



اللائحة الداخلية

لبرنامج

بكالوريوس الصيدلة فارم دي (صيدلة إكلينيكية)

**Pharm D (Clinical Pharmacy)**

طبقا لنظام الساعات المعتمدة

(يونيو - 2019)

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## رؤية و رسالة و أهداف كلية الصيدلة - جامعة بني سويف

### الرؤية:

تسعى كلية الصيدلة جامعة بني سويف أن تكون رائدة و متميزة في مجال العلوم الصيدلانية إستنادا لبرامجها التعليمية و أنشطتها البحثية و خدماتها المجتمعية.

### الرسالة:

تعمل كلية صيدلة جامعة بني سويف على إعداد كوادر علمية و بحثية مؤهلة في مجال العلوم الصيدلانية و الإكلينيكية لخدمة المجتمع و تلبية إحتياجات سوق العمل من خلال إعداد بنية أساسية و معرفية و مهارية لجعلهم قادرين على المنافسة محليا و إقليميا و مواكبة المستجدات العلمية و التكنولوجية.

### أهداف الكلية:

١. التنمية المستمرة للموارد المادية للكلية و تحسين الوضع التنافسي للمؤسسة
٢. تنمية و تطوير مهارات و كفاءه الموارد البشرية
٣. دعم منظومة التعليم بالكلية
٤. دعم منظومة البحث العلمي
٥. دعم الطلاب و غرس روح الابتكار و ريادة الاعمال
٦. دعم دور الكلية في تنمية البيئة المحيطة و الارتقاء بالمجتمع و فتح قنوات اتصال مع الجهات المستفيدة من هيئات و مصانع و مستشفيات و غيرها.

### الأقسام العلمية:

١. الصيدلانيات و الصيدلة الصناعية .
٢. العقاقير
٣. الأدوية و السموم
٤. الميكروبيولوجيا الصيدلانية و المناعة
٥. الكيمياء العضوية الصيدلانية
٦. الكيمياء التحليلية الصيدلانية
٧. الكيمياء الحيوية .
٨. الكيمياء الدوائية
٩. الصيدلة الإكلينيكية

## 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 الجامعة بناءً على طلب مجلس كلية الصيدلة درجة بكالوريوس الصيدلة فارم دي (صيدلة إكلينيكية) Pharm D (Clinical Pharmacy) طبقاً لنظام الساعات المعتمدة.

## مادة (3):

التأهيل للدرجات الأكاديمية الأعلى:

درجة بكالوريوس الصيدلة فارم دي (صيدلة إكلينيكية) 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 أى 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 ميدانى فعلية فى الصيدليات الأهلية والحكومية وصيدليات المستشفيات تتم خلال الأجازات الصيفية لسنوات الدراسة بعد نهاية المستوى الثالث و قبل البدء فى 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:

أولا : عدد الساعات المعتمدة **176** ساعة معتمدة بالإضافة إلى متطلبات الجامعة بحد أقصى 6 ساعات معتمدة.

ثانيا : ألا تقل عدد المقررات الإختيارية عن أربعة مقررات (8 ساعات معتمدة) يتم اختيارها من القائمة التي تحددها الكلية. هذا بالإضافة إلى 100 ساعة فعلية تدريب صيفي يبدأ بنهاية المستوى الثالث قبل البدء في سنة الإمتياز.

ثالثا : أن تقوم الكليات بوضع وصف ومحتوى المقررات الدراسية ( Course description & content ) من خلال الاقسام العلمية وتقوم لجنة القطاع بتشكيل لجان من الخبراء المتخصصين لمراجعة اللوائح و التأكد من انها تحقق مواصفات الخريج .

رابعا : يمكن للكلية عمل تغيير بالحذف والإضافة في الساعات المقترحة للمقررات بما لا يزيد عن 15% وبما لا يتسبب في زيادة اجمالي عدد الساعات المعتمدة المقررة للتخرج ( 176 ساعة معتمدة ) ولا يقل عن 171 ساعة معتمدة بالإضافة إلى متطلبات الجامعة بحد أقصى 6 ساعات معتمدة ، بما يحافظ على تحقيق المعايير الأكاديمية القومية المرجعية 2017 NARS.

خامسا: يمكن للكلية عمل تعديل بالحذف والأضافة في توصيف المقررات بما لا يزيد عن 20% من المحتوى العلمى للمقرر وبما يحقق إضافة وتحديث ضرورى.

سادسا : المقررات الإختيارية للطالب في المستويين الآخرين يفضل ان تحقق له جدارات و مهارات تساعد على التوجيه المهني والتخصص. وأن يكون أحد المقررات الإختيارية في إحدى المجالات الصيدلانية 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 الشؤون العلمية والاجتماعية 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) ، أو إذا كان تخرجه يتوقف على ذلك، على أن يتم كتابة إقرار بمعرفة ولي أمر الطالب بأنه لن يتم اعتماد نجاحه في هذا المقرر إلا بعد اجتياز متطلباته 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 وعلى الا يزيد العبء الدراسي للطالب المتعثر (المعدل التراكمي أقل من 1) عن 12 ساعة معتمدة (أنظر مادة 13) .

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)، كما يجوز لمجلس الكلية السماح للطالب المتعثر (أنظر مادة 13 - التعثر الأكاديمي) بزيادة العبء الدراسي عن الحد الأقصى خلال الفصل الصيفي وبما لا يتجاوز عدد 2 ساعة معتمدة.

#### (ب) الإضافة والحذف والانسحاب :

يجوز للطالب بعد استكمال إجراءات التسجيل أن يضيف أو يحذف إلى ساعاته المعتمدة مقررًا أو أكثر في أي فصل دراسي على أن يكون ذلك في خلال الفترات المحددة حسب الأجنحة الدراسية المعلنة لكل فصل دراسي، ويكون ذلك خلال أسبوع من نهاية التسجيل، 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، وذلك قبل بداية الامتحانات النهائية. 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 للامتحان 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 الصيدلانية الإكلينيكية ، وتخصص دورة واحدة للتدريب في المجال الدوائي ( التصنيع -الرقابة الدوائية-... الخ) ، كما يوضح في البرنامج التدريبي الذي يشمل برنامج تدريبي متكامل وممنهج بطريقة دورية تناوبية مسجلة بالساعات والمهام التدريبية وتحت إشراف دقيق من الكلية وجهة التدريب. كما يقدم مشروع تخرج في تخصص معين يساهم في تمهيد وإعداد الطالب للتوجه لهذا التخصص. ويمكن للخريج العمل في هذا المجال لمدة سنتين ليصبح بعدها صيدلياً متخصصاً قادراً على تقديم خدمات صيدلانية إكلينيكية أو الممارسات الصيدلانية المختلفة .

يتم تصميم البرنامج التدريبي في تخصصات إكلينيكية مختلفة (مثل: امراض القلب – السرطان – الامراض النفسية و العصبية – التغذية – العناية الفائقة – وحدة معلومات الدواء - اقتصاديات الدواء - والأبحاث السريرية.....) حسب إمكانيات الجامعة واحتياج المجتمع في نطاق الجامعة .

## مادة (10):

### شروط القبول

يشترط فيمن يتقدم للالتحاق بالبرنامج أن يستوفي كافة الشروط التي يحددها المجلس الأعلى للجامعات.

يجوز قبول تحويل الطلاب المقيدون ببرنامج مماثل في إحدى كليات الصيدلة بالجامعات المصرية أو الأجنبية بشرط استيفاء الطالب لمتطلبات القبول بالكلية وتحتسب للطالب المقررات التي درسها في الكلية المحول منها وفقاً للقواعد التي 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 في أي مقرر هو 60% من مجموع درجات هذا المقرر ، ولا يكون الطالب ناجحاً في أي 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
	B	3	77,5 لأقل من 82,5
	B <sup>-</sup>	2,7	75 لأقل من 77,5
جيد	C <sup>+</sup>	2,3	72,5 لأقل من 75
	C	2	67,5 لأقل من 72,5
	C <sup>-</sup>	1,7	65 لأقل من 67,5
مقبول	D <sup>+</sup>	1,3	62,5 لأقل من 65
	D	1	60 لأقل من 62,5
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 مع الإحتفاظ بالتقدير، وذلك في أول موعد يتم عقد الامتحان فيه لهذا المقرر على ألا يتكرر ذلك أكثر من مرتين لنفس المقرر وفي المرة الثالثة يعتبر الطالب راسباً.

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 الاحتفاظ 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:

مجموع نقاط كافة المقررات الدراسية في الفصل الدراسي  
الواحد

إجمالي الساعات المعتمدة المسجلة في الفصل الدراسي الواحد

= المعدل الفصلي (GPA)

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 اكاديميا 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 للطلاب المتعثر أن يعيد دراسة المقررات التي اجتازها بتقدير D وذلك لتحسين المعدل التراكمي وتحتسب 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 إكلينيكية) يتطلب الحصول على درجة بكالوريوس الصيدلة فارم دي (صيدلة إكلينيكية) طبقاً لنظام الساعات المعتمدة ما يلي:

أولاً : دراسة واجتياز عدد الساعات المعتمدة **176** ساعة معتمدة موزعة على عشرة فصول دراسية وتشمل متطلبات الكلية الإلزامية **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 بإجمالي 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 تقرره 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 والعرض علي لجنة القطاع الصيدلي.

## 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

### Key for Course Abbreviations

MS	Mathematics
PB	Biochemistry
POC	Pharmaceutical Organic Chemistry
PAC	Pharmaceutical Analytical Chemistry
PMC	Medicinal Chemistry
PG	Pharmacognosy
PM	Pharmaceutical Microbiology and Immunology
PO	Pharmacology and Toxicology
PP	Pharmacy Practice/Clinical Pharmacy
PT	Pharmaceutics and Pharmaceutical Technology
MD	Medical Courses
NP	Non professional
EN	English/Latin

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:** See programme curriculum (Appendix 2)

### 3- متطلبات الكلية

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

### 4- مقررات اختيارية

#### 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
PAC E04	Advanced Pharmaceutical Analysis	1	1	2
PG E07	Complementary Therapies	1	1	2
PG E08	Production and Manufacture of Medicinal Plants	1	1	2
PG E09	Chromatography and Separation Techniques	1	1	2
PG E10	Processing of medicinal plants	1	1	2
PG E11	Aromatherapy and herbal cosmetics	1	1	2
PG E12	Biotechnology of medicinal plants	1	1	2
PM E08	Antibiotic stewardship	1	1	2
PM E09	Infection Control	1	1	2
PM E10	Bioinformatics	1	1	2
PMC E04	Drug Design	1	1	2
PO E06	Veterinary Pharmacology	1	1	2
PO E07	Biological Standardization	1	1	2
POC E04	Advanced Drug Structural Determination	1	1	2
PP E17	Geriatric pharmacotherapy	1	1	2
PP E18	Interprofessional Skills	1	1	2
PP E19	Pharmacoeconomics	1	1	2
PT E09	Veterinary pharmacy	1	1	2



PT E10	Advanced pharmaceutical technology	1	1	2
PT E11	Medical devices	1	1	2
PT E12	Good Manufacturing Practices	1	1	2
PT E13	Applied Industrial Pharmacy	1	1	2
PT E14	Cosmetic Preparations	1	1	2
PT E15	Drug Metabolism and Transport	1	1	2
PT E16	Protein Pharmaceuticals	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 والعرض علي لجنة القطاع.

مرفق رقم 2

خاص بالمادة رقم ( 18 )

الخطة الدراسية

Programme Curriculum

Table (1)

**Semester (1) (Fall)**

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	PAC 101	2	1	3	Registration	20	40	75	15	150	2
Pharmaceutical Organic Chemistry I	POC 101	2	1	3	Registration	20	40	75	15	150	2
Pharmacy Orientation	PT 101	1	-	1	Registration	10	--	40	--	50	1
Medicinal Plants	PG 101	2	1	3	Registration	20	40	75	15	150	2
Medical Terminology	MD 101	1	-	1	Registration	10	--	40	--	50	1
English Language	EN 101	1	-	1	Registration	10	--	40	--	50	1
Information Technology	NP 101	1	1	2	Registration	15	25	60	---	100	1
Mathematics	MS 101	1	---	1	Registration	10	--	40	--	50	1
Human Rights and Fighting Corruption	NP 102	1	---	1	Registration	10	--	40	--	50	1
<b>Total</b>		<b>12</b>	<b>4</b>	<b>16</b>						<b>800</b>	

*Lect.* = Lecture

*Period.* = Periodical

*Pract./ Tut.* = Practical / Tutorial

*Wr.* = Written

## Table (2)

### Semester (2) (Spring)

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	PAC 202	2	1	3	Pharmaceutical Analytical Chemistry I	20	40	75	15	150	2
Pharmaceutical Organic Chemistry II	POC 202	2	1	3	Pharmaceutical Organic Chemistry-I	20	40	75	15	150	2
Cell Biology	PM 201	1	1	2	Registration	15	25	50	10	100	1
Anatomy & Histology	MD 202	2	1	3	Registration	20	40	90	-	150	2
Physical Pharmacy	PT 202	2	1	3	Registration	20	40	75	15	150	2
Pharmacognosy I	PG 202	2	1	3	Medicinal Plants	20	40	75	15	150	2
Psychology	MD 203	1	-	1	Registration	10	--	40	--	50	1
<b>Total</b>		<b>12</b>	<b>6</b>	<b>18</b>						<b>900</b>	

*Lect.* = Lecture

*Period.* = Periodical

*Pract./ Tut.* = Practical / Tutorial

*Wr.* = Written

## Table (3)

### Semester (3) (Fall)

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	POC 303	2	1	3	Pharmaceutical Organic Chemistry-II	20	40	75	15	150	2
Biochemistry I	PB301	2	1	3	Registration	20	40	75	15	150	2
Pharmacognosy II	PG 303	2	1	3	Pharmacognosy-I	20	40	75	15	150	2
Basic Pharmacology	PO 301	2	1	3	Registration	20	40	75	15	150	2
Physiology and pathophysiology	MD 303	2	---	2	Registration	25	---	75	---	100	2
Pharmaceutical dosage forms I	PT 303	2	1	3	Physical pharmacy	20	40	75	15	150	2
<b>Total</b>		<b>12</b>	<b>5</b>	<b>17</b>						<b>850</b>	

*Lect.* = Lecture

*Period.* = Periodical

*Pract./Tut.* = Practical/ Tutorial

*Wr.* = Written

## Table (4)

### Semester (4) (Spring)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam. Hours
		Lect.	Pract. /Tut	Total		Period	Pract. /Tut.	Wr.	Oral		
<b>Pharmacology –I</b>	<b>PO 402</b>	2	1	3	Basic Pharmacology	20	40	75	15	150	2
<b>General Microbiology and Immunology</b>	<b>PM 402</b>	2	1	3	Registration	20	40	75	15	150	2
<b>Scientific writing and Communication skills</b>	<b>NP 403</b>	1	1	2	Registration	15	25	60	---	100	1
<b>Pathology</b>	<b>MD 404</b>	2	--	2	Registration	25	---	75	---	100	2
<b>Pharmaceutical Dosage Forms-II</b>	<b>PT 404</b>	2	1	3	Physical Pharmacy	20	40	75	15	150	2
<b>Biochemistry II</b>	<b>PB 402</b>	2	1	3	Biochemistry I	20	40	75	15	150	2
<b>Pharmacy Legislation and practice ethics</b>	<b>NP 404</b>	1	-	1	Registration	10	--	40	--	50	1
<b>Total</b>		<b>12</b>	<b>5</b>	<b>17</b>						<b>850</b>	

*Lect.* = Lecture

*Period.* = Periodical

*Pract./Tut* = Practical/ Tutorial

*Wr.* = Written

## Table (5)

### Semester (5) (Fall)

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	Pharmacology I	20	40	75	15	150	2
Pharmaceutical Microbiology and Antimicrobials	PM 503	2	1	3	General Microbiology & Immunology	20	40	75	15	150	2
Parasitology&Virology	PM 504	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	Pharmacognosy II Pharmaceutical Organic Chemistry II	20	40	75	15	150	2
Community Pharmacy Practice	PP 501	2	1	3	Pharmacology -I	20	40	75	15	150	2
<b>Total</b>		<b>12</b>	<b>6</b>	<b>18</b>						<b>900</b>	

*Lect.* = Lecture

*Period.* = Periodical

*Pract./Tut* = Practical/ tutorial

## Table (6)

### Semester (6) (Spring)

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	Pharmacology-II	20	40	75	15	150	2
Phytochemistry-II	PG 605	2	1	3	Phytochemistry-I	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 605	1	1	2	Registration	15	25	60	---	100	1
<b>Total</b>		<b>11</b>	<b>6</b>	<b>17</b>						<b>850</b>	

*Lect.* = Lecture

*Period.* = Periodical

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

*Wr.* = Written

## Table (7)

### Semester (7) (Fall)

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	PMC 701	2	1	3	Pharmaceutical Organic Chemistry-II	20	40	75	15	150	2
Drug Information	PP 704	1	1	2	Pharmacology-III	15	25	60	---	100	1
Advanced Drug Delivery Systems	PT 707	1	1	2	Registration	15	25	50	10	100	1
Biopharmaceutics and Pharmacokinetics	PT 708	2	1	3	Pharmaceutical dosage forms III	20	40	75	15	150	2
Medical Microbiology	PM 705	2	1	3	Pharmaceutical Microbiology	20	40	75	15	150	2
Quality Control of Pharmaceuticals	PAC 707	2	1	3	Pharmaceutical Analytical Chemistry-II Pharmaceutical Microbiology	20	40	75	15	150	2
Elective course	PE --	1	1	2	Registration	15	25	60	---	100	1
<b>Total</b>		<b>11</b>	<b>7</b>	<b>18</b>						<b>900</b>	

*Lect.* = Lecture

*Period.* = Periodical

*Pract./Tut.* = Practical/Tutorial

*Wr.* = Written



## Table (8)

### Semester (8) (Spring)

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	PMC 802	2	1	3	Medicinal Chemistry I	20	40	75	15	150	2
Management of Endocrine and Renal Disorders	PP 805	1	1	2	Pharmacology III	15	25	50	10	100	1
Management of Oncological Diseases and Radiopharmacy	PP 806	2	1	3	Pharmacology III	20	40	75	15	150	2
Clinical Pharmacokinetics	PP 807	2	1	3	Biopharmaceutics and Pharmacokinetics	20	40	75	15	150	2
Clinical Biochemistry	PB 803	2	1	3	Biochemistry-II	20	40	75	15	150	2
Public Health and Preventive Medicine	PM 806	2	--	2	Medical Microbiology	25	---	75	---	100	2
Elective course	PE --	1	1	2	Registration	15	25	60	---	100	1
<b>Total</b>		<b>12</b>	<b>6</b>	<b>18</b>						<b>900</b>	

*Lect.* = Lecture  
*Period.* = Periodical  
*Pract.* = Practical  
*Wr.* = Written

## Table (9)

### Semester (9) (Fall)

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 905	2	1	3	Pharmacology-III	20	40	75	15	150	2
Management of Neuropsychiatric Diseases	PP 908	1	1	2	Pharmacology-III	15	25	50	10	100	1
Biotechnology	PM 907	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	PP 909	1	1	2	Biochemistry-II	15	25	50	10	100	1
Marketing &Pharmacoeconomics	NP 905	2	--	2	Registration	25	---	75	---	100	2
Entrepreneurship	NP 906	1	---	1	Registration	10	--	40	--	50	1
Elective course	PE --	1	1	2	Registration	15	25	60	---	100	1
<b>Total</b>		<b>12</b>	<b>6</b>	<b>18</b>						<b>900</b>	

*Lect.* = Lecture

*Period.* = Periodical

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

*Wr.* = Written

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

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 010	1	1	2	Pharmacology-III	15	25	50	10	100	1
Management of Dermatological, Reproductive and Musculoskeletal Diseases	PP 011	2	1	3	Pharmacology II	20	40	75	15	150	2
Management of Pediatric Diseases	PP 012	2	1	3	Pharmacology-III	20	40	75	15	150	2
Management of Cardiovascular Diseases	PP 013	2	1	3	Pharmacology-III	20	40	75	15	150	2
Management of Gastrointestinal Diseases	PP 014	2	1	3	Pharmacology-III	20	40	75	15	150	2
Management of Respiratory Diseases	PP 015	1	1	2	Pharmacology-III	15	25	50	10	100	1
Clinical Research and Pharmacovigilance	PP 016	1	--	1	Drug information	10	--	40	--	50	1
Elective course	PE --	1	1	2	Registration	15	25	60	---	100	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

## مرفق 3

خاص بالمادة (19)

محتوى المقررات الدراسية

### Course Content

#### **POC 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, alkadienes 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).

#### **POC 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.

#### **POC 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.

#### **PAC 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 , Theories of reaction rate, activation energy and catalysis , Photochemistry, absorbed energy and quantum yield.

Introduction to qualitative and quantitative inorganic chemistry, acid-base theory, titration curve and buffer solutions. Precipitometry factors affecting precipitate formation and pharmaceutical application.

### **PAC 202 Pharmaceutical Analytical Chemistry II (2+1)**

Complexometric titrations and oxidation-reduction titrations (electrical properties of redox systems, Nernst equation factors affecting oxidation potential, redox titration curves, pharmaceutical application on redox reaction), Electrochemistry (potentiometry, conductometry; and polarography).

### **PAC 703 Quality Control of Pharmaceuticals (2+1)**

The course is shared with departments: Microbiology & 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.

### **PMC 701 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.

### **PMC 802 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 301 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 402 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 803 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.

## **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 Advanced Drug Delivery Systems: (1+1)**

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.

### **PT 708 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.

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

The cell theory and cell structure (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.

## **PM 402 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 503 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.

## **PM 504 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 705 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 806 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 antibiotic 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 907 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 and Histology ( 2 +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 and histology. Histology part includes cytology, epithelium, C.T., blood, muscle, vascular, lymphatic, respiratory, gastrointestinal and endocrine systems. Anatomy part 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 303 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).

### **MD 404 Pathology ( 2 + 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 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 905 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 704 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 pharmacoeconomic literature are described.

### **PP 805 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 806 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 807 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 908 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 909 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.

### **PP 010 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 011 Management of dermatological, reproductive and musculoskeletal diseases (2+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 012 Management of Pediatric diseases (2+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 013 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 014 Management of Gastrointestinal diseases (2+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 015 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 016 Clinical Research and Pharmacovigilance (1+0)**

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 chemical 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 101 Information Technology (1+1)**

This course tends to provide students 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 practices some computer applications in the laboratory such as Internet Access, word processing and power point. It gives students a practical experience on developing projects related to the specialty.

### **NP 102 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 قانوني العمل والتأمين الاجتماعي، حقوق الإنسان في التقاضي، الحقوق المدنية والسياسية للإنسان

### **NP 403 Scientific Writing and Communication skills (1+1)**

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 ( 2+0 )**

#### **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

## محتوى المقررات الدراسية الاختيارية

### Elective Courses Descriptions

#### **PAC E04 Advanced Pharmaceutical Analysis (1+1)**

Electromagnetic radiation- UV and visible light- molecular absorption- Beer's Lambert Law- Monochromatic light and monochromators- Spectrophotometer- deviation from Beer's Lambert Law- Job's method- serial dilution- Calibration curve and determination of unknown- Fluorimetry- difference between fluorimetry and phosphorescence- Stoke's shift- factors affecting Fluorescence - Spectrofluorimeter- atomic spectroscopy- atomic absorption- atomic emission.

#### **PG E07 Complementary Therapies (1+1)**

The study of herbal preparations, nutritional supplements, and homeopathies. The study of herbal preparations that are widely used by the general public as self-selected OTC (over-the-counter) products/NPDs (nonprescription drugs). Food items for therapeutic, disease prevention, or health promotion purposes. Emphasis will be placed on the role of the pharmacist to help clients make an informed choice and counsel them on the selection of useful and safe products.

#### **PG E08 Production and Manufacture of Medicinal Plants (1+1)**

The study of commercial production of medicinal plants, cultivation, collection, drying, preservation, extraction, standardization, quality control, and final packaging of entire or powdered forms or extracts with the emphasis on the production of standardized herbals and phytopharmaceuticals.

#### **PG E09 Chromatography and Separation Techniques (1+1)**

Introduction and modes of separation for adsorption, partition, gel filtration and permeation, ion exchange and non-ion exchange, affinity chromatography and their applications. High-pressure liquid chromatography, gas liquid chromatography and their applications.

### **PG E10 Processing of Medicinal Plants (1+1)**

This course will deal with all aspects relating to collection, drying and extraction of medicinal plants and their biologically active compounds depending on specific equipments to minimize the process loss or chemical degradation. Different extracts and herbal formulations and their quality standards will be studied.

### **PG E11 Aromatherapy and Herbal Cosmetics (1+1)**

The study of natural products used in cosmetics as oils, perfumes, natural dyes, composition and its sources. Plant extracts used in cosmetic preparation. Identification and evaluation of natural products in different cosmetic preparation and their stability study and safety. The course deals also with the study of essential oils used in aromatherapy and their preparation.

### **PG E12 Biotechnology of Medicinal Plants (1+1)**

This course deals with the modern techniques for the production of medicinal plants using different tissue culture techniques and endophytes.

### **PM E08 Antimicrobial Stewardship (1+1)**

It is designed to introduce students to the principles of Antimicrobial Stewardship to facilitate rational antimicrobial selection; stewardship interventions that have been reported in the literature; quality improvement methods; as well as program development, implementation and evaluation. The basic clinical science of antimicrobial use. Practical Aspects of Antimicrobial Stewardship and Application to Special Circumstances and Populations. Infection prevention and antimicrobial stewardship. Surgical site prophylaxis. Out-patient parenteral therapy. Antimicrobial stewardship in pediatrics. Antimicrobial stewardship and transplant infectious diseases. Antimicrobial stewardship and long-term care.

### **PM E09 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. Students will be encouraged to explore aspects of clinical governance, prevention of infection and outbreak/exposure management.



### **PM E10 Bioinformatics (1+1)**

Introduces bioinformatics concepts and practice of biological databases, sequence alignment (DNA, RNA and protein analysis), gene and protein structure prediction, molecular phylogenetics, genomics and proteomics. Students will gain practical experience with bioinformatics tools and develop basic skills in the collection and presentation of bioinformatics data.

### **PMC E04 Drug Design (1+1)**

This course will allow students to get introduced to 2D drugs design methods including introduction to pharmacokinetic and pharmacodynamic properties, physicochemical properties, isosterism, and prodrug design. In addition, 3D drug design methods will be discussed including chemical drawing, ADME and drug-likeness studies. Moreover, the application of computer-aided drug design, identification of drug receptor interactions, lead optimization, target prediction and similarity search. This course will allow students to perform docking experiment(s) to understand how drugs bind into the active site of their corresponding enzymes/receptors. During this course, students should be able to apply their fundamental background knowledge in medicinal chemistry I-II, Organic chemistry, Biochemistry and Pharmacology to deal with and assimilate the different topics included.

### **PO E06 Veterinary Pharmacology (1+1)**

This course aims to ensure that the students understand and list the basic principles of veterinary pharmacology. Students will be also able to define pathophysiology, risk factors, symptoms, diagnosis and management of different diseases of animals such as cows, goats, dogs and other animals. This course will emphasize pathophysiology of different animal diseases and their laboratory diagnosis as well as principles of etiology and epidemiology of different animal disease. By the end of the course the students will be able to determine appropriate methods of infection control to prevent infection, construct public health by controlling infection and detecting infection methods and choose the best drugs for treatment of different animal diseases. Select the appropriate medication for certain animal diseases depending on their etiology, pathophysiology and laboratory data.

## **PO E07 Biological Standardization (1+1)**

This course will enable the students to understand necessary knowledge and skills enabling them and to develop professional competence in recognition, analysis and discussion of general screening and bioassay of various drug classes. It will include brief accounts on basic principles of biostatistics and basics of statistical principles and procedures used in the description, measurement, analysis and interpretation of results of clinical trials. After completing the course, the students will be able to choose the appropriate biological method for the assay of different drug classes and instruct appropriate laboratory skills, including safe working practices where relevant.

## **POC E04 Advanced Drug Structural Determination (1+1)**

Spectral technique, using of spectroscopic methods in drug determination, UV (Electronic Transitions, Beer-Lambert Law, Sample Preparation, Common Transitions and Functional Groups, Conjugation, Woodward-Fieser Rules), IR (Stretching and Bending; Hooke's Law, Sample Preparation, Spectral Range; Hydrocarbons, Alcohols, Carbonyls; Structural Insight Through Changes Playing with  $k$  / bond order), NMR ( $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR) and Mass spectroscopy (Electron Impact MS, Fragmentation, High Resolution MS, Soft-ionization techniques (ESI, CI, MALDI, etc.).

## **PP E17 Geriatric pharmacotherapy (1+1)**

Geriatric Therapeutics is designed to prepare the student to provide pharmaceutical care to the elderly patient. The course is composed of 3 sections covering general principles of aging and geriatric assessment skills, followed by the pharmacotherapy of selected disease states and syndromes common to the senior population and ending with geriatric & consultant pharmacy practice. At completion of this course, the successful student will be able to: 1. Describe the biology of aging and discuss common theories of aging. 2. Perform selected aspects of physical and psychiatric assessment utilizing tools developed for the geriatric patient to identify those with the highest risk for medication-related problems. 3. Effectively communicate with elderly patients using appropriate sources of patient education information. 4. Describe drug regimen review and regulations involving consultant

pharmacy practice. 5. Evaluate therapeutic decisions and preventive care given a patient's life expectancy and available evidence for benefit.

### **PP E18 Interprofessional skills (1+1)**

By the end of this course students will be able to: 1) Describe the philosophy of interprofessional practice; 2) Describe the role of other professionals and their roles and responsibilities in patient care and in the health of populations; 3) Explore methods of interprofessional collaboration with others; 4) Appreciate the relevance and impact of ethics in interprofessional practice; 5) Apply appropriate communication skills with team members, patients and individuals involved in patient care or health promotion.

### **PP E19 Pharmacoeconomics (1+1)**

The purpose of this course is to introduce students to the fundamental methods of pharmacoeconomic analysis. Topics include the terminology used in pharmacoeconomics, research methods frequently used in pharmacoeconomics, and the role of pharmacoeconomics in the drug development process and health care decision making relevant to the practice of pharmacy, cost/benefit assessment, public health systems, health insurance, tax-based systems. These principles will prepare the student for future coursework where the student will develop and implement individualized treatment plans, taking into consideration pharmacoeconomics factors.

### **PT E09 Veterinary Pharmacy (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, veterinary specific nomenclature, medication safety skills in their practice

### **PT E10 Advanced Pharmaceutical Technology (1+1)**

This course is designed to provide students with various important aspects of quality assurance, cGMP, quality audit, and process validation; including regulatory and quality compliance as applied to pharmaceutical industries. The students will also be provided with in-depth knowledge in the organization and operation of the major

departments of pharmaceutical companies, as well as ways of dealing with regulatory and compliance issues. Additionally, the course will provide advanced information on drug discovery & development process, including INDA, NDA & ANDA, drug master file & therapeutic equivalent codes. Other essential topics such as production & operational management, production planning & control shall be covered. In addition, various in-process quality control tests needed to assess some sterile and non-sterile products shall also be discussed. The course will also include pilot plant and scale up techniques, design, construction and operation of clean rooms as well as recent advances in packaging techniques for various pharmaceutical dosage forms, including stability & regulatory aspects of packaging.

### **PT E11 Medical Devices (1+1)**

Medical device technology is a course that presents an introduction of medical devices and procedures. We shall cover Minimally invasive and open procedures, techniques and devices, including mechanical and electrosurgical devices Manufacturing methods for catheters, balloons, plastic and metal components Design of metal device components including material selection and strength and deformation adequacy using material properties and classical mechanics Selection of insulation materials for and testing of electrosurgical devices. Selection of medical plastics and design elements. Balloon and catheter burst strength. Understanding of biocompatibility testing and accelerated age testing, Device sterilization methods and testing.

### **PT E12 Good Manufacturing Practices (1+1)**

Good Manufacturing Practices are guidelines that provide a system of processes, procedures, and documentation to assure the product produced has the identity, strength, composition, quality, and purity that it is represented to possess. Concepts, objectives and applicability, general provisions, organization and personal, Building and facilities, materials, equipment, production and process controls, packing and labeling, control, distribution, laboratory controls, records and reports, returned and salvaged drug products, repacking , inspections and recalls.

### **PT E13 Applied Industrial Pharmacy (1+1)**

Good manufacturing practice regulations and quality assurance with emphasis on process validation and sampling techniques.

### **PT E14 Cosmetic Preparations (1+1)**

Definition and concepts, classification, hair preparation, Idea generation, formulation development, manufacturing considerations of bath preparation, fragrance preparation, make-up preparation, nail lacquers, shaving preparations, after-shave preparations, skin care, anal hygiene products, antiperspirants and deodorants, quality control tests and evaluation of cosmetic products.

### **PT E15 Drug Metabolism and Transport (1+1)**

Learn how advances in biomedicine hold the potential to revolutionize drug development, drug treatments, and disease prevention: where are we now, and what does the future hold? This course will present short primers in genetics and mechanisms underlying variability in drug responses. A series of case studies will be used to illustrate principles of how genetics are being brought to bear on refining diagnoses and on personalizing treatment in rare and common diseases. The ethical and operational issues around how to implement large scale genomic sequencing in clinical practice will be addressed.

### **PT E16 Protein Pharmaceuticals (1+1)**

A perspective on the importance of formulation development in the biopharmaceutical industry, An understanding of the most common mechanisms of protein degradation, An overview of where pharmaceutical macromolecules are most likely to be damaged during handling and storage, The physical basis for the aggregation and solubility behaviour of polypeptides, Descriptions of the most important analytical tools needed in formulation development, Detailed strategies for stabilization of peptide proteins and chemically modified proteins. Overview of Formulation Development and Principles of Proteins Stabilization, Introduction to Protein Structure and Physical Properties, Overview of Instability Issues with Proteins.