See programme curriculum (Appendix 2)

**Table 1: Courses offered by the Department of Pharmaceutics and Industrial Pharmacy**

Course Code	Course Title	Credit Hours		
		Lect.	Pract./Tut	Total
PT 101	Pharmacy Orientation	1	-	1
PT 102	Physical Pharmacy	2	1	3
PT 303	Pharmaceutical dosage forms I	2	1	3
PT 404	Pharmaceutical Dosage Forms-II	2	1	3
PT 505	Pharmaceutical Dosage Forms-III	2	1	3
PT 606	Pharmaceutical Technology	2	1	3
PT 707	Advanced Drug Delivery Systems	2	-	2
PT 708	Biopharmaceutics and Pharmacokinetics	2	1	3
Total		15	6	21
PTE 1	Cosmetics	1	1	2
PTE 2	Good Manufacturing Practice	1	1	2
PTE 3	Mass Production of Pharmaceutical Products	1	1	2
PTE 4	Total Quality Management	1	1	2
PTE5	Advanced pharmaceutical technology	1	1	2

**Table 2. Courses offered by the Department of Pharmacognosy**

Course Code	Course Title	Credit Hours		
		Lect.	Pract./Tut	Total
PG 101	Medicinal Plants	2	1	3
PG 202	Pharmacognosy I	2	1	3
PG 303	Pharmacognosy II	2	1	3
PG 504	Phytochemistry I	2	1	3
PG 605	Phytochemistry II	2	1	3
PG 906	Phytotherapy	2	1	3
Total		12	6	18
PGE 1	Plant Biotechnology	1	1	2
PGE 2	Production and Manufacture of Medicinal plants	1	1	2
PGE 3	Narcotics, Psychotropic and Toxic Plants	1	1	2
PGE 4	Marine Natural Products	1	1	2
PGE 5	Nutraceutical and Herbal Drugs Interaction	1	1	2

**Table 3. Courses offered by the Department of Pharmacology and Toxicology**

Course Code	Course Title	Credit Hours		
		Lect.	Pract./Tut	Total
PO 301	Basic Pharmacology	2	1	3
PO 302	Physiology and Pathophysiology	2	0	2
PO 402	Pharmacology –I	2	1	3
PO 503	Pharmacology-II	2	1	3
PO 604	Pharmacology-III	2	1	3
PO 705	Drug Information	1	1	2
PO 906	Basic & clinical Toxicology	2	1	3
Total		13	6	19
POE 1	Drug Abuse	1	1	2
POE 2	Immunopharmacology	1	1	2
POE 3	Pharmacogenetics	1	1	2
POE 4	Screening and Biological Standardization	1	1	2
POE 5	Veterinary Pharmacology	1	1	2

**Table 4. Courses offered by the Department of Microbiology and Immunology**

Course Code	Course Title	Credit Hours		
		Lect.	Pract./Tut	Total
PM 401	General Microbiology and Immunology	2	1	3
PM 502	Pharmaceutical Microbiology and Antimicrobials	2	1	3
PM 503	Parasitology and Virology	2	1	3
PM 704	Medical Microbiology	2	1	3
PM 805	Public Health and Preventive Medicine	2	--	2
PM 906	Biotechnology	2	1	3
Total		12	5	17
PME 1	Advanced Techniques in Microbiology and Immunology	1	1	2
PME 2	Antimicrobial stewardship	1	1	2
PME 3	Bioinformatics	1	1	2
PME 4	Infection control	1	1	2
PME 5	Marine microbiology	1	1	2

**Table 5. Courses offered by the Department of Pharmaceutical Analytical Chemistry**

Course Code	Course Title	Credit Hours		
		Lect.	Pract./Tut	Total
PC 101	Pharmaceutical Analytical Chemistry I	2	1	3
PC 203	Pharmaceutical Analytical Chemistry II	2	1	3
PC 306	Pharmaceutical Analytical Chemistry III	1	1	2
PC 401	Instrumental Analysis	2	1	3
PC 707	Quality Control of Pharmaceuticals	2	1	3
Total		9	5	14
PCE 4	Cosmetics Analysis	1	1	2
PCE 5	Food Analysis	1	1	2
PCE 6	Assessment of Food contaminant	1	1	2
PCE 7	Green chemistry	1	1	2



**Table 6. Courses offered by the Department of Medicinal Chemistry**

Course Code	Course Title	Credit Hours		
		Total	Pract./Tut	Lect.
PC 706	Medicinal Chemistry I	2	1	3
PC 808	Medicinal Chemistry II	2	1	3
Total		4	2	6
PCE1	Drug discovery	1	1	2
PCE1	Drug design	1	1	2

**Table 7. Courses offered by the Department of Biochemistry and Molecular Biology**

Course Code	Course Title	Credit Hours		
		Lect.	Pract./Tut	Total
PB 201	Cell Biology	1	1	2
PB302	Biochemistry I	2	1	3
PB 403	Biochemistry II	2	1	3
PB 804	Clinical Biochemistry	2	1	3
PB 905	Human Nutrition	1	1	2
Total		8	5	13
PBE 1	Introduction to Research Methodology	1	1	2
PBE 2	Biotechnology and Human Disease	1	1	2
PBE 3	Nutrition through life cycle	1	1	2
PBE 4	Therapeutic Nutrition	1	1	2

**Table 8. Courses offered by the Department of Pharmaceutical Organic Chemistry**

Course Code	Course Title	Credit Hours		
		Total	Pract./Tut	Lect.
PC 102	Pharmaceutical Organic Chemistry I	2	1	3
PC 204	Pharmaceutical Organic Chemistry II	2	1	3
PC 305	Pharmaceutical Organic Chemistry III	2	1	3
Total		6	3	9
PCE 2	Polymers	1	1	2
PCE 3	Synthesis of Raw Materials	1	1	2

**Table 9. Courses offered by the Department of Pharmacy practice**

Course Code	Course Title	Credit Hours		
		Lect.	Pract./Tut	Total
PP 501	Community Pharmacy Practice	2	1	3
PP 602	Hospital Pharmacy	2	1	3
PP 603	Clinical Pharmacy Practice	2	1	3
PP 804	Management of Endocrine and Renal Disorders	1	1	2
PP 805	Management of Oncological Diseases and Radiopharmacy	2	1	3
PP 806	Clinical Pharmacokinetics	2	1	3
PP 907	Management of Neuropsychiatric Diseases	1	1	2
PP 008	Management of Critical Care Patients	1	1	2
PP 009	Management of Dermatological, Reproductive and Musculoskeletal Diseases	2	1	3
PP 010	Management of Pediatric Diseases	2	1	3
PP 011	Management of Cardiovascular Diseases	2	1	3
PP 012	Management of Gastrointestinal Diseases	1	1	2
PP 013	Management of Respiratory Diseases	1	1	2
PP 014	Clinical Research and Pharmacovigilance	1	--	1
Total		22	13	35
PPE1	Advanced Clinical Pharmacy	1	1	2

