

نموذج وصف البرنامج الأكاديمي

اسم الجامعة: جامعة الكرخ للعلوم

الكلية: العلوم

القسم العلمي: قسم الفيزياء الطبية

اسم البرنامج الأكاديمي أو المهني: بكالوريوس فزياء / معاون فيزيائي

اسم الشهادة النهائية: بكالوريوس في علوم الفيزياء الطبية

النظام الدراسي:

تاريخ اعداد الوصف:

تاريخ ملء الملف:

التوقيع:
اسم المعاون العلمي: أ. د. حسن محمد لعبيبي
التاريخ:



التوقيع:
اسم رئيس القسم: أ. د. صباح ابراهيم
التاريخ:



التوقيع:
اسم مدير شعبة ضمان الجودة والأداء الجامعي: م. د. علياء ماجد يحيى
التاريخ:

التوقيع:

مصادقة السيد العميد : أ. د. عدي هادي رؤوف

وزارة التعليم العالي والبحث العلمي
جهاز الإشراف والتقويم العلمي
دائرة ضمان الجودة والاعتماد الأكاديمي
قسم الاعتماد



دليل وصف البرنامج الأكاديمي والمقرر الدراسي لمسار بولونيا

2027-2026

المقدمة:

يُعد البرنامج التعليمي بمثابة حزمة منسقة ومنظمة من المقررات الدراسية التي تشتمل على إجراءات وخبرات تنظم بشكل مفردات دراسية الغرض الأساس منها بناء وصقل مهارات الخريجين مما يجعلهم مؤهلين لتلبية متطلبات سوق العمل يتم مراجعته وتقييمه سنوياً عبر إجراءات وبرامج التدقيق الداخلي أو الخارجي مثل برنامج الممتحن الخارجي.

يقدم وصف البرنامج الأكاديمي ملخص موجز للسمات الرئيسة للبرنامج ومقرراته مبيناً المهارات التي يتم العمل على اكسابها للطلبة مبنية على وفق اهداف البرنامج الأكاديمي وتتجلى أهمية هذا الوصف لكونه يمثل الحجر الأساس في الحصول على الاعتماد البرامجي ويشترك في كتابته الملاكات التدريسية بإشراف اللجان العلمية في الأقسام العلمية.

ويتضمن هذا الدليل بنسخته الثانية وصفاً للبرنامج الأكاديمي بعد تحديث مفردات وفقرات الدليل السابق في ضوء مستجدات وتطورات النظام التعليمي في العراق والذي تضمن وصف البرنامج الأكاديمي بشكلها التقليدي نظام (سنوي، فصلي) فضلاً عن اعتماد وصف البرنامج الأكاديمي المعمم بموجب كتاب دائرة الدراسات ت م 2906/3 في 2023/5/3 فيما يخص البرامج التي تعتمد مسار بولونيا أساساً لعملها.

وفي هذا المجال لا يسعنا إلا أن نؤكد على أهمية كتابة وصف البرامج الأكاديمية والمقررات الدراسية لضمان حسن سير العملية التعليمية.

مفاهيم ومصطلحات:

وصف البرنامج الأكاديمي: يوفر وصف البرنامج الأكاديمي إيجازاً مقتضباً لرؤيته ورسالته وأهدافه متضمناً وصفاً دقيقاً لمخرجات التعلم المستهدفة على وفق استراتيجيات تعلم محددة.

وصف المقرر: يوفر إيجازاً مقتضباً لأهم خصائص المقرر ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهنًا عما إذا كان قد حقق الاستفادة القصوى من فرص التعلم المتاحة. ويكون مشتق من وصف البرنامج.

رؤية البرنامج: صورة طموحة لمستقبل البرنامج الأكاديمي ليكون برنامجاً متطوراً وملهماً ومحفزاً وواقعياً وقابلاً للتطبيق.

رسالة البرنامج: توضح الأهداف والأنشطة اللازمة لتحقيقها بشكل موجز كما يحدد مسارات تطور البرنامج واتجاهاته.

أهداف البرنامج: هي عبارات تصف ما ينوي البرنامج الأكاديمي تحقيقه خلال فترة زمنية محددة وتكون قابلة للقياس والملاحظة.

هيكلية المنهج: كافة المقررات الدراسية / المواد الدراسية التي يتضمنها البرنامج الأكاديمي على وفق نظام التعلم المعتمد (فصلي، سنوي، مسار بولونيا) سواء كانت متطلب (وزارة، جامعة، كلية وقسم علمي) مع عدد الوحدات الدراسية.

مخرجات التعلم: مجموعة متوافقة من المعارف والمهارات والقيم التي اكتسبها الطالب بعد انتهاء البرنامج الأكاديمي بنجاح ويجب أن يُحدد مخرجات التعلم لكل مقرر بالشكل الذي يحقق أهداف البرنامج.

استراتيجيات التعليم والتعلم: بأنها الاستراتيجيات المستخدمة من قبل عضو هيئة التدريس لتطوير تعليم وتعلم الطالب وهي خطط يتم إتباعها للوصول إلى أهداف التعلم. أي تصف جميع الأنشطة الصفية واللاصفية لتحقيق نتائج التعلم للبرنامج.

نموذج وصف البرنامج الأكاديمي

اسم الجامعة: جامعة الكرخ للعلوم

الكلية: العلوم

القسم العلمي: قسم الفيزياء الطبية

اسم البرنامج الأكاديمي أو المهني: بكالوريوس فزياء / معاون فيزيائي

اسم الشهادة النهائية: بكالوريوس في علوم الفيزياء الطبية

النظام الدراسي: نظام بولونيا

تاريخ اعداد الوصف: 2026 / 5/1

تاريخ ملء الملف: 2026/5/1

التوقيع:

اسم رئيس القسم: أ.د. صباح ابراهيم عباس

التاريخ:

التوقيع:

اسم المعاون العلمي: أ.د. حسن محمد لعيبي

التاريخ:

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي: م.د. علياء ماجد يحيى

التاريخ

التوقيع

مصادقة السيد العميد : أ.د. عدي هادي رؤوف

1. رؤية البرنامج	بناء وتأهيل قسم علمي متكامل مستند على تجارب علميه متميزة يتناغم مع سوق العمل وتلبية احتياجات المؤسسات العلمية واتباع أساليب علمية تواكب وتنافس الأقسام المماثلة في الجامعات المحلية والعالمية وبناءا على توجهات الوزارة العلمية.
2. رسالة البرنامج	اضافة جديدة ونوعية في مجال الفيزياء الطبية من خلال اتباع احدث الوسائل والاساليب العلمية المنهجية المدروسة والابحاث النوعية المميزة والمختبرات الطبية الحديثة والكادر الاكاديمي المتمرس لتأهيل اخصائيين في الفيزياء الطبية على درجة عالية من المهارة العلمية والفنية يساهمون في تلبية احتياجات سوق العمل والارتقاء بهذا المجال.
3. اهداف البرنامج	تخريج وتأهيل كادر متخصص في مجال الفيزياء الطبية لهم قدرة على تقديم خدمات طبية ساندة في مجال التشخيص والعلاج وبجودة عالية (التصوير الطبي باستخدام الاشعة السينية , الرنين المغناطيسي , العلاج بالإشعاع, وغيرها من المجالات ذات العلاقة) وكذلك المساهمة في تطوير البحث العلمي والصحي , وفتح افاق ومفاهيم جديدة في البحث العلمي ولهم القابلية على العمل الصحي الميداني واكسابهم المهارات الادارية والعلمية في هذا المجال.
4. الاعتماد البرامجي	في صدد التقديم على الاعتماد البرامجي
5. المؤثرات الخارجية الأخرى	التطبيق في مختبرات المستشفيات والمراكز الصحية الحكومية

6. هيكلية البرنامج				
هيكل البرنامج	عدد المقررات	وحدة دراسية	النسبة المئوية	ملاحظات *
متطلبات المؤسسة	10	25	10.42 %	اساسي
متطلبات الكلية	3	21	8.75%	اساسي
متطلبات القسم	36	196	81.67%	اساسي + اختياري
التدريب الصيفي				اساسي
أخرى				

* ممكن ان تتضمن الملاحظات فيما اذا كان المقرر أساسي او اختياري .

7. وصف البرنامج				
السنة / المستوى	رمز المقرر أو المساق	اسم المقرر أو المساق	الساعات المعتمدة	
2026-2027 / الاول	KUS11003	ديمقراطية وحقوق انسان	2 نظري	لايوجد
	KUS11002	اساسيات علم الحاسوب	1 نظري	2 عملي
	SCI11004	احياء عام	3 نظري	2 عملي
	SCI11005	كيمياء عام	3 نظري	2 عملي
	KUS11001	رياضيات	4 نظري	لايوجد
	MPH11006	كهربائية	3 نظري	2 عملي
	MPH12007	الميكانيك	3 نظري	2 عملي
	MPH12008	المغناطيسية	3 نظري	2 عملي
	MPH12009	برمجة	3 نظري	2 عملي
	KUS12010	لغة عربية	2 نظري	لايوجد
	KUS12011	لغة انكليزية	2 نظري	لايوجد
	SCI12012	فيزياء عام	3 نظري	2 عملي
2026-2027 / الثاني	KUS23016	جرائم نظام البعث بالعراق	2 نظري	لايوجد
	MPH21013	معادلات تفاضلية	3 نظري	لايوجد
	MPH21014	بصريات	3 نظري	2 عملي
	MPH21015	فيزياء ذرية	3 نظري	2 عملي
	MPH21016	كهرومغناطيسية	3 نظري	لايوجد
	MPH21017	ثرموداينمك	3 نظري	2 عملي
	MPH22018	علم المواد	4 نظري	لايوجد
	MPH22019	فيزياء الليزر	3 نظري	2 عملي
	KUS24020	لغة عربية 2	2 نظري	لايوجد
	KUS24021	لغة انكليزية 2	2 نظري	لايوجد

2 عملي	1 نظري	تطبيقات علم الحاسوب	KUS24022	
2 عملي	3 نظري	تصوير طبي	MPH22023	
2 عملي	2 نظري	فيزياء طبية 1	MPH22024	
لايوجد	2 نظري	احصاء حيوي	MPH31025	2026-2027 / الثالث
لايوجد	3 نظري	فيزياء الاجهزة الطبية 1	MPH31026	
2 عملي	3 نظري	فيزياء طبية 2	MPH31027	
2 عملي	3 نظري	الكترنيات تماثلية	MPH31028	
2 عملي	2 نظري	تشرح	MPH31029	
2 عملي	3 نظري	فيزياء نووية	MPH31030	
لايوجد	3 نظري	فيزياء موجية	MPH32031	
لايوجد	3 نظري	متحسسات بايولوجية	MPH32032	
لايوجد	4 نظري	ميكانيك الكم	MPH32033	
لايوجد	3 نظري	تقنيات العلاج الطبيعى	MPH32034	
2 عملي	2 نظري	الكترنيات رقمية	MPH32035	
2 عملي	3 نظري	فسلجة	MPH32036	
لايوجد	1 نظري	منهجية البحث العلمى	MPH32037	
2 عملي	3 نظري	فيزياء طبية 3	MPH41038	2026-2027 / الرابع
2 عملي	3 نظري	فيزياء اجهزة طبية 2	MPH41039	
لايوجد	4 نظري	الليزر فى الطب	MPH41040	
لايوجد	4 نظري	الوقاية من الاشعاع	MPH41041	
لايوجد	3 نظري	موائع حيوية	MPH41042	
لايوجد	2 نظري	اخلاقيات البحث العلمى	KUS47043	
2 عملي	3 نظري	فيزياء طبية 4	MPH42044	
2 عملي	3 نظري	تحليل ومعالجة صور طبية	MPH42045	
2 عملي	3 نظري	الطب النووى والعلاج الاشعاعى	MPH42046	
لايوجد	3 نظري	فيزياء الاعصاب	MPH42047	
	4 نظري	مشروع التخرج	MPH42048	

8. مخرجات التعلم المتوقعة للبرنامج
المعرفة
1. تطبيق مبادئ الفيزياء في التشخيص والعلاج الطبي. 2. استخدام وتشغيل الأجهزة الطبية والإشعاعية بكفاءة وأمان. 3. تحليل البيانات والصور الطبية باستخدام الأساليب العلمية المناسبة. 4. تطبيق معايير الحماية من الإشعاع وضمان الجودة.

5. إجراء البحوث العلمية وحل المشكلات المهنية.
6. التواصل والعمل بفعالية ضمن فريق رعاية صحية متعدد التخصصات.
المهارات
1 – مهارة استخدام الاجهزة المختبرية .
2 – يكون الطالب قادر على توصيف النماذج والايوساط المختبرية.
3 – يكون الطالب قادر على ربط الاسباب بالمسببات .
القيم
1. استخدام اسلوب الحوار بين الطالب والاستاذ (سمنار).
2. اعداد التقارير الفصلية.
3. مناقشة النتائج الخاصة بالاختبارات.
4. اكتشاف بعض الحقائق العلمية من خلال اجراء التجارب في المختبرات.

9. استراتيجيات التعليم والتعلم
1 – الأختبارات .
2 – الدرجات.
3 – المناقشة .
4- التطبيقات العملية (المختبرات) .
5- الزيارات الميدانية.
6- الورش والندوات والدورات المقامة من قبل القسم والكلية.

10. طرائق التقييم
1 – الدرجات الأمتحانية.
2 – تقييم التقارير.
3 – بحوث التخرج.
4 – تقييم التدريب الصيفي في المؤسسات الصحية.

الرتبة العلمية		التخصص		اعداد الهيئة التدريسية	
		عام	خاص	ملاك	محاضر
د. عامر باسم شعلان/ استاذ		علوم فيزياء	فيزياء نظرية/هوائيات	نعم	
د. صباح ابراهيم عباس/ استاذ		علوم فيزياء	الكهرو بصريات	نعم	
د. جعفر فاضل عودة/ استاذ		علوم فيزياء	فيزياء الليزر والجزيئية	نعم	
د. فاضل كريم فرحان/ استاذ		علوم فيزياء	مواد متقدمة	نعم	
د. بسمة حسين حمد/ استاذ مساعد		علوم فيزياء	بصريات	نعم	
د. اشرف محمد ابراهيم/ استاذ مساعد		علوم فيزياء	ليزر وجزيئية	نعم	

د.نهاد خلف علي/ استاذ مساعد	علوم فيزياء	اغشية رقيقة	نعم
د. علي عبد الامير رشيد/ استاذ مساعد	علوم فيزياء	Electron optics	نعم
د. مازن محمد موات/ استاذ مساعد	علوم فيزياء	فيزياء طبية	نعم
د. عبد المهيمن وسام فخري/ استاذ مساعد	علوم فيزياء	مواد نانوية	نعم
د. مصطفى عبد الكريم محمود/ استاذ مساعد	علوم فيزياء	فيزياء مواد	نعم
د. بلال خالد جاسم/ مدرس دكتور	علوم فيزياء	فيزياء جزيئية وتركيب ذري	نعم
د.نورا انور عبد الزهرة/ مدرس دكتور	علوم فيزياء	بصريات وليزر	نعم
د.علياء ماجد يحيى/ مدرس دكتور	علوم فيزياء	مواد نانوية	نعم
د. نسمة عدنان جبر/ مدرس دكتور	علوم تطبيقية	فيزياء تطبيقية مواد	نعم
د. نورا حكمت مطشر/ مدرس دكتور	علوم فيزياء	الليزر والجزيئية	نعم
م.د. علي كتاب عطية/ مدرس دكتور	علوم فيزياء	مواد نانوية	نعم
د.علياء عبد الرزاق عبد الجبار/ مدرس دكتور	علوم فيزياء	النووية والبينية	نعم
د. مصطفى كاظم عبد الرحمن/ مدرس دكتور	علوم فيزياء	فيزياء مواد	نعم
د. رسل محمد عبد الله/ مدرس دكتور	علوم فيزياء	فيزياء الاغشية الرقيقة	نعم
د. هوليا احمد لفته/ مدرس دكتور	علوم فيزياء	فيزياء الاغشية الرقيقة	نعم
د. حيدر غني عبد الزهرة/ مدرس دكتور	علوم تطبيقية	علوم مواد	نعم
م. كواكب جعفر رشيد/ مدرس	علوم فيزياء	فيزياء طبية	نعم
م.زينب فالح نزال/ مدرس	علوم فيزياء	فيزياء الحالة الصلبة	نعم
د. فرح عبد الكافي لازم/ مدرس دكتور	علوم فيزياء	فيزياء بلازما	نعم
م.م. شيماء علي راهي/ مدرس مساعد	علوم فيزياء	فيزياء نووية	نعم
م.م. اوس خليل محمد/ مدرس مساعد	علوم فيزياء	فيزياء الليزر والكهرو بصريات	نعم
م.م. تبارك محمد عواد/ مدرس مساعد	تربية فيزياء	فيزياء عام	نعم
م.م. محمد عادل اسماعيل/ مدرس مساعد	علوم فيزياء	فيزياء طبية	نعم
م.م. اكرم عبدالله خلف/ مدرس مساعد	علوم فيزياء	فيزياء عام	نعم

م.م. وائل علي سعيد/ مدرس مساعد	علوم فيزياء	نوعية وبيئية	نعم
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التطوير المهني
توجيه أعضاء هيئة التدريس الجدد
يتم توجيه الاعضاء من خلال التكاليفات واللجان
التطوير المهني لأعضاء هيئة التدريس
من خلال اقامة دورات وورش ومحاضرات واشراك الاعضاء في لجان متعددة وتكاليفات مختلفة

11. معيار القبول
1. القبول المركزي 2. قبول الطلبة خريجي الفرع العلمي حصرا 3. المقابلة الشخصية للطلبة 4. استثناء العمر في القبول للدراسات المسائية 5. قبول الطلبة على باب التعليم الموازي. 6. الطاقة الاستيعابية لأقسام الكلية .

12. أهم مصادر المعلومات عن البرنامج
1. وثيقة تخرج الطالب من الاعدادية الصادرة من وزارة التربية 2. نتائج القبول المركزي الصادرة من وزارة التعليم العالي 3. الوثائق الرسمية الشخصية للطلاب (المستمسكات الاربعة او البطاقة الموحدة)

14. خطة تطوير البرنامج
1. الاهتمام بالوقت . 2. الاتزان السلوكي داخل الحرم الجامعي من خلال نشر الوعي الخاص بأنظمة وقوانين انضباط الطلبة داخل الحرم الجامعي. 3. يمكن أن يتطور طالب البكالوريوس من خلال جعله ذات قابلية في أن يكون مساعد فيزيائي او مشغل اجهزة في مختبرات وزارة الصحة او مختبرات القطاع الخاص

مخطط مهارات البرنامج												
مخرجات التعلم المطلوبة من البرنامج												
القيم				المهارات				المعرفة				اساسي أم اختياري
ج4	ج3	ج2	ج1	ب4	ب3	ب2	ب1	أ4	أ3	أ2	أ1	
— +	+	+	+	+	+	— +	+	+	+	+	+	اساسي
— +	+	+	+	+	+	— +	+	+	+	+	+	اساسي
— +	+	+	+	+	+	— +	+	+	+	+	+	اساسي
— +	+	+	+	+	+	— +	+	+	+	+	+	اساسي
— +	+	+	+	+	+	— +	+	+	+	+	+	اساسي
— +	+	+	+	+	+	— +	+	+	+	+	+	اساسي
— +	+	+	+	+	+	— +	+	+	+	+	+	اساسي

— +	+	+	+	+	+	— +	+	+	+	+	+	أساسي	الميكانيك	MPH12007	/2027-2026 الاول
— +	+	+	+	+	+	— +	+	+	+	+	+	أساسي	المغناطيسية	MPH12008	/2027-2026 الاول
— +	+	+	+	+	— +	— +	+	+	+	+	— +	أساسي	برمجة	MPH12009	/2027-2026 الاول
— +	+	+	+	+	+	— +	+	+	+	+	+	أساسي	لغة عربية	KUS12010	/2027-2026 الاول
— +	+	+	+	+	+	— +	+	+	+	+	+	أساسي	لغة انكليزية	KUS12011	/2027-2026 الاول
— +	+	+	+	+	+	— +	+	+	+	+	+	أساسي	فيزياء عام	SCI12012	/2027-2026 الاول
— +	+	+	+	+	+	— +	+	+	+	+	+	أساسي	جرائم نظام البعث بالعراق	KUS23016	/2027-2026 الثاني
— +	+	+	+	+	+	— +	+	+	+	+	+	أساسي	معادلات تفاضلية	MPH21013	/2027-2026 الثاني

— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	بصريات	MPH21014	/2027-2026 الثاني
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	فيزياء ذرية	MPH21015	/2027-2026 الثاني
— +	+	+	+	+	+	— +	+	+	+	+	+	— +	اساسي	كهرومغناطيسية	MPH21016	/2027-2026 الثاني
— +	+	+	+	+	+	— +	+	+	+	+	+	+	أساسي	ثرموداينمك	MPH21017	/2027-2026 الثاني
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	علم المواد	MPH22018	/2027-2026 الثاني
— +	+	+	+	+	+	— +	+	+	+	+	+	+	أساسي	فيزياء الليزر	MPH22019	/2027-2026 الثاني
— +	+	+	+	+	+	— +	+	+	+	+	+	+	أساسي	لغة عربية 2	KUS24020	/2027-2026 الثاني
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	لغة انكليزية 2	KUS24021	/2027-2026

																الثاني
— +	+	+	+	+	+	— +	+	+	+	+	+	+	أساسي	تطبيقات علم الحاسوب	KUS24022	/2027-2026 الثاني
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	التصوير الطبي	MPH22023	/2027-2026 الثاني
— +	+	+	+	+	+	— +	+	+	+	+	+	+	أساسي	فيزياء طبية 1	MPH22024	/2027-2026 الثاني
— +	+	+	+	+	— +	— +	+	+	+	+	+	— +	اختياري	احصاء حيوي	MPH31025	/2027-2026 الثالث
— +	+	+	+	+	+	— +	+	+	+	+	+	+	أساسي	فيزياء الاجهزة الطبية 1	MPH31026	/2027-2026 الثالث
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	فيزياء طبية 2	MPH31027	/2027-2026 الثالث
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	الكرونيات تماثلية	MPH31028	/2027-2026 الثالث

— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	تشرح	MPH31029	/2027-2026 الثالث
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	فيزياء نووية	MPH31030	/2027-2026 الثالث
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اختياري	فيزياء موجية	MPH32031	/2027-2026 الثالث
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اختياري	متحسسات بايولوجية	MPH32032	/2027-2026 الثالث
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اختياري	ميكانيك الكم	MPH32033	/2027-2026 الثالث
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اختياري	تقنيات العلاج الطبيعي	MPH32034	/2027-2026 الثالث
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	الكترونيات رقمية	MPH32035	/2027-2026 الثالث
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	فسلجة	MPH32036	/2027-2026

																الثالث
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	منهجية البحث العلمي	MPH32037	/2027-2026 الثالث
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	اخلاقيات البحث العلمي	KUS47043	/2027-2026 الرابع
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	فيزياء الاجهزة طبية II	MPH41039	/2027-2026 الرابع
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	الليزر في الطب	MPH41040	/2027-2026 الرابع
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	الوقاية من الاشعاع	MPH41041	/2027-2026 الرابع
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	موائع حيوية	MPH41042	/2027-2026 الرابع
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	تحليل ومعالجة الصور الطبية	MPH42045	/2027-2026 الرابع

— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	فيزياء طبية III	MPH41038	/2027-2026 الرابع
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	فيزياء طبية IV	MPH42044	/2027-2026 الرابع
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اختياري	فيزياء الاعصاب	MPH42047	/2027-2026 الرابع
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اساسي	مشروع التخرج	MPH42048	/2027-2026 الرابع
— +	+	+	+	+	+	— +	+	+	+	+	+	+	اختياري	طب النووي والعلاج الاشعاعي	MPH42046	/2027-2026 الرابع

يرجى وضع اشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم

المستوى الأول

Module Description Form

نموذج وصف المادة الدراسية الكهربائية

Module Information			
معلومات المادة الدراسية			
Module Title	Electricity		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	MPH1106		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	1 st
Administering Department	Medical Physics	College	Science
Module Leader	Dr. Amer Basim Shaalan	e-mail	ame72@kus.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/ 5/2026	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The study of electric charge involves differentiating between conductors and insulators and using them to demonstrate the existence of charges. In addition, Coulomb's law will be stated and its expression derived and used in calculations. Along with this, electric field, dipole moments; potential energy; and torque on an electric dipole and flux of electric field will be defined. Their expressions will be derived and also used to solve problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Differentiate between conductors and insulators; 2. Explain charging processes. 3. State, derive and use Coulomb's law to solve problems about electric field and electric potential. 4. Use Gauss' law to a number of kinds of charge distributions in space having high symmetry (spherical, cylindrical, and uniform-plane distribution). 5. Derive the expression for calculating capacitance. 6. Explain the physical basis of Ohm's law and use Ohm's law in solving various problem of resistors connected in parallel and in series.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Unit 1: Electrostatics You'll begin your study of the electric force with an exploration of electric charges. 24 hr's Unit 2: Conductors, Capacitors, Dielectrics You'll explore how electric charge can move through an object and the factors that affect the way charge moves. 24 hr's Unit 3: Electric Circuits You'll build on your knowledge of electrical components to investigate the nature of electric circuits and explore current, resistance, and power. 24 hr's

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, and 5
	Assignments	2	10% (10)	2, 12	LO # 3, 4, and 6
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 3, 4 and 6
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Electric charge, Charge is conserved, Electric Charge and the Structure of Matter
Week 2	Conductors, Insulators, and Induced Charges, Charging an object
Week 3	Coulomb's law.
Week 4	Electric field, A point charge in an electric field, A dipole in an electric field.
Week 5	Flux of the electric field, Gauss's law.
Week 6	Gauss's law and Coulomb law, An insulated conductor.
Week 7	Electric potential, Potential and the electric field, A group of point charges.
Week 8	Potential due to a dipole, Electric potential energy.
Week 9	Capacitance, Calculating Capacitance.

Week 10	Energy storage in an electric field, Parallel plate capacitor with dielectric.
Week 11	Dielectrics and atomic view.
Week 12	Current and current density, Ohm's law-A microscopic view.
Week 13	Electromotive force, Calculating the current.
Week 14	Potential difference.
Week 15	Multi loop circuits.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1-2	Lab 1: Introduction, Measurement, graph drawing and lab safety.
Week 3-4	Lab 2: Verification of Ohm's Low.
Week 5-6	Lab 3: A graphical Method for Calculating Ammeter Resistance.
Week 7	Test 1
Week 8-9	Lab 4: Calculating the Value of Unknown Resistance.
Week 10-11	Lab 5: The Ratio Between Lamp Power Dissipation and Resistance Power Dissipation.
Week 12-13	Lab 6: Capacitor Discharge and Calculating Time Constant.
Week 14	Test 2

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Physics/John D. Cutnell & Kenneth W. Johnson—9th ed.	No
Recommended Texts	Fundamentals of Physics Extended 9th-HQ-Halliday	No
Websites	https://engineeringinterviewquestions.com/electrostatic-electrical-engineering-multiple-choice-questions-and-answers/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية

الكيمياء العام

Module Information معلومات المادة الدراسية				
Module Title	General Chemistry		Module Delivery	
Module Type	Basic		☐ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	SCI11005			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	Semester of Delivery	1	
Administering Department	Medical Physics	College	Science	
Module Leader	Fadhil Muhi Mohammed	e-mail	fadhil.mohammed@kus.edu.iq	

Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	-----	e-mail	-----
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/5/2026	Version Number	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1-To develop skills and understanding of different types of elements through the application of techniques. 2. To understand metals, physical and chemical properties. 3. This course deals with the basic concept of general chemistry. 4. To understand periodic table and distribution elements on it
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the classification of elements. 2. List the various terms associated with periodic table. 3. Summarize what is meant by a basic chemical property. 4. Discuss the reaction and involvement of atoms in chemical reaction. 5. Describe bonds, oxidation number, and Lewis term. 6. Identify the elements according to conductivity and their applications. 7. Discuss the electrons distribution in the atomic levels. 8. Identify the primary terms that used to characterize physical and chemical properties.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A-Circuit Theory Starting from atomic theory and electron distribution in the outer and inner shells the details required make enough information for the principle of chemistry. [15 hrs] Enhance the principle of general chemistry when highlight in more information about losing and acceptance electrons with the abilities for forming any bonds and forming new molecules with new properties. [16 hrs] Periodic table with highlight in the orientations of molecules to show different and variance in properties. [12hrs] Revision problem classes [6hrs] Part B-Analogue chemistry 3-Fundamentals Electron configuration, oxidation number, The ratios of forming molecules. [15hrs] Components and active site. [9 hrs] Identification of general properties.[9 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	To describe the learning activities of the students and the teaching methods of the staff. Effective module design should result in a varied range of active learning experiences for students, including learning activities which are 'research-like'. Activities should, of course, motivate and encourage deep learning (reflection on wider meanings, rather than superficial memorisation of information). They should also be varied and flexible enough to accommodate different learning styles and orientations, and allow for inclusivity of students from different backgrounds and with different kinds of learning abilities. Learning activities therefore need to include reference to independent, interdependent (peer- supported) and online activities, as well as participation in different kinds of taught class.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	100	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	6.66
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation					
تقييم المادة الدراسية					
		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to chemistry
Week 2	Periodic table
Week 3-4	Atomic structure types of bonding
Week 5	Physical and chemistry properties / Drawing Lewis Structures
Week 6	Chemical Reactions
Week 7	Preparation solution (types of concentration)
Week 8	Mid-term Exam
Week 9-10	Acids, Bases and titration
Week 11-12	Titrimetric Methods
Week 13-14	Separation method of elements
Week 15	Preparatory week before the final exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
Week 1	Lab 1: general safety rules for laboratory and equipment
Week 2	Lab 2: Standard solution
Week 3	Lab 3: Preparation of standard solution from liquid solutions
Week 4	Lab 4: Preparation of standard solution from solid materials
Week 5	Lab 5: titration strong acid with strong base
Week 6	Lab 6: titrating sodium carbonate with hydrochloric acid
Week 7	Lab 7: pH-Metric titration
Week 8	Lab 8 : Exam
Week 9	Lab 9 : Conductometric titrating of strong acid with strong base
Week 10	Lab 10: titration of acetic acid in vinegar
Week 11	Lab 11: titration of a mixture of carbonate (CO_3^{2-}) and bicarbonate (NaHCO_3^-)
Week 12,13	Lab 12,13: Separation of I group Cations (Ag^+ , Pb^{2+} , Hg_2^{2+})
Week 14	Lab 14: Exam
Week 15	Lab 14: review all previous experiences
Week 15	Review all previous experiences ,Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	A Textbook of physical chemistry Vol-6 Kapoor, K.L Mcgraw- Hill 2019	Yes
Recommended Texts	Introductory chemistry essentials, Global Edition Tro, N.J. Pearson 2015	No
Websites	https://www.openstax.org/details/books/chemistry-2e https://open.umn.edu/opentextbooks/textbooks/2019	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors

Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module description form

نموذج وصف المادة الدراسية الاحياء العام

Module Information			
معلومات المادة الدراسية			
Module Title	General Biology		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	SCI11004		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	1
Administering Department	Medical Physics	College	Science
Module Leader	Eslah Shakir Rajab	e-mail	Eslah_bio@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	

Scientific Committee Approval Date	1/5/2026	Version Number	
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Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Give a general understanding of the types, divisions, and components of organisms. 2. Understand the effect of organisms on humans and their environments. 3. Gain practical knowledge of the classification of organisms 4. Complete the reports, seminars, and presentations to develop the student's skills.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the most important differences between animals, plants, and microorganisms 2. Identify the processes of evolution in the organisms and the theories of their emergence 3. Statement the divisions of the plant kingdom and the animal kingdom 4. Identify the types of animal and plant tissues 5 Identifying the interdependent relationship between animals and plants.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Part A - Life and science Life - Characteristics of life, The scientific method, Development of the scientific attitude, Biology today, Biology as a science. [22 hrs.] Part B - Different forms of life The kingdoms of organisms - The animals, plants, and Monera, Their structure, Components, Functions, and Classification. [10 hrs.] Revision problem classes. [6hrs.] Part C - Chemistry of life Matter and elements - How elements differ, Structure of matter, Chemical bonding, Ionic bonding, Inorganic compounds, and Organic compounds. [22 hrs.]

	Part D – Cells in Life Cells - The cell theory, The cell and its parts, Prokaryotic, and eukaryotic cells, Compare and contrast between plant and animal cells, The cell membrane/Wall, The cell membrane/Wall structure and function, and The transport of materials across the membrane. [19 hrs.] Part D – Cell life cycle Cell Cycle - Control of cycle, Interphase (Gap I phase, Synthesis phase, and Gap II phase), Mitosis (Prophase, Metaphase, Anaphase, and Telophase), Meiosis. [21 hrs.]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Many strategies will be used in this module to encourage students to learn such as participation in the exercises, seminars, lab experiments, and workshops, as well as using educational videos and electronic to refine and expand their critical thinking skills. This will be achieved through classes, interactive tutorials, and by considering types of simple experiments involving some interesting sampling activities for the students.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب اسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	100	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب اسبوعيا	6.66
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	4, 8	LO #1, 2, 3, 5,6, and 7
	Assignments	2	10% (10)	5, 10	LO # 2, 4, 6, 8, and 9
	Projects / Lab.	1	20% (20)	Continuous	
	Report	1	5% (5)	13	LO # 12
Summative	Midterm Exam	1 hr	10% (10)	7	LO,#1-6
	Final Exam	3hr	50% (50)	15	All

assessment					
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to the life science and characteristics
Week 2	The characteristics of organisms
Week 3	The kingdom of organisms
Week 4	Chemistry of life (1) biological macromolecules in cell
Week 5	Chemistry of life (2) (energy and metabolism)
Week 6	Taxonomy
Week 7	Mid-term Exam
Week 8	Kingdom Monera
Week 9	Cell structure and function
Week 10	Secondary metabolites
Week 11	Genetics
Week 12	Cell life cycle
Week 13	Mitosis
Week 14	Meiosis
Week 15	Final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Microscope
Week 2,3	Lab 2,3: cell structure
Week 4, 5	Lab 4, 5: Cell behavior (osmosis and phagocytosis)
Week 6, 7	Lab 6, 7 Respiration
Week 8,9	Lab 8,9: Photosynthesis

Week10	Lab 10: DNA examination
Week 11,12	Lab 11,12: Secondary metabolites
Week 13, 14	Lab 13, 14 Cell division (Mitosis and Meiosis)
Week 15	Lab 15: A preparatory week before the final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Biology: Concepts and Connections; Campbell, Reece, Taylor, and Simon; Latest edition 2018	No
Recommended Texts	The Science of Biology by Sadava, Hillis, Heller and Berenbaum 9th ed. 2011	No
Websites	https://www.coursera.org/browse/biology-science.	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية

الرياضيات

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	KUS11001		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1 st	Semester of Delivery	1
Administering Department	Medical Physics	College	Science
Module Leader	Ali Kitab Attia	e-mail	ali.kitab@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Ali Kitab Attia	e-mail	ali.kitab@kus.edu.iq
Peer Reviewer Name	Dr. Sabah Ibrahim Abbas	e-mail	sabahibrahim@kus.edu.iq
Scientific Committee Approval Date	1/5/2026	Version Number	1.0

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Learn the different types of functions: polynomial, trigonometric, logarithmic, and exponential functions, and their properties. 2. Learn the inverse of trigonometric, logarithmic, and exponential functions, and the properties of each function. 3. Learn the integration of different types of functions. 4. Learn integration methods for different functions. 5. Learn linear systems and their properties. 6. Learn methods for solving linear systems.

	7. Learn the different types of straight lines, the different types of slope for each, and how to find the equation of a line.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student will be able to identify the types of functions: polynomial, parametric, and exponential, and the properties of each type. 2. The student will be able to identify the inverse of all types of functions. 3. The student will be able to use differentiation rules to find the derivative of a function. 4. The student will be able to use integration methods to find the integral of a function. 5. This course develops the student's ability to discuss the behavior of different functions in differentiation and integration. 6. The student will analyze the results of mathematical problems that use differentiation and integration of functions. 7. Solving mathematical problems with scientific material. 8. Writing scientific reports and analyzing data. 9. Self learning method. 10. Solving problems relevant with mathematical subject. 11. Testing the student's ability to solve mathematical problems related to the subjects he studied.
Indicative Contents المحتويات الإرشادية	1. Introduction to Linear Algebra. 2. Linear system -Linear Equations –Solution Of Linear Equations. 3. Matrix Algebra. 4. Logarithmic function. 5. Trigonometric functions. 6. Exponential function. 7. Techniques of integrations.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lecture Method 2. Practice Examples 3. Discussion 4. Homework 5. Brainstorming

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/week) الحمل الدراسي المنتظم للطالب اسبوعياً	2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	Unstructured SWL (h/week) الحمل الدراسي غير المنتظم للطالب اسبوعيا	5.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125 (h/sem)		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	5% (20)	4,7,9,11	LO#1-3, #4-6,#6-8 and #9-10
	Assignments	5	2% (10)	4,7,9,11,13	LO#1-3, #4-6,#6-8 ,#9-10 and #10-12
	Projects / Lab.				
	Report	1	10% (10)	13	LO#1-2-3-4-5-6-7-8-9-10
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO,#1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

	Material Covered
Week 1	Functions: Trigonometric Functions.
Week 2	Differentiation: Differentiation rule, tangent and derivative, derivative Trigonometric functions, Chan rule.
Week 3	Transcendental function: natural logarithms , properties of logarithmic function , derivation of logarithmic function, Integration of the logarithmic function .
Week 4	Transcendental function: Exponential function, properties of the exponential function derivation and integration of the exponential function, Lhopital rule.
Week 5	Transcendental function: hyperbolic function ,derivation and integration of hyperbolic function
Week 6	Transcendental function: inverse Trigonometric, derivation and integration of inverse Trigonometric.
Week 7	Techniques of integration: integral by part, Trigonometric integral, trigonometric substitution.
Week 8	Techniques of integration: integration of rational function partial fraction, integral table,
Week 9	Matrices - the concept of matrices - some types of matrices- operations on matrices
Week 10	Determinants, Properties of the determinants ,Calculate the determinant of a 2x2 matrix and a nxn matrix.
Week 11	The Inverse - Matrix - Properties Of The Inverse - Matrix, The Transpose Properties.
Week 12	practical - method for finding the Inverse the cofactor method.
Week 13	solution of linear systems using the inverse matrix- the adjutant inverse.
Week 14	solution of linear systems using The Cramer's rule, Gauss_ Jordan Elimination method.
Week 15	Slop of a line, equation of a line, types of line equation.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas Calculus George B. Thomas, Maurice D. Weir, Joel R. Hass , 11th edition Wesley.	non
Recommended Texts	Howard Anton,IrI Bivens & Stephen Davis "Calculus"(2009),9thedition,John Wiley & Sons,NC.	non
Websites	https://rodrigopacios.github.io/mrpacios/download/Thomas Calculu s.pdf	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية

الديمقراطية وحقوق الانسان

Module Information معلومات المادة الدراسية						
Module Title	الديمقراطية وحقوق الانسان		Module Delivery			
Module Type	Basic		☐ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar			
Module Code	KUS 1103					
ECTS Credits	2					
SWL (hr/sem)	50					
Module Level	1	Semester of Delivery		1		
Administering Department	Medical Physics	College	Science			

Module Leader	Mohammed Mahdi Nazaal	e-mail	mohammed.mahdi@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	
Module Tutor	-----	e-mail	-----
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/5/2026	Version Number	

Relation with other Modules			
العلاقة على المواد الدراسية الأخرى			
Prerequisite module	Non	Semester	
Co-requisites module	Non	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	تهدف المادة الى بيان اهمية الحقوق الاصلية للصيغة بالإنسان ، التي تتفق مع فطرته والتي يقبلها العقل المجرد ، والتي لا تختلف باختلاف الزمان والمكان وهذه هي حقوق الانسان .
Module Learning outcomes مخرجات التعلم المادة الدراسية	تسهم المادة العلمية الى تثقيف الطالب من الناحية القانونية، ليكون مطلع على ماهية الحقوق الانسانية واصلها التاريخي و تعريف ماله من حقوق وماعليه من التزامات من خلال معرفة حقه وحدود ذلك الحق وحقوق الاخرين ، وماسعت اليه الدول والمنظمات الدولية والاقليمية في تعزيز مفاهيم تلك الحقوق ، والزام الدول للنص عليها في التشريعات الداخلية والضمانات التي تكفل تطبيق تلك الحقوق .
Indicative Contents المحتويات الارشادية	ان المحتويات الارشادية لمادة الديمقراطية وحقوق الانسان تتلخص بتهذي الطالب (15 ساعة) وتعريفه ان تعامله مع غيره من بني البشر يقوم على مبدأ (أن الناس صنفان ، إما اخ لك في الدين أو نظير لك في الخلق (15 ساعة)

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	نعمد في هذا الجانب إلى ما يلي : 1. يعرف الطالب إبتداءً بمضمون موجز عن المفردات التي سيتم تناولها خلال المحاضرة ، ثم توجه له بعض الاسئلة التي تحرك ذهنه ، وتشد إنتباهه ، لضمان حسن الاستماع .

	2. يتم التعمق بشرح المفردات العلمية في حدود تناسب متوسط المستويات العلمية لضمان عدم تجاوز الفروق الفردية عند عموم الطلبة . 3. يتم ترك مساحة للنقاش الحر في إطار الموضوع المخصص للمحاضرة. 4. الحرص على جانب التغذية الراجعة للمعلومات قبل نهاية المحاضرة. 5. التواصل إلكترونياً مع الطلبة لنشر المحاضرات المسجلة ، والمكتوبة من خلال الموقع الرسمي للجامعة.
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Student Work load (SWL) الحمل الدراسي للطلاب ل 15 اسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	30	Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	20	Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	1.3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	Lo #1,#2,#10 and 11
	Assignments	2	10% (10)	2 and 12	Lo #3,#4,#6, and #7
	Projects / Tutorial	1	10%(10)	Continuous	All
	Report	1	10% (10)	13	Lo #5, #8 and #10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	Lo #1-7
	Final Exam	2hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered

Week 1	تعريف وطبيعة حقوق الانسان
Week 2	التطور التاريخي لحقوق الانسان
Week 3	مميزات حقوق الانسان عن غيرها من الحقوق
Week 4	حقوق الانسان في الديانات السماوية
Week 5	حقوق الانسان في المواثيق الدولية
Week 6	حقوق الانسان في التشريعات الداخلية
Week 7	حقوق الانسان الشخصية
Week 8	حقوق الانسان الاجتماعية
Week 9	حقوق الانسان الثقافية
Week 10	حقوق الانسان الاقتصادية
Week 11	ضمانات حقوق الانسان الدولية
Week 12	ضمانات حقوق الانسان الاقليمية
Week 13	ضمانات حقوق الانسان الداخلية (الوطنية)
Week 14	الجزاء المترتبة على المساس بحقوق الانسان
Week 15	امتحان نهائي

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	حقوق الانسان (تطورها ، مضامينها ، حمايتها) / د. رياض عزيز هادي	Yes
Recommended Texts	حقوق الانسان / د. حميد حنون	
Websites	https://www.noor-book.com/ https://www.un.org/ar/about-us/universal-declaration-of-human-rights https://ar.wikipedia.org/wiki	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings

	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية

اساسيات علم الحاسوب

Module Information				معلومات المادة الدراسية	
Module Title	Fundamental of Computer Science		Module Delivery		
Module Type	Basic		☐ Theory		
Module Code	KUS11002		☒ Lecture		
ECTS Credits	3		☒ Lab		
SWL (hr/sem)	75		☐ Tutorial ☐ Practical ☐ Seminar		
Module Level	1	Semester of Delivery	1		
Administering Department	Medical Physics	College	Science		
Module Leader	Dr. Nora Hikmat Mutasher	e-mail	dr.nora.hikmat@kus.edu.iq		
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.		
Module Tutor	Lecturer Eng. Ahmed Sobri	e-mail	eng.ahmed.sabri@kus.edu.iq		
Peer Reviewer Name		e-mail			
Scientific Committee Approval Date	1/09/2025	Version Number			

Relation with other Module			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The computer course includes in the theoretical side the basics of computers, as well as a brief historical summary on the development and generations of computers also Computer Types. A detailed explanation of the Computer Components (Hardware and Software); addition to the student's definition of Numbers Systems (Decimal & Binary); the last axis comes about introducing the student to the Internet and the Intranet. As for the practical side, the student is taught the ready-made basic programs that include Microsoft Office and the Windows operating system, as the course includes practical hours, so the most important output is the student's mastery in dealing with the calculator as an easy tool to work with.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes of studying medical image analysis include: 1. Defining computer components (hardware and software) to the students. 2. Explaining input and output devices to the students. 3. Enabling students to recognize different types of memory. 4. Teaching students about number systems and how to convert between decimal and binary. 5. Defining the Internet and Intranet to students and discussing the similarities and differences between the two. 6. Providing hands-on experience with basic programs, including Microsoft office and the Windows operating system, to students.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A</u> Introduction to Computer, Definition of Computer, Computer History, Generations of Computers, Categories of Computer. [4 hrs] <u>Part B</u> Computer Components, Software. [4 hrs] <u>Part C</u> Computer Components, Hardware, Input Devices, Output Devices, Components of the System Unit, Central Processing Unit (CPU), Memory. [4 hrs] <u>Part</u>

	<u>D</u>
	Hardware, Cache Memory, Primary, Memory (Main Memory), Random Access Memory, Read Only Memory, Secondary Memory, Memory Units, Storage Devices. [8 hrs]
	<u>Part E</u>
	Numbers Systems, Decimal Number System, Binary Number System, Convert Decimal to Binary System, Examples, Convert Binary to Decimal System, Examples. . [6 hrs]
	<u>Part F</u>
	Defining Internet and Intranet, Types of Computer Network, Computer network. [4 hrs]

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	In order to enable students to learn computer skills effectively, here are some strategies that can be employed: 1. Provide hands-on activities: Incorporate hands-on activities, projects, and exercises to engage students actively in the learning process. Practical application of concepts helps students understand how computers work and reinforces their understanding. 2. By using visual aids and interactive resources: Utilize visual aids, diagrams, charts, and interactive resources like educational software, simulations, and coding platforms to make abstract concepts more tangible and engaging. 3. Foster a collaborative learning environment: Encourage students to work in teams or pairs on projects or coding exercises. Collaborative learning allows students to share ideas, help one another, and learn from different perspectives. 4. Personalize the learning experience: Recognize that students have different learning styles and paces. Provide opportunities for individualized learning, allowing students to progress at their own speed and explore topics of interest to them. Tailor the learning experience to accommodate diverse learning needs. 5. Encourage exploration and experimentation: Encourage students to explore and experiment with different programming languages, tools, and technologies. Let them pursue their own coding projects and interests. This fosters curiosity and self-directed learning. 6. Connect with real-world applications: Demonstrate how computer skills are applied in various fields and industries. Show examples of how coding is used in creating websites, mobile apps, robotics, or data analysis. Connecting computer skills to real-world applications can motivate students and help them understand the practical significance of what they are learning. Through updated with technology trends: Stay abreast of the latest technology trends, tools, and programming languages. Integrate relevant and up-to-date content into the curriculum to ensure students are learning skills that are in demand in the job market. 7. It is important to create a supportive and inclusive learning environment where students feel encouraged to ask questions, take risks, and explore their interests. By implementing these strategies, we can help students develop a solid foundation in computer skills and foster their passion for technology.

Student Workload (SWL)				الحمل الدراسي للطالب
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	2	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75			

Module Evaluation						تقييم المادة الدراسية
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome	
Formative assessment	Quizzes	2	5% (5)	4, 8	LO # 1,2,3,5,6, and 7	
	Assignments	2	10% (10)	10, 14	LO # 8, 9, 11,12 and 13	
	Projects / Lab.	1	20% (20)	Continuous		
	Report	1	5% (5)	15	LO # 4,14	
Summative assessment	Midterm Exam	1hr	10% (10)	9	LO # 1-8	
	Final Exam	3hr	50% (50)	15	All	
Total assessment			100% (100 Marks)			

Delivery Plan (Weekly Syllabus)		المنهاج الأسبوعي النظري
	Material Covered	
Week 1	Introduction to Computer, Definition of Computer	
Week 2	Computer History, Generations of Computers,	
Week 3	Categories of Computer.	
Week 4	Computer Components, Software	
Week 5	Computer Components, Hardware, Input Devices	
Week 6	Computer Components, Hardware, Output Devices	
Week 7	Computer Components, Hardware, Components of the System Unit, Central Processing Unit (CPU), Memory	
Week 8	Hardware, Cache Memory, Primary, Memory (Main Memory)	
Week 9	Hardware, Random Access Memory, Read Only Memory	

Week 10	Hardware, Secondary Memory, Memory Units, Storage Devices
Week 11	Numbers Systems, Decimal Number System, Binary Number System
Week 12	Numbers Systems, Convert Decimal to Binary System, Examples
Week 13	Numbers Systems, Convert Binary to Decimal System, Examples
Week 14	Defining Internet and Intranet, Types of Computer Network, Computer network
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Windows 10: An introduction to windows 10, The start menu, Notification pane and action center.
Week 2	Lab 2: Cortana, Microsoft edge, Use multiple desktops, Tablet mode, The settings App.
Week 3	Lab 3: Microsoft word 2016: An introduction to Microsoft Word 2016, Starting Word, The Home Ribbon: Using Paragraph Styles, Bold, Italic & Underlined, Superscript & Subscript, Highlighting Text, Text Colour, Text Justification, Paragraph Indents, Bullet Lists, Numbered Lists, Cut, Copy & Paste.
Week 4	Lab 4: The Insert Ribbon: Inserting Symbols, Equations, Cover Pages, Adding Images, Adding Effects to Images, Cropping Images, Wrap Text around Images, Adding Tables, Formatting Tables, Add a Column, Insert a Row, Resizing Rows & Columns, Headers and Footers, Inserting Headers & Footers, Editing Headers & Footers.
Week 5	Lab 5: Page Numbering: The Design Ribbon (Page Borders, Page Color, Watermarks, Page

	Numbering: The Page Layout Ribbon, Page Setup, The References Ribbon, The Mailings Ribbon, The Format Ribbon, File Backstage, Saving Documents, Saving as a Different Format, Opening Saved Documents, Printing Documents.
Week 6	Lab 6: Microsoft Excel 2016: An introduction to Microsoft Excel 2016, Starting Excel, The Home Ribbon, The Insert Ribbon, The Page Layout Ribbon, The Formulas Ribbon, The Data Ribbon, The Review Ribbon, The View Ribbon, File Backstage, Introduction to a Spreadsheet, Entering Data.
Week 7	Lab 7: Simple Text Formatting, Text Orientation, Resizing Rows and Columns, inserting Rows & Columns, Cut, Copy & Poste, Sorting Data, Formatting Spreadsheet, Cell Alignment, Text Format, Cell Borders, Using Formulas, Using Functions, Count, Count IF, Auto Sum, Average, Max & Min, IF Function, Adding Charts, Change Chart Type.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Ata Elahi, "Computer Systems, Digital Design, Fundamentals of Computer, Architecture and Assembly Language", Springer International Publishing AG 2018. 2- Peter Norton "Introduction to Computers", sixth Edition, 2008, ISBN-13:978-0-07-059374-9. 3- B. Hemanta, Computer Fundamental, Stratford College London, pp.1-20. 4- R Mansfield, "Mastering VBA for Microsoft Office", 2019, 944 Pages.	Yes
Recommended Texts	1- Steven Freund, Gary B. Shelly, Thomas J. Cashman, Misty Vermaat, Introduction to Computers, Eighth Edition, 2012, ISBN10 143908131X, ISBN13 9781439081310	No
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	تميز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية المغناطيسية

Module Information			
معلومات المادة الدراسية			
Module Title	Magnetism		Module Delivery
Module Type	Core		☐ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MPH12008		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	2 nd
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Nihad K. Ali		e-mail: nihad@kus.edu.iq
Module Leader's Acad. Title	Assoc. Prof	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	/ /2023	Version Number	1.0

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This unit is designed to provide experiences for the student that will lead him/her into an understanding of the similarities and differences among electric, magnetic, and gravitational fields. The inquiry projects used here will support instruction in electrical circuits, gravitational dynamics, and electromagnetic phenomena of all sorts. The students will know how to demonstrate magnetic field and interaction using magnets, and current-carrying wire, show the influence of the magnetic field by a moving charge using a oscilloscope, and demonstrate the electromagnetic induction/ Faraday's law using simple materials
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Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define the terms: magnetic field, magnetic flux and flux density 2. Explain and draw magnetic field lines associated with current carrying conductors, and explain the principles of instruments based in it; 3. Explain the principles of an oscilloscope; 4. State, explain and use Faraday's law of electromagnetic induction; 5. Derive expression for force on a current-carrying wire in a magnetic field 6. Relate the force (F) to velocity (v), charge (q) and magnetic field (B) 7. How electromotive force induced.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to the magnetic field, Magnetic flux and Calculating the magnetic field. (18 hrs) Motion of charged particles in magnetic fields, The Torque on a Current-Carrying Coil. (12 hrs) Ampere's law. Applications of ampere's law. (15 hrs) Magnetic field of current. Biot- Savart law. (12 hrs) Induced electric field. Lens's law. Inductance. (15 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية				
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome

Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	➤ The magnetic field 1- Magnetism 2- The magnetic field
Week 2	➤ Magnetic field lines - Magnetic flux
Week 3	➤ Calculating the magnetic field.
Week 4	➤ Motion of charged particles in magnetic fields
Week 5	➤ The Torque on a Current-Carrying Coil.
Week 6	➤ Ampere's law - Applications of ampere's law
Week 7	➤ Magnetic field of current 1- Sources of magnetic field 2- Magnetic field of moving charge.
Week 8	➤ Magnetic field of current element ➤ Biot- Savart law.
Week 9	➤ Magnetic field of a long straight conductor 1- Force between parallel Conductors
Week 10	➤ Magnetic field of circular loop.
Week 11	➤ Induced electromotive force - Faraday's law.
Week 12	➤ Induced electric fields - Lens's law.
Week 13	➤ Inductance 1- Mutual and self-inductance 2- Energy in an inductor

Week 14	➤ R-L circuit
Week 15	➤ L-C circuit
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Hall Effect, and Gauss Meter
Week 2	Lab 2: Measurement of the Earth's Magnetic Field
Week 3	Lab 3: Magnetic Field Induced by a Current-Carrying Wire
Week 4	Lab 4: Biot -Savart Law, the relation between magnetic field and distance.
Week 5	Lab 5: Biot -Savart Law, the relation between current and magnetic field
Week 6	Lab 6: Current Balance
Week 7	Lab 7: The Transformer

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Physics/John D. Cutnell & Kenneth W. Johnson—9th ed.	No
Recommended Texts	Fundamentals of Physics Extended 9th-HQ-Halliday	No
Websites	https://engineeringinterviewquestions.com/electrostatic-electrical-engineering-multiple-choice-questions-and-answers/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية الفيزياء العام

Module Information			
معلومات المادة الدراسية			
Module Title	General Physics		Module Delivery
Module Type	Supported		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	SCI12012		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	2
Administering Department	Medical Physics	College	Science
Module Leader	Dr. Ali Kitab Attia	e-mail	ali.kitab@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Ali Kitab Attia	e-mail	ali.kitab@kus.edu.iq
Peer Reviewer Name	Dr. Sabah Ibrahim Abbas	e-mail	sabahibrahim@kus.edu.iq
Scientific Committee Approval Date	1/5/2026	Version Number	2

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims	
أهداف المادة الدراسية	1. To have knowledge about General Physics basic principles like Mechanics of liquid and material properties.

	- To get skills in solving mathematical problems that related to physics subjects. - To get practical skills in managing physics experiments in the lab. and record measurements and then calculate required quantities. - Analysis the physical information in syllabus and be able to make conclusions by joining between physical concepts. - To be able to apply his knowledge in physics in market.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Save in memory basic principles and laws of Fluids and material properties. - Produce scientific concepts by joining between physical principles. - Joining physical concepts to produce more complicated concepts. - The ability to make conclusions by analysis the physical information. - The ability to apply all his knowledge to solve problems in reality. - To be able to run the devices and apparatus in the lab. - Assemble devices and make an experiment to prove physical relation. - Discuss the results get from running experiment in the lab. - Make reports from theory to conclusion about any physical concept proved in the lab.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - You will begin your study with Fluid Properties like density and pressure - You will learn how to measure the Pressure and Pressure varying with depth - You will learn Pascal and Archimedes principles - You will study Fluid dynamics and Bernoulli equation - You will study thermal Physics (heat, internal energy and specific heat) - You will study kinetic theory of gases

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, online lectures and home works and by considering type of simple experiments involving some sampling activities that bring attention of the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6

Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	175
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Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4,6	LO #1, 2
	Assignments	2	10% (10)	2, 12	LO # 3, 4, and 5
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 9
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Fluid Mechanics: Fluid Density and Pressure
Week 2	Measuring Pressure
Week 3	Heat Engines and Efficiency
Week 4	Archimedes principle of Buoyancy, Pascal principle
Week 5	Fluid dynamics and Bernoulli's Equation
Week 6	Surface tension
Week 7	Exam
Week 8	Thermal Physics: Heat and internal energy
Week 9	Specific Heat , Phase Changes and Latent Heat
Week 10	Energy transfer
Week 11	Applications of Energy transfer
Week 12	Calorimeter
Week 13	Ideal gases , Real Gases vs. Ideal Gases
Week 14	Kinetic theory of gases , Applications of Kinetic theory of gases
Week 15	Laws of Thermodynamics
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1,2	Lab 1,2: Introduction to diagrams and report writing
Week 3,4	Lab 3,4: Surface tension
Week 5,6	Lab 5,6: Center of Pressure
Week 7,8	Lab 7,8: Flow Through a Venturi Meter
Week 9,10	Lab 9,10: Measure the specific Heat capacity of liquid by method of cooling
Week 11,12	Lab 11,12: Measure the specific Heat capacity of Copper by Calendar method
Week13,14	Lab 13,14: Determination of coefficient of apparent cubic expansivity of a liquid
Week 15	Lab 15: Measure of Specific Heat capacity of Metal by method of mixtures

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Applied Physics by Schaum 2013	No
Recommended Texts	Physics for scientists and engineers by Serway 2004.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية

الميكانيك

Module Information			
معلومات المادة الدراسية			
Module Title	Mechanics		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ seminar
Module Code	MPH12007		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	2	Semester of Delivery	2
Administering Department	Medical Physics	College	Sciences
Module Leader	Dr. Rusul Mohammed Abdullah	e-mail	rusul.mohammed@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/6/2026	Version Number	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To develop an understanding of the fundamentals of mechanics. 2. To develop problem solving skills in mechanics through the application of concepts in statics and dynamics to real world problems. 3. To introduce the standards and associated measurements that regulate the use of mechanics. 4. To provide reinforcement of learning using laboratory investigations.
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Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define the meaning of mechanics. 2. Develop a clear understanding of basic physical phenomena in thermal physics and materials science as an integral part of the student's overall education 3. Compare between vectors and scalar quantities. 4. Calculate and find the displacement, velocity and acceleration of bodies. 5. Use algebra, trigonometry, and basic calculus, in solving problems in one and two dimensions motion. 6. Provide detailed and accurate description of forces effect on bodies. 7. Classify the energy types. 8. Calculate the work done on subject.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Vectors and scalars</u> Learn the differences between scalars and vectors quantity. The mathematical process that done on vectors quantities. [25 hrs] <u>Part B- motion</u> The differences between distance and displacement, speed and velocity. The motion in one dimension. The motion in two dimensions. The uniform circular motion. Non uniform circular motion. [30 hrs]. <u>Part C- forces:</u> Newton's laws in motion. Weight force, friction force, drag force. Nature force [25hrs] <u>Part D- work and energy:</u> Work done on subject. Kinetic energy. Potential energy. Spring. The power [17 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course will be delivered through a combination between theoretical lectures in the classroom and experimental lectures in the Lab. The students will be receive the outcome of each lecture through discussions, videos related to the subject and questions. In addition, the information will be developed by self-learning through reading and searching to hand in the essay and home works.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem)	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	LO#1,2,10 and 11
	Assignments	2	10% (10)	2,12	LO#3,4,6 and 7
	Projects / Lab.		10% (10)	Continuous	
	Report	1	10% (10)	13	LO#5,8, and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO,#1-7
	Final Exam	3hr	50% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Vectors and scalar
Week 2	Unit victors.
Week 3	Motion in one dimension
Week 4	Motion in two dimensions
Week 5	Uniform circular motion.
Week 6	Force and motion: Newton's laws.
Week 7	Midterm exam.
Week 8	Forces types
Week 9	Work
Week 10	Energy, kinetic energy
Week 11	Potential energy
Week 12	Power
Week 13	Momentum
Week 14	Collision in one dimension
Week 15	Collision in two dimensions
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المناهج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to the mechanics lab: safety and training
Week 2	How can we draw graph in mechanics lab?
Week 3	The simple pendulum
Week 4	Hooke's law
Week 5	The linear air track: Part 1
Week 6	The linear air track: Part 2
Week 7	Young's modulus

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Jearl Walker "fundamental of physics" (2005), 8 th edition.	Available online
Recommended Texts	Hans C. Ohanian, John T. Markert "physics for engineers and scientists "(2009), 3rd edition.	Yes
Websites	Various lectures and lecture notes on the internet.	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية برمجة حاسوب

Module Information			
معلومات المادة الدراسية			
Module Title	Computer Programing		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MPH12009		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	First	Semester of Delivery	2 nd
Administering Department	Medical Physics	College	Science
Module Leader	Maysara Aljaf	e-mail	Maysara.aljaf@kus.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Maysara Aljaf	e-mail	Maysara.aljaf@kus.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/05/2026	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	First
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims	1. This course provides a manual to operate MATLAB. It presents a detailed course of MATLAB code capabilities required for general programming.
أهداف المادة الدراسية	

	2. MATLAB is a high-performance language of technical computing. It integrates calculation, visualization and programming in an easy-to-use environment where problems and solutions are expressed in writing programs and implementing algorithms through the graphical user interface. MATLAB is an interactive system whose basic data element is an arrays that does not require dimensions. This allows solving many technical computing problems, especially those with matrix and vector formulations. 3. This course includes interactive lectures and practical applications to enable the student to apply algorithms for image processing and apply enhancement methods. In addition, it enables the student to rotate and scale the image by applying many examples.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes of studying computer programing include: 10. Providing the student with cognitive skills from the basic concepts of programming language and enables them to the skills to run the MATLAB program and dealing with the MATLAB windows and all the types of Statements. 11. Enables students to understood and run all Statements (Loop, Control, Branch), reading and writing data file. 12. Providing the student with cognitive skills to deal with operations with Arrays or Matrices. 13. Providing the student with skills in the technique of dealing with ready-made functions in the language of MATLAB. 14. Providing the student with skills in the Plotting Capabilities, Subplots, 2D Plotting, 3 D Plotting 15. Enables students to deal with the Files: M-files, and functions. 16. They will also learn about algorithms and how to apply them to solve problems. 17. Additionally, they will acquire skills in opening graphical interfaces using the GUIDE UI. 18. Furthermore, the course will cover the types of images and their importance in processing. 19. Students will be provided with digital image processing skills in the MATLAB language.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A</u> Logical Operators, Algorithms and Control Structures, Advantages of algorithm. [5 hrs] <u>Part B</u> MATLAB Windows: Window layout, Command Windows, History Window, Workspace Window, Editor Window, Figure Window, General MATLAB Code: Types of Statements, Rules for Statement Editing, Arithmetic Statement. Constant Value, Variables, Numerical. Variable, Logical Variable, Character Variable, Arrays and Matrices: Index Concept Numerical Arrays and Matrices, Operations on one Arrays or Matrices, N-Dimension Matrices, Logical Arrays, character and String Variables. [12 hrs]

	<u>Part C</u> Operators, Expression, Loop Statement, Control Statement, Branch Statement, reading and writing data file, Plotting: , Plotting Elementary Function- XY- plotting functions, Generating Sub-Plots, Create Line Plot from Matrix, Specify Line Style, Specify Line Style and Color, Specify Line Width, and Color, Add Title and Axis Labels. [12 hrs] <u>Part D</u> Functions & Files, a) Elementary Mathematical Functions, b) User Defined Functions ,c) Advanced Function Programming ,d) Working with Data Files, Introduction to Graphical User Interfaces (GUI) using GUIDE ,Set the Window Size in GUIDE, Layout the Simple GUIDE UI. [10 hrs] <u>Part E</u> Programming Techniques: Image Types , •Indexed images, •Intensity (or grayscale) images, •RGB (or truecolor) images, Convert signals from an image sensor into digital images, Examples ,Convert Between Image Types, Convert Between Data Types. [8 hrs] <u>Part F</u> Image Rotation and Scale, Examples, Define Image Processing, Image processing in MATLAB, Read Image, Show Image, Examples, Improve clarity, and remove noise and other artifacts, (Enhancement methods in image processing). [8 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	When it comes to teaching computer programming, it is important to use strategies that engage students, promote active learning, and facilitate the development of problem-solving and critical-thinking skills. Here are some effective teaching strategies for computer programming: 1. Hands-on coding practice: must provide ample opportunities for students to write code and practice programming through assign coding exercises, projects, and challenges that allow students to apply the concepts they have learned. 2. Pair programming: should encourage students to work in pairs, with one student as the "driver" who writes the code and the other as the "navigator" who reviews the code and offers suggestions. This collaborative approach promotes active learning, communication, and problem-solving skills. 3. Code reviews and feedback: Regularly review and provide feedback on students' code. Offer constructive criticism and guidance on how to improve their programming skills. Encourage students to review and provide feedback to their peers, fostering a culture of collaboration and continuous improvement. 4. Project-based learning: Assign projects that require students to design and develop software applications or solve real-world problems using

	programming. Project-based learning provides a context for applying programming skills, encourages creativity, and promotes deeper understanding of programming concepts. - Demonstrate coding practices: Model good coding practices by writing clean, well-structured code. Explain the reasoning behind coding decisions, such as variable names, code organization, and documentation. Show examples of code refactoring and optimization to help students understand the importance of writing efficient code. - Use visual aids and interactive resources: Utilize visual aids, diagrams, flowcharts, and interactive programming environments to explain programming concepts. Visual representations can help students grasp abstract concepts and understand program flow. - Real-world examples and applications: Connect programming concepts to real-world examples and applications. Illustrate how programming is used in various domains, such as web development, mobile app development, data analysis, or game development. This helps students understand the practical applications of programming and fosters motivation. - Updated with technology trends: Stay informed about the latest programming languages, frameworks, and tools. Integrate current and relevant examples into your teaching to expose students to industry-relevant skills.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	4	LO # 1, 2,3,7 and 11
	Assignments	2	10% (10)	5,7,14	LO # 4, 5,6,10,11,12 and 13
	Projects / Lab.	1	20% (20)	Continuous	
	Report	1	5% (5)	10	LO # 8 and 9
Summative assessment	Midterm Exam	1hr	10% (10)	9	LO # 1-8
	Final Exam	3hr	50% (50)	16	All

Total assessment	100% (100 Marks)		
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Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Logical Operators, Algorithms and Control Structures, Advantages of algorithm, Examples
Week 2	MATLAB Windows: Window layout, Command Windows, History Window, Workspace Window, Editor Window, Figure Window.
Week 3	General MATLAB Code: Types of Statements, Rules for Statement Editing, Arithmetic Statement. Constant Value, Variables, Numerical. Variable, Logical Variable, Character Variable.
Week 4	Arrays and Matrices: Index Concept Numerical Arrays and Matrices, Operations on one Arrays or Matrices, N-Dimension Matrices, Logical Arrays, character and String Variables.
Week 5	Operators, Expression, Loop Statement, Control Statement, Branch Statement, reading and writing data file.
Week 6	Plotting: , Plotting Elementary Function- XY- plotting functions, Generating Sub-Plots, Create Line Plot from Matrix, Specify Line Style, Specify Line Style and Color, Specify Line Width, and Color, Add Title and Axis Labels.
Week 7	Functions & Files, a) Elementary Mathematical Functions, b) User Defined Functions ,c) Advanced Function Programming ,d) Working with Data Files .
Week 8	Introduction to Graphical User Interfaces (GUI) using GUIDE
Week 9	Set the Window Size in GUIDE, Layout the Simple GUIDE UI
Week 10	Programming Techniques: Image Types , •Indexed images, •Intensity (or grayscale) images, •RGB (or truecolor) images.
Week 11	Convert signals from an image sensor into digital images, Examples
Week 12	Convert Between Image Types, Convert Between Data Types, Examples
Week 13	Image Rotation and Scale, Examples
Week 14	Define Image Processing, Image processing in MATLAB, Read Image, Show Image, Examples
Week 15	Improve clarity, and remove noise and other artifacts, (Enhancement methods in image processing) , Examples
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	Lab 1: MATLAB Windows, example of Constant Value, Variables, Numerical. Variable, Logical Variable, Character Variable.
Week 2	Lab 2: Examples of Arrays and Matrices: Index Concept Numerical Arrays and Matrices, Operations on one Arrays or Matrices, N-Dimension Matrices, Logical Arrays, character and String Variables.
Week 3	Lab 3: Examples of Operators, Expression, Loop Statement, Control Statement, Branch Statement, reading and writing data file.
Week 4	Lab 4: Examples of Plotting: , Plotting Elementary Function- XY- plotting functions, Generating Sub-Plots, Create Line Plot from Matrix, Specify Line Style, Specify Line Style and Color, Specify Line Width, and Color, Add Title and Axis Labels.
Week 5	Lab 5: Functions & Files, Introduction to Graphical User Interfaces (GUI) using GUIDE ,Set the Window Size in GUIDE, Layout the Simple GUIDE UI
Week 6	Lab 6: Programming Techniques: Image Types , •Indexed images, •Intensity (or grayscale) images, • RGB images, Convert signals from an image sensor into digital images, Examples.
Week 7	Lab 7: Examples of convert between Image Types, Convert Between Data Types, Examples of Image Rotation and Scale, Read Image, Show Image.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Matlab: Numerical Computing, Tutorial point, 2014. 2- Alasdair McAndrew, An Introduction to Digital Image Processing with Matlab, Notes for SCM2511 Image, Processing 1, Semester 1, 2004, School of Computer Science and Mathematics, Victoria University of Technology. 3- The MathWorks, Image Processing Toolbox For Use with MATLAB, Version 2, COPYRIGHT 1993 - 2000.	Yes
Recommended Texts	1- Brian R. Hunt, Ronald L. Lipsman, Jonathan M. Rosenberg, R. Coombes, John E. Osborn, and Garrett J. Stuck, A Guide to MATLAB for Beginners and Experienced Users, Cambridge, University Press, 2001	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية اللغة الانكليزية

Module Information			
معلومات المادة الدراسية			
Module Title	English Language		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	KUS12011		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1 nd	Semester of Delivery	
Administering Department	Medical Physics	College	Science
Module Leader	Dr. Jaafer Fadhel Odah		e-mail
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/ 5/2026	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	a. to enable the learner to communicate effectively and appropriately in real life situation; b. to use English effectively for study purpose across the curriculum; c. to develop interest in and appreciation of Literature; d. to develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing; e.to revise and reinforce structure already learnt
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enhance the efficiency of student to use many reference or books which reported in English language. 2. To develop the competence that students need to read a wide range of general and academic texts in English. 3. To develop students competence in reference skills [locating and evaluating information needed for assignments in a library. 4. demonstrate adequate general and detailed comprehension of a range of advanced general and academic texts 5. undertake research in an academic library
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Attention will be given to both grammatical form and communicative function. Controlled practice will be given to consolidate form and meaning. Classroom activities will be designed to maximize active participation and use of the target language. The Language Labs will be used for students to work on their own individual needs and problems. Students' language skills will improve through completion of a range of tasks, both individual and group-based. In this programme module the Teacher / Tutor will ensure that the Learner uses correct pronunciation and grammatical constructions , to include: sentence connectors, for example, and, or, with, but, then question words, for example, why, where, who, when when communicating in the English language. An ability to read a minimum of 10 introductory level reading texts, on both social information and work-related information. In reading the texts, the Learner will complete tasks to demonstrate an understanding of the context and content of the text An ability to read the message being communicated in a minimum of 6 common such as name, address, phone number, age, date of birth The collection of work may include work sheets, cloze tests, multiple choice statements or other appropriate evidence in the form of written, oral, graphic, audio, visual or any combination of these. Any audio or video evidence must be provided on tape. Make different activity for the student to be able to use huge amount of sources such report, books, journals to enhance the abilities and skills. Revision problem classes [6 hrs] Part B - Develop the toking and spooking skills

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Use will be made of individual, pair and groupwork to develop students abilities to read increasingly complex academic and general texts. Other skills will be practised and developed within this modules and students will be expected to work extensively out of class to develop their reading fluency. Students will study the specialist vocabulary in the context of published listening and reading materials produced particularly for these ESP situations and also explore lexis within authentic sources. Groups will be managed according to specialist areas and students will be expected to work extensively outside class contact time. Emphasis will be placed on integrating this module to work done within the International Foundation option module programme
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Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem)	33	Structured SWL (h/w)	2
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)	17	Unstructured SWL (h/w)	1
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem)	50		
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2
	Assignments	2	10% (10)	2, 12	LO # 3,4, and 5
	Projet	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 2,3
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Reading Comprehension
Week 2	Writing I
Week 3	Writing I
Week 4	Learning English through Literature

Week 5	Advanced Reading
Week 6	Linguistics
Week 7	Exam
Week 8	Advanced Writing
Week 9	Grammar I
Week 10	Grammar II
Week 11	Introduction to Literature
Week 12	Debate and Dialogue
Week 13	General Translation
Week 14	Listening & Speaking
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Haarman et al. <i>Reading Skills