**Table 10. Medical Courses**

Course Code	Course Title	Credit Hours		
		Lect.	Pract./Tut	Total
MD 101	Medical Terminology	1	-	1
MD 202	Anatomy	1	1	2
MD 203	Psychology	1	-	1
MD 204	Histology	1	1	2
MD 405	Pathology	2	--	2
MD 606	First Aid and Basic Life Support (BLS)	1	1	2
Total		7	3	10

**Table 11. Nonprofessional Courses**

Course Code	Course Title	Credit Hours		
		Lect.	Pract./Tut	Total
MS 102	Mathematics	1	---	1
NP 404	Scientific writing and Communication skills	1	--	1
NP 406	Pharmacy Legislation and practice ethics	1	-	1
NP 905	Marketing &Pharmacoeconomics	2	--	2
NP 906	Entrepreneurship	1	---	1
Total		6	--	6

**4-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
<b>PTE 1</b>	<b>Cosmetics</b>	1	1	2
<b>PTE2</b>	<b>Good Manufacturing Practice</b>	1	1	2
<b>PTE 3</b>	<b>Mass Production of Pharmaceutical Products</b>	1	1	2
<b>PTE 4</b>	<b>Total Quality Management</b>	1	1	2
<b>PTE5</b>	<b>Advanced pharmaceutical technology</b>	1	1	2
<b>PGE 1</b>	<b>Plant Biotechnology</b>	1	1	2
<b>PGE 2</b>	<b>Production and Manufacture of Medicinal plants</b>	1	1	2
<b>PGE 3</b>	<b>Narcotics, Psychotropic and Toxic Plants</b>	1	1	2
<b>PGE 4</b>	<b>Nutraceutical and Herbal Drugs Interaction</b>	1	1	2
<b>POE1</b>	<b>Drug Abuse</b>	1	1	2
<b>POE2</b>	<b>Immunopharmacology</b>	1	1	2
<b>POE3</b>	<b>Pharmacogenetics</b>	1	1	2
<b>POE4</b>	<b>Screening and Biological Standardization</b>	1	1	2
<b>POE5</b>	<b>Veterinary Pharmacology</b>	1	1	2
<b>PCE1</b>	<b>Drug discovery</b>	1	1	2
<b>PCE2</b>	<b>Drug design</b>	1	1	2
<b>PCE3</b>	<b>Polymers</b>	1	1	2
<b>PCE4</b>	<b>Synthesis of Raw Materials</b>	1	1	2
<b>PCE5</b>	<b>Cosmetics Analysis</b>	1	1	2
<b>PCE6</b>	<b>Food Analysis</b>	1	1	2
<b>PCE7</b>	<b>Assessment of Food contaminant</b>	1	1	2
<b>PCE8</b>	<b>Green chemistry</b>	1	1	2
<b>PBE1</b>	<b>Introduction to Research Methodology</b>	1	1	2

Course Code	Course Title	Credit Hours		
		L	P/T	Total
<b>PBE2</b>	<b>Biotechnology and Human Disease</b>	1	1	2
<b>PBE3</b>	<b>Nutrition through life cycle</b>	1	1	2
<b>PBE4</b>	<b>Therapeutic Nutrition</b>	1	1	2
<b>PME1</b>	<b>Advanced Techniques in Microbiology and Immunology</b>	1	1	2
<b>PME2</b>	<b>Antimicrobial stewardship</b>	1	1	2
<b>PME3</b>	<b>Bioinformatics</b>	1	1	2
<b>PME4</b>	<b>Infection control</b>	1	1	2
<b>PME5</b>	<b>Marine microbiology</b>	1	1	2
<b>PPE1</b>	<b>Advanced Clinical Pharmacy</b>	1	1	2

L: Lecture  
P: Practical  
T: Tutorial

- لمجلس الكلية طرح المقررات الإختيارية من الأمثلة المذكورة بالجدول السابق في كل مستوى/فصل دراسي وذلك بعد موافقة اللجنة المختصة بالإشراف وبعد أخذ رأي مجالس الأقسام المعنية. و يمكن للكلية إضافة مقررات إختيارية أخرى يشترط موافقة مجلس الجامعة بعد إبداء المبررات اللازمة.

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	PC 101	2	1	3	Registration	20	40	75	15	150	2
Pharmaceutical Organic Chemistry I	PC 102	2	1	3	Registration	20	40	75	15	150	2
Pharmacy Orientation	PT 101	1	-	1	Registration	10	--	30	10	50	1
Medicinal Plants	PG 101	2	1	3	Registration	20	40	75	15	150	2
Medical Terminology	MD 101	1	-	1	Registration	10	--	30	10	50	1
Mathematics	MS 102	1	---	1	Registration	10	--	30	10	50	1
<b>Total</b>		<b>9</b>	<b>3</b>	<b>12</b>						<b>600</b>	

o *Lect.* = Lecture - *Period.* = Periodical - *Pract./ Tut.* = Practical / Tutorial, *Wr.* = Written

## 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	PC 203	2	1	3	Registration	20	40	75	15	150	2
Pharmaceutical Organic Chemistry II	PC 204	2	1	3	Registration	20	40	75	15	150	2
Cell Biology	PB 201	1	1	2	Registration	15	25	50	10	100	1
Anatomy	MD 202	1	1	2	Registration	15	25	50	10	100	1
Histology	MD 204	1	1	2	Registration	15	25	50	10	100	1
Physical Pharmacy	PT 202	2	1	3	Registration	20	40	75	15	150	2
Pharmacognosy I	PG 202	2	1	3	Registration	20	40	75	15	150	2
Psychology	MD 203	1	-	1	Registration	10	--	30	10	50	1
<b>Total</b>		<b>12</b>	<b>7</b>	<b>19</b>						<b>950</b>	

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

**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 Organic Chemistry-III	PC 305	2	1	3	Registration	20	40	75	15	150	2
Biochemistry I	PB302	2	1	3	Registration	20	40	75	15	150	2
Pharmacognosy II	PG 303	2	1	3	Registration	20	40	75	15	150	2
Basic Pharmacology	PO 301	2	1	3	Registration	20	40	75	15	150	2
Physiology and pathophysiology	PO 302	2	---	2	Registration	25	---	60	15	100	2
Pharmaceutical dosage forms I	PT 303	2	1	3	Physical pharmacy	20	40	75	15	150	2
Pharmaceutical Analytical Chemistry III	PC 306	1	1	2	Registration	15	25	50	10	100	1
<b>Total</b>		<b>13</b>	<b>6</b>	<b>19</b>						<b>950</b>	

○ *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		
Pharmacology –I	PO 402	2	1	3	Basic Pharmacology	20	40	75	15	150	2
General Microbiology and Immunology	PM 401	2	1	3	Registration	20	40	75	15	150	2
Scientific writing and Communication skills	NP 404	1	-	1	Registration	10	--	30	10	50	1
Pathology	MD 405	2	--	2	Registration	25	---	60	15	100	2
Pharmaceutical Dosage Forms-II	PT 404	2	1	3	Physical Pharmacy	20	40	75	15	150	2
Biochemistry II	PB 403	2	1	3	Biochemistry I	20	40	75	15	150	2
Pharmacy Legislation and practice ethics	NP 406	1	-	1	Registration	10	--	30	10	50	1
Instrumental Analysis	PC 401	2	1	3	Pharmaceutical Analytical Chemistry III	20	40	75	15	150	2
<b>Total</b>		<b>14</b>	<b>5</b>	<b>19</b>						<b>950</b>	

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## 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		
Pharmacology-II	PO 503	2	1	3	Basic Pharmacology	20	40	75	15	150	2
Pharmaceutical Microbiology and Antimicrobials	PM 502	2	1	3	General Microbiology & Immunology	20	40	75	15	150	2
Parasitology & Virology	PM 503	2	1	3	Registration	20	40	75	15	150	2
Pharmaceutical Dosage Forms-III	PT 505	2	1	3	Physical Pharmacy	20	40	75	15	150	2
Phytochemistry-I	PG 504	2	1	3	Registration	20	40	75	15	150	2
Community Pharmacy Practice	PP 501	2	1	3	Registration	20	40	75	15	150	2
<b>Total</b>		<b>12</b>	<b>6</b>	<b>18</b>						<b>900</b>	

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**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		
Pharmacology-III	PO 604	2	1	3	Basic Pharmacology	20	40	75	15	150	2
Phytochemistry-II	PG 605	2	1	3	Registration	20	40	75	15	150	2
Pharmaceutical Technology	PT 606	2	1	3	Registration	20	40	75	15	150	2
Hospital Pharmacy	PP 602	2	1	3	Registration	20	40	75	15	150	2
Clinical Pharmacy Practice	PP 603	2	1	3	Registration	20	40	75	15	150	2
First Aid and Basic Life Support (BLS)	MD 606	1	1	2	Registration	15	25	50	10	100	1
<b>Total</b>		<b>11</b>	<b>6</b>	<b>17</b>						<b>850</b>	

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**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		
Medicinal Chemistry-I	PC 706	2	1	3	Pharmaceutical Organic Chemistry-II	20	40	75	15	150	2
Drug Information	PO 705	1	1	2	Pharmacology-III	15	25	50	10	100	1
Advanced Drug Delivery Systems	PT 707	2	-	2	Registration	25	---	60	15	100	2
Biopharmaceutics and Pharmacokinetics	PT 708	2	1	3	Pharmaceutical dosage forms III	20	40	75	15	150	2
Medical Microbiology	PM 704	2	1	3	Pharmaceutical Microbiology	20	40	75	15	150	2
Quality Control of Pharmaceuticals	PC 707	2	1	3	Pharmaceutical Analytical Chemistry-II- Instrumental analysis	20	40	75	15	150	2
Elective course	PE --	1	1	2	Registration	15	25	50	10	100	1
<b>Total</b>		<b>12</b>	<b>6</b>	<b>18</b>						<b>900</b>	

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**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		
Medicinal Chemistry-II	PC 808	2	1	3	Medicinal Chemistry I	20	40	75	15	150	2
Management of Endocrine and Renal Disorders	PP 804	1	1	2	Pharmacology III	15	25	50	10	100	1
Management of Oncological Diseases and Radiopharmacy	PP 805	2	1	3	Pharmacology III	20	40	75	15	150	2
Clinical Pharmacokinetics	PP 806	2	1	3	Biopharmaceutics and Pharmacokinetics	20	40	75	15	150	2
Clinical Biochemistry	PB 804	2	1	3	Biochemistry-II	20	40	75	15	150	2
Public Health and Preventive Medicine	PM 805	2	--	2	Medical Microbiology	25	---	60	15	100	2
Elective Course	PE ---	1	1	2	Registration	15	25	50	10	100	1
<b>Total</b>		<b>12</b>	<b>6</b>	<b>18</b>						<b>900</b>	

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## 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		
Basic & clinical Toxicology	PO 906	2	1	3	Pharmacology-III	20	40	75	15	150	2
Management of Neuropsychiatric Diseases	PP 907	1	1	1	Pharmacology-III	15	25	50	10	100	1
Biotechnology	PM 906	2	1	3	Pharmaceutical Microbiology	20	40	75	15	150	2
Phytotherapy	PG 906	2	1	3	Phytochemistry-II	20	40	75	15	150	2
Clinical Nutrition	PB 905	1	1	2	Clinical biochemistry	15	25	50	10	100	1
Marketing & Pharmacoeconomics	NP 905	2	--	2	Registration	25	---	60	15	100	2
Entrepreneurship	NP 906	1	---	1	Registration	10	--	30	10	50	1
Elective Course	PE --	1	1	2	Registration	15	25	50	10	100	1
<b>Total</b>		<b>12</b>	<b>6</b>	<b>18</b>						<b>900</b>	

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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		
Management of Critical Care Patients	PP 008	1	1	2	Pharmacology-III	15	25	50	10	100	1
Management of Dermatological, Reproductive and Musculoskeletal Diseases	PP 009	2	1	3	Pharmacology II	20	40	75	15	150	2
Management of Pediatric Diseases	PP 010	2	1	3	Pharmacology-III	20	40	75	15	150	2
Management of Cardiovascular Diseases	PP 011	2	1	3	Pharmacology-III	20	40	75	15	150	2
Management of Gastrointestinal Diseases	PP 012	1	1	2	Pharmacology-III	15	25	50	10	100	1
Management of Respiratory Diseases	PP 013	1	1	2	Pharmacology-III	15	25	50	10	100	1
Clinical Research and Pharmacovigilance	PP 014	1	--	1	Drug information	10	--	30	10	50	1
Elective	PE --	1	1	2	Registration	15	25	50	10	100	1
<b>Total</b>		<b>11</b>	<b>7</b>	<b>18</b>						<b>900</b>	

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## مرفق 3

### خاص بالمادة (19)

### محتوى المقررات الدراسية

#### Course Content

##### **PC 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, gravimetry.

##### **PC 102 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, alkadienes and alkynes. Alkyl halides (nomenclature, preparation and chemical reactions ( $S_N1$ ,  $S_N2$ ,  $E_1$ ,  $E_2$ )). The practical sessions of this course help students gain skills required to purify and identify organic compounds of different classes such as aliphatic aldehydes, ketones alcohols and hydrocarbons, halogenated hydrocarbons.

##### **PC 203 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.

##### **PC 204 Pharmaceutical Organic Chemistry II ( 2 +1 )**

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



### **PC 305 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 306 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 . 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.

### **PC 401 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.

### **PC 706 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), CNS. The course handles different classes of antibiotics and antimicrobials (natural and synthetic), beside other synthetic chemotherapeutic agents (including antivirals, antifungals and antiparasitics). Additionally, various anticancer therapies, steroidal hormones and related drugs are also covered.

### **PC 707 Quality Control of Pharmaceuticals (2+1)**

The course will cover the following items:

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

II-Documentation

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

VI- 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.

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

### **PC 808 Medicinal Chemistry II ( 2+ 1 )**

The course is tailored to assist the students to gain the drugs affecting neurodegenerative disorders. Moreover, endocrine-related drugs (Diabetes, thyroid and calcium-regulating agents), antihistamines (H1, H2 blockers and anti-ulcer PPIs), drugs controlling pain and inflammation (NSAIDs, local anaesthetics and rheumatoid drugs) are also handled.

### **PB 201 Cell Biology ( 1 + 1 )**

The course aims at studying the structure and function of prokaryotic and eukaryotic cells. In this course study will include many different areas of cellular biology involving: the synthesis and function of macromolecules such as DNA, RNA, and proteins; control of gene expression; membrane and organelle structure and function; bioenergetics; and cellular communication, transformation; transport, receptors, and cell signaling; the cytoskeleton, the extracellular matrix, and cell movements.

### **PB 302 Biochemistry I ( 2 + 1 )**

Structure of proteins – Biologically active peptides – Protein turnover – Amino acids as precursors for biosynthesis of biomolecules (e.g. neurotransmitters –nucleotides, ...) – Structurally and physiologically important lipids – Lipoprotein metabolism – Carbohydrates and connective tissue – Enzymes (theories of enzyme action – enzyme kinetics – inhibition and regulation of enzyme activity – clinical correlations) – ATP synthesis from reduced metabolites (electron transport chain – inhibitors – uncouplers) – Hemoglobin and myoglobin (structure – synthesis and metabolism – clinical correlations).

### **PB 403 Biochemistry II ( 2 + 1 )**

Mobilization of body stores of glycogen and fats -Metabolism and tissue utilization of glucose, amino acids, and fatty acids – Regulation of blood glucose level and clinical correlations – Feed/fast cycle – Nitrogen metabolism and nitrogen balance – Inborn errors of metabolism – Second messengers and signal transduction –

Biochemistry of cancer - Biochemistry of aging – Food biochemistry (milk – probiotics) – Oxidative stress and body defense mechanisms.

### **PB 804 Clinical Biochemistry ( 2 + 1 )**

Organ function and laboratory diagnostic tests (liver – kidney – heart – pancreas – bone) – Plasma proteins and albumin/globulin ratio – Types and lab differentiation of hyperlipidemia - Examples of different diseases (case study – interpretation of analytical data) - Handling, preservation, storage and analysis of biological samples - Abnormalities of urine analysis – Blood analysis and complete blood count – Tumor markers – Endocrinology (classification of hormones - mechanisms of action – dysfunction) - Electrolytes, blood gases and acid-base balance - Recent diagnostic biomarkers.

### **PB 905 Clinical Nutrition (1+1)**

Measures of healthy life-style – Macronutrients and calculation of calories – Basal metabolic rate (BMR) - recommended 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.

### **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 physical and chemical 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

### **PT303 Pharmaceutical Dosage Forms 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 Pharmaceutical Dosage Forms 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 Pharmaceutical Dosage Forms 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 Pharmaceutical Technology : (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, extraction, size reduction, size separation, size analysis and size enlargement. 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 707 Biopharmaceutics & Pharmacokinetics: (2+1)**

The course is concerned with the exploration and examination of the physicochemical properties of drugs in the physiological environment and their impact on product performance. It explores the principles of biopharmaceutics and strategies for enhancing drug delivery and bioavailability .Also it introduces the students to basic

pharmacokinetic parameters and mathematical aspects. General principles of pharmacokinetic models are presented as they pertain to the process of absorption, distribution and elimination of drugs in humans and the significance of these processes in drug therapy. Topics also emphasize linear and nonlinear metabolic clearance kinetics, drug-drug interaction mechanisms and kinetics, in vitro-in vivo predictions, pharmacogenetics and other sources of inter-individual variability.

### **PT 708 Advanced Drug Delivery Systems: (2+0)**

A continued study of pharmaceutical dosage forms with emphasis on novel and targeted drug delivery systems. Discussions focusing on transforming proteins, genes, and other biotechnology driven compounds into therapeutic products including the role of molecular modeling and new drug therapies in fabricating rational drug delivery systems are included.

The course covers targeted nanocarrier-based delivery Systems and other advanced therapy medicinal products such as gene therapy medicinal products (GTMPs), somatic cell therapy medicinal products (sCTMPs), and tissue-engineered products (TEPs). 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.

### **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. 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.

### **PG 303 Pharmacognosy II ( 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, fruits, subterreans, herbs, unorganized drugs of marine and animal 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.

### **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 the students the knowledge and experience those enable them to understand, describe and deal with the chemistry and Pharmaceutical uses of volatile oils, resins and resin combinations, carbohydrates, glycosides, and bitters of plant or animals as well as techniques for their, isolation, identification and determination from their respective sources.Clinical applications will be correlated with various clinical analyses.

### **PG 605 Phytochemistry II ( 2+1 )**

The course aims to enable students to demonstrate knowledge of basic concepts of chemistry and bioactivities of alkaloids, tannins and antioxidants as well as chromatographic techniques for their isolation and identification. The course emphasizes on drugs with valuable use in the Egyptian and worldwide markets, such as anti-cancer agents, drugs affecting CNS, drugs ameliorating liver diseases and anti-inflammatory agents. Finally, the course focuses on the structure activity relationships (SAR) of these natural products derived compounds and their pharmacophoric features. Clinical applications will be correlated with various clinical analyses.

### **PG 906 Phytotherapy ( 2+1 )**

The course aims to enable students to attain the systematic approach for herbal prescribing through a comparative study of both traditional and scientifically based uses of herbal drugs in the treatment of various clinical disorders. The course provides clinical pharmacy students with review of the available information on how botanicals may normalize an altered function. Approval by World Health Organization (WHO), German Federal Institute for Drugs and Medical Devices

(Commission E) is the base for selection of the studied herbs. The herbal drugs treated in combined way relative to pharmacognosy, pharmacology and toxicology. Special concern is given to the possible mode of action of the herbal drugs based on experimental and clinical pharmacological studies.

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.

### **PM 401 General Microbiology and Immunology (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.

Moreover it introduces the modern 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 502 Pharmaceutical Microbiology and Antimicrobials (2+1)**

This course is designed to provide student with basic, practical and professional knowledge on antimicrobial agents, either antibiotics or non-antibiotics. Different sterilization methods and their application scope will be studied in this course. Also, the course is designed to **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.

### **PM 503 Parasitology & Virology (2 +1 )**

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 704 Medical Microbiology (2+1)**

To educate students about the basic features of general bacteriology, virology and mycology.

- To familiarize students with the common infections and diseases of medical importance, their microbial causes, as well as laboratory diagnosis, treatment, prevention and control of such diseases.

### **PM 805 Public Health and Preventive medicine ( 2+0)**

The course introduces students to the global public health and the Sustainable Development Goals (SDGs). It also includes the fundamentals of epidemiology, communicable and non-communicable diseases and their control with special emphasis on antibiotic resistance and antibio

\ tic stewardship as well as emerging pathogens. The course also covers nutritional health, occupational medicine and women's, children's and adolescent's health and the relationship between the environment and public health. It is anticipated that students will achieve an understanding of the optimal environmental conditions for improved public health such as air, food and water purity and sanitary water disposal. The ability to understand and evaluate the biological and chemical basis for health threats emanating from the environment is also gained.

### **PM 906 Biotechnology (2+1)**

The biotechnology subject is crucial for pharmacy students. It mainly aims to provide sufficient foundation for the student on how to learn the concept of the biotechnology, its main components, optimization of fermentation, bioconversion biodegradation and bioremediation – gene therapy and genetic engineering. It simply



puts the student on the track of the hot topic and the coming near future of the pharmaceutical industries.

### **MD 101 Medical Terminology ( 1 + 0 )**

To ensure that the students have the necessary competency enabling them to recognize, analyze, synthesize, and apply medical terms as well as universally approved abbreviations related to the health profession, medical and paramedical. This course deals with basic components of medical terms (roots, prefixes, suffixes, and linking or combining vowels) and how does the medical terminology work by combining these basic components. The course also includes commonly used prefixes, and roots of body system, as well as the commonly used medical abbreviations .

### **MD 202 Anatomy ( 1 +1 )**

The aim of the course is to provide the students with competency concerning the appropriate functions of cells, tissues, organs and body system. The course also enables the student to integrate physiological data and mechanisms with ongoing taught sciences: anatomy. The course includes introduction to human anatomy, tissues of the body, skeletal system, articular system, muscular system, digestive system, cardiovascular, respiratory system, lymphatic system, urinary system, genital system, nervous and endocrine systems.

### **MD 204 Histology ( 1 +1 )**

The aim of the course is to provide the students with competency concerning the appropriate functions of cells, tissues, organs and body system. The course also enables the student to integrate physiological data and mechanisms with ongoing taught sciences: histology. Histology part includes cytology, epithelium, C.T., blood, muscle, vascular, lymphatic, respiratory, gastrointestinal and endocrine systems.

### **MD 404 Pathology ( 1 + 0 )**

The study of biochemical, structural and functional changes in cells, tissues and organs, which are caused by diseases

### **MD 605 First Aid and Basic Life Support (BLS) ( 1 + 1 )**

After completing the course, the student should be able to know how to deal with medical emergency based on the different courses. It includes: introduction & accidents, 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.

### **PO 301 Basic Pharmacology ( 2 + 1 )**

This course provides the principles underlying the actions of drugs; including pharmacokinetics, drug-receptor interactions, and drug metabolism. It explores the fundamental mechanism of drug action emphasizing the modulation of interactions between endogenous ligands and targets. Key target types include receptors, enzymes, transporter proteins, ion channels and nucleic acids. Key concepts include enzyme action, regulation, inhibition and signal transduction. In addition, the course provides the basic principles of drug absorption, distribution, metabolism and excretion.

### **PO 302 Physiology and Pathophysiology ( 2 + 0 )**

To ensure that the students have the necessary knowledge & skills enabling them to develop professional competency in the recognition & discussion of different physiological and Pathophysiology aspects of the major body organs and system pertinent to this course and in the application of such competencies in the specialist areas. This course cover the physiological function of different organs including physiology of body fluids, blood, nerve and muscle, central nervous system, special senses, autonomic nervous system, defense mechanisms. Physiology of cardiovascular, respiratory, excretory, endocrine and digestive systems; organic and energy metabolism; exercise and environmental stress are also included.

The basic concepts of pathophysiology at the cellular level related to injury, the self-defense mechanism, mutation, and cellular proliferation, and the pathological factors that influence the disease process. Clinical manifestations associated with the diseased organ(s).

### **PO 402 Pharmacology I ( 2 + 1 )**

This course integrates principles of pharmacology with conceptual knowledge of physiology and pathophysiology to disease processes regarding the autonomic, neuromuscular, autacoids and cardiovascular systems.

### **PO 503 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 and pulmonary systems. The anti-inflammatory, analgesics as well as gout treatments are also within the scope of the course.

### **PO 604 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 includes an advanced application of the science of drug information in terms of: its practice within the drug information centers and various clinical sites. The course will focus on Drug information and poison information centers, different drug information resources, use of the internet for drug and research information, evaluating information on the web. The classification of study design and clinical trials, data presentation, and basic statistical concepts are detailed. Basics of pharmaco-economic literature are described.

### **PO 906 Basic & clinical Toxicology ( 2 + 1 )**

To ensure that the students have the necessary knowledge & skills, as well as comprehensive understanding of the basics of toxicology enabling them to have detailed knowledge and to develop professional competence in the recognition, solving, and discussion of different toxicological cases. It includes: 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.

### **PP 501 Community Pharmacy Practice (2+1)**

This course includes the study of the clinical situations that can be handled by the pharmacist in the community pharmacy (referral or using OTC medications) including upper respiratory tract, gastrointestinal, and musculoskeletal symptoms, skin, eyes, and ears, and childhood symptoms.

### **PP 602 Hospital Pharmacy (2+1)**

Organization and structure of a hospital pharmacy, hospital pharmacy facilities and services (inpatient and outpatient services), transfer of care, patient's medication record, and rational medication use, hospital formulary, pharmacy and therapeutic committee, I.V. admixtures and incompatibilities, parenteral nutrition, handling of cytotoxic drugs, therapeutic drug monitoring, patient counselling and safety, and risk management

### **PP 603 Clinical Pharmacy Practice (2+1)**

This course includes the definition and concepts of clinical pharmacy and pharmaceutical care, case history and case presentation, medication history taking, clinical problem solving, and therapeutic planning, clinical rounding and assessment of patient compliance. Principles of special care populations (geriatric, pediatric, pregnancy, and lactation). Drug-related problems and drug interactions . Interpretation of clinical laboratory data and physical examination.

#### **PP 804 Management of endocrine & renal diseases (1+1)**

This course includes the Pathophysiology, causes, clinical presentation, diagnosis and application of pharmaceutical care plans in different endocrinologic disorders (Diabetes, thyroid disorder, caushing syndrome,...) and different renal disorders and related fluid and electrolyte disturbances (acute and chronic renal failure, uremic syndrome, kidney stones, ..). The course develops the students' ability to design, monitor, refine safe and cost-effective treatment plans and provide appropriate information to patient, caregivers, and health professionals.

#### **PP 805 Management of oncological diseases and radio pharmacy (2+1)**

Cancer aetiology, risk factors, cancer staging and grading, diagnosis, prognosis, optimizing chemotherapeutic regimens, different types of tumours (solid and hematologic) and their management, toxicities of chemotherapy, supportive treatment, pharmaceutical care and patient's support measures. This course also includes studying radioactive isotopes which process medical applications and precautions of their usage.

#### **PP 806 Clinical Pharmacokinetics (2+1)**

Introduction to clinical pharmacokinetics and its applications, pharmacokinetics, non-compartmental pharmacokinetics and moment analysis. Drug distribution and drug clearance mechanisms, IV infusion kinetics and kinetics following extra-vascular dosing, metabolite kinetics, multiple dose kinetics, non-linear pharmacokinetics, dosage regimen design, dosage individualization of drugs of narrow therapeutic index especially in patients with compromised renal and hepatic function.

#### **PP 907 Management of neuropsychiatry diseases (1+1)**

This course aims to provide the student with the knowledge in, pathophysiology, clinical interpretation, pharmacotherapy and management of neuropsychiatric diseases (e. .g mental health disorders, schizophrenia, depression, anxiety, seizure disorders, parkinsonism, migraines, dementia and Alzheimer's disease). Sedative and hypnotics, general anesthetics, opioid analgesics and non-steroidal anti-inflammatory drugs.

#### **PP 008 Management of critical care patients (1+1)**

This course aims to provide the student with the knowledge in, pathophysiology, clinical interpretation, pharmacotherapy and management of critical care illness (e.g. medical and surgical crises, trauma patients, supportive care, ICU infections, burns,

neuro-critical care, cardiovascular critical care, sepsis, septic shock, pain and analgesia, bleeding disorders and anticoagulation, nutritional support and therapy, hemodynamic monitoring, fluid and electrolyte disorders).

**PP 009 Management of dermatological, reproductive and musculoskeletal diseases (1+1)**

Skin structure and function, primary and secondary lesions. Most popular skin diseases: infective and non-infective types and their differentiation. Sexually transmitted diseases, male infertility, and women health. Musculoskeletal disorders are also included.

**PP 010 Management of Pediatric diseases (1+1)**

Nutritional requirements in neonates and infants, nutritional disorders, neonatology, infectious diseases in pediatrics, congenital heart diseases, endocrine, neurological, haematologic, renal, and respiratory disorders, pediatric emergencies.

**PP 011 Management of Cardiovascular diseases (2+1)**

Main diseases affecting the cardiovascular system, symptoms, prognosis, pharmacological and non-pharmacological management, patient counseling and monitoring of dyslipidaemias, hypertension, coronary artery disease, acute coronary syndromes, heart failure, dysrhythmias, thromboembolic disorders, and stroke.

**PP 012 Management of Gastrointestinal diseases (1+1)**

Hepatic disorders including viral hepatitis, pancreatitis, gastrointestinal bleeding, peptic ulcer, gastro-esophageal reflux disease, inflammatory bowel diseases and irritable bowel syndrome as well as gastrointestinal symptoms including nausea, vomiting, constipation, and diarrhea.

**PP 013 Management of Respiratory diseases (1+1)**

Epidemiology, aetiology, pathophysiology, clinical manifestation, investigations, treatment, monitoring, and patient counseling of bronchial asthma, chronic obstructive pulmonary disease, pulmonary hypertension, cystic fibrosis, upper and lower respiratory tract infections, and drug-induced respiratory problems.

**PP 014 Clinical Research 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 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)**

This course provides an essential guide to the mathematical concepts, techniques, and calculations, a student in the pharmaceutical sciences is likely to encounter. It

includes definition of Number, Variable, Function, composition of functions, different types of functions. Definition of Limits of one variable functions, continuity, differentiability and applications of these concepts. Definition of the definite and indefinite integrals. The fundamental theorem of calculus and applications of definite integral. Determined the area arc length, volumes and surfaces of revolutions Differentiation and integrations of exponential, logarithmic, trigonometric and transcendental functions. Techniques of integrations, trigonometric and transcendental functions. Techniques of integrations. Matrix Algebra and system of linear equations.

### **NP 303 Scientific Writing and Communication Skills ( 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. In addition it 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. The course will also deal with the underlying attitudes, which form an interpersonal skills. It focuses on concept and meaning of communication; verbal and non verbal communication (body and vocal language); active listening skills; communication styles and presentation skills. Communication skills in diverse pharmacy practice setting will be discussed

### **NP 404 Pharmaceutical Legislations and Practice ethics ( 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 ( 1 + 1 )**

#### **Pharmacoeconomics**

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 906 Entrepreneurship ( 1 + 0 )**

This course outlines the process of designing, launching and running a new business, which is often initially a small business. The people who create these businesses are called entrepreneurs. Entrepreneurship has been described as the "capacity and willingness to develop, organize and manage a business venture along with any of its risks in order to make a profit. While definitions of entrepreneurship typically focus on the launching and running of businesses, due to the high risks involved in launching a start-up, a significant proportion of start-up businesses have to close due to "lack of funding, bad business decisions, an economic crisis, lack of market demand, or a combination of all of these.

### **Elective courses**

#### **PTE 1:Cosmetics (1+1)**

The course aims to provide the students with the necessary knowledge and skills of the manufacture of cosmetics for hair and skin. It includes the difference between drugs, cosmeceuticals and cosmetics, different skin types, effects of age, race, sex and age on skin characters, Baumann skin type indicator, UV filters, after sun care products and tanning agents, skin whitening agents, anti-cellulite products, decorative products as face powders, blushers, eye cosmetics and foundations, as well as their main ingredients and specification of colors used for their preparation, seawater salts: their composition and their anti-inflammatory action, antiperspirants and deodorants: their main components and mechanism of action, hair structure, hair conditioners: their composition and effect on health and beauty of hair, preparation of aromatic waters, preparation of soaps and soap bases and preparation of cosmetic creams and gels.

#### **PTE2 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.

### **PTE 3 Mass Production of Pharmaceutical Products (1+1)**

The course aims at informing the students with the problems that arise when manufacturing pharmaceuticals on a large scale, what are these problems, and how to solve them. It includes problems evolved during transfer of the formula from laboratory scale to industrial scale, how to solve different problems of scaling up- case study, packs and packaging techniques, design of facility utility, mechanical systems, heating, ventilation-air conditioning systems, fire protection systems, piping systems, purified water station, vacuum and process gases.

### **PTE 4 Total Quality Management (1+1)**

The course aims at clarifying the practices of management, control and documentation of quality within pharmaceutical manufacturing establishments. It includes quality, quality control, quality management, process control, material control, basic requirements for pharmaceutical quality management, total quality management. quality costs, manufacturing quality management, documentation, sanitation procedures including food safety, drugs, microbes, allergens, GMP, staff, pest control, plant construction, design, sanitary facilities, cleaning and sterilization.

### **PTE5 Advanced pharmaceutical technology (1+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.

### **PGE 1 Plant Biotechnology (1+1)**

The course aims to introduce the principles of tissue culture, plant cells, types, factors and techniques used. It includes introduction to plant tissue culture- advantage and disadvantage, plant cell culture media composition and preparation, factors affecting secondary metabolite production (media formulation, agitation, temperature,...), plant growth regulators, culture types (callus, suspension, embryo, protoplast,..), plant explants and sterilization, callus culture and induction, *In vitro* shoot proliferation, *In vitro* root formation and acclimatization, plant regeneration, somatic embryogenesis, RAPD analysis for genetic assessment, elicitation, characteristics of elicitors and classification of elicitors and their mechanism of actions.

### **PGE 2 Production and Manufacture of Medicinal plants (1+1)**

The course aims to introduce the students to the chemical composition of compounds separated from natural sources and different techniques of their separation. It includes the study of the interaction of electromagnetic radiation with matter, different



spectroscopic methods used in structure elucidation of compounds isolated from natural sources. In each method; terminology, principle, instrumentation and application are illustrated. In ultraviolet spectrophotometry (UV); electron transitions are used to determine bonding patterns and determine ring structures. In Infrared spectrophotometry (IR); bond vibration frequencies in a molecule are used to determine the functional group. Nuclear magnetic resonance ( $^1\text{H}$  and  $^{13}\text{C}$ NMR) detects signals from H or C atoms and can be used to elucidate the molecular structure of known or new compounds through chemical shift, multiplicity, coupling constant and integration. Mass spectrometry is used to measure the mass of the unknown compounds based on the mass-to-charge ( $m/z$ ) ratio of the molecular ion and its fragments.

### **PGE 3 Narcotics, Psychotropic and Toxic Plants (1+1)**

Interpretation of the difference between the narcotic drugs from natural source based on their potential for abuse, existing medicinal use as well as safety assessments and analytical detection and quantification in biological samples.

#### **PGE 3 Marine Natural Products (1+1)**

Detailed study of biologically active agents from marine organisms; chemistry, preparation and pharmaceutical uses.

### **PGE 4 Nutraceutical and Herbal Drugs Interaction (1+1)**

Devoted to food or food products that provide health and medical benefits, including the prevention and treatment of disease. Such products may range from isolated nutrients, dietary supplements and specific diets to genetically engineered foods and herbal products.

### **POE1 Drug Abuse (1+1)**

The course aims to provide students with a comprehensive overview of the drugs and chemicals that are commonly being abused or misused in our society. It includes the classes of drug and short-term and long-term effects of each class of drug, short-term and long-term effects of the drugs, as well as treatment strategies and principles for prevention. The course also discusses the common methods of administration, the speed of transmission to the brain and the neurological impact on the brain as well as treatment strategies and principles for prevention.

### **POE2 Immunopharmacology (1+1)**

The course aims to cover the basics of immunology and its relevance for human disease and how to deal with it, and drugs that are linked to the immune system. It includes the structure and function of the immune system, systematic coverage of drugs affecting the immune system (immunostimulants, immunosuppressants), immunotoxicology including types of allergic reactions, management of allergy, management of inflammation, management of organ transplantation and tests for allergy, autoimmune diseases and immunodiagnostics using molecular techniques.

### **POE3 Pharmacogenetics (1+1)**

The course aims to provide students with the principles and applications of human genetics and genomics in drug therapy optimization, patient care, and counseling. It includes introduction to pharmacogenetics, gene structure and function, organization of human genome, mutation nature and types, mutagenic diseases, molecular lesions and genetic disorders, types of genetic disorders, treatment plans for genetic diseases, relation between immunology and pharmacogenetics.

#### **POE4 Screening and Biological Standardization (1+1)**

The course covers different procedures applied for screening of pharmacological activity of new compounds. The course includes screening of autonomic acting drugs, drugs acting on the cardiovascular system, drugs affecting the central nervous system, anti-inflammatory drugs, analgesics (narcotics and non-narcotics), anti-ulcer drugs as well as hormones.

#### **POE5 Veterinary Pharmacology (1+1)**

The commonly used veterinary biological and pharmaceutical preparations; general sanitary and management procedures for the prevention and control of livestock diseases; a brief review of infectious diseases and animal parasites.

#### **PCE1 Drug discovery (1+1)**

The course aims to provide the students with the necessary knowledge and skills concerning methods of discovery and composition of different drugs. It includes different synthetic pathway of drugs, characters, advantages and disadvantages and application of each way.

#### **PCE 2 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).

### **PCE3 Polymers (1+1)**

The course aims to provide the student with the necessary knowledge about polymers and their types and industrial applications, especially in the field of pharmaceutical manufacturing. It includes introduction to synthetic and biological polymers methods for making polymers, introduction to addition, or chain-growth, polymers, free radical polymerization, cationic polymerization, anionic, polymerization, introduction to condensation, or step-growth, polymers, polyamides, polyesters, polycarbonates, polyurethanes and applications in pharmaceutical industry.

### **PCE 4 Synthesis of Raw Materials**

The course aims to study strategies for the formation of raw materials and organic compounds. It includes applying retrosynthetic strategies in synthesis of raw materials including definition of disconnection, FGI (functional group interconversion), synthon and reagent, synthetic strategies and tactics, 2-group disconnections, synthetic strategies for 1,4-difunctionalised compounds, cyclic systems, cycloaddition and reconnection strategies. It also includes case studies of most common active principles like paracetamol, ibuprofen .....etc (mini and mass scale).

### **PCE 5 Cosmetics Analysis (1+1)**

The course aims to introduce how cosmetics are analyzed with their various components. It includes classification of cosmetics, additives, preservatives, coloring matter, degradation of coloring matter, sampling analysis of preservatives, analysis of coloring matter and analysis of heavy metals.

### **PCE 6 Food Analysis (1+1)**

The course aims to provide the student with the necessary knowledge and skills concerning the techniques of food analysis and its various components. It includes sampling techniques, calculation of the energy content of foods, determination of moisture and solids, analytical methods of food lipid, analysis of food carbohydrate, analysis of fiber, analysis of proteins, analysis of vitamin, trace element analysis and elemental analysis.

### **PCE 7 : Assessment of Food contaminant (1+1)**

The course aims at providing the students with the knowledge and skills related to assessment of safe food definition - food chemical residues - food biological residues - radiological residues - contamination of particular foods.

### **PCE 8 Green chemistry (1+1)**

This course is designed to includes introduction about green chemistry, principles of green chemistry (prevention, atom economy, less hazardous chemicals synthesis, designing safer chemicals, designing safer chemicals, safer solvents and auxiliaries, design for energy efficiency, use of renewable feed stocks, reduce derivatives, catalysis, design for degradation, real-time analysis for pollution prevention,

inherently safer chemistry for accident prevention)- green analytical chemistry- application of green methods in pharmaceutical analysis.

### **PBE1 Introduction to Research Methodology (1+1)**

The course aims to provide the student who hope to pursue careers in scientific research with the necessary knowledge and skills related to the scientific research methods and its various stages and controls. It includes research methodology by concentrating on the foundations of scientific research and educating students on multiple methods of tackling research points, how to conduct literature surveys, experimental design, data collection and statistical analysis and time management.

### **PBE2 Biotechnology and Human Disease (1+1)**

The course aims to provide the students with the necessary knowledge and skills concerning the most important biotechnology techniques related to the diagnosis and understanding of human genetic diseases. It includes understand of genes and their expression, possible several techniques that contributed to our understanding of many genetic disease, the discovery of restriction endonucleases as well as the development of cloning techniques, providing a mechanism for amplification of specific nucleotide sequences. It also includes the ability to synthesize specific probes, which has allowed the identification and manipulation of nucleotide sequences of interest. These and other experimental approaches have permitted the identification of both normal and mutant nucleotide sequences in DNA.

### **PBE3 Nutrition through life cycle (1+1)**

The course aims at providing the students with the knowledge and skills related to balanced diet and principle of meal planning - functions and deficiency of micro nutrients (vitamins, minerals, and antioxidants) - and dietary supplement - nutrition during pregnancy and lactation - nutrition during infancy, preschool , school age and adolescence - growth and development during different stages of life cycle - growth and development during different stages of life cycle - nutrition for adults and elderly.

### **PBE4 Therapeutic Nutrition (1+1)**

The course aims at providing the students with the knowledge and skills related to Effects of Drugs on Appetite- Effects of Drugs on Food Absorption, and Metabolism - Drug affecting food kinetics - Possible Effects of Drugs on Mineral and Vitamin Metabolism - GIT diseases : Nutritional back grounds , Nutraceuticals and Drug interaction ( Liver diseases: - Renal diseases: CNS and peripheral nervous systems diseases- respiratory diseases-GIT diseases - cardiovascular system- endocrine system diseases).

### **PME1 Advanced Techniques in Microbiology and Immunology (1+1)**

The course aims to provide the students with the necessary knowledge and skills of modern techniques used in microbiological and immunological studies and their applications. It includes principles and applications of advanced microbiological and

immunological techniques including mass spectrometry, flow cytometry, fluorescence imaging, pulsed field gel electrophoresis, Southern blot and Northern blot.

### **PME2 Antimicrobial stewardship**

Factors affecting choice of antimicrobial agent, types of antimicrobial compounds, types of antibiotics and synthetic antimicrobial agents, clinical uses of antimicrobial drugs, manufacturing of antibiotics and other synthetic antimicrobial agents, principle methods of assaying antibiotics, mechanism of action antibiotics, bacterial resistance.

### **PME3 Bioinformatics**

The course aims to introduce the students to the databases of nuclear acids and proteins and how to use them, and the applications of bioinformatics in the fields of industry and scientific research. It includes sequencing technology and next generation sequencing, overview of various primary and secondary databases of protein and nucleic acid, sequence comparison methods, use of sequences to determine phylogenetic relationship, database search algorithms and applications in pharmaceuticals industry.

### **PME4 Infection control (1+1)**

Course includes infection prevention and control practices, the chain of infection, standard and transmission-based precautions, barriers and use of personal protective equipment (PPE), and strategies for preventing the spread of infectious disease to healthcare workers and patients.

### **PME5 Marine microbiology (1+1)**

This course aimed to understand microbiology of marine environment with special emphasis on microbiological ecology, taxonomy, nutrient cycle, food microbiology and microbial biodegradation.

### **PPE1 Advanced Clinical Pharmacy**

Clinical pharmacy in obstetrics, gynaecology, neonates, paediatrics, geriatrics, blood disease and CNS disease. Nutritional deficiencies, energy and nutritional needs, enteral and parenteral nutrition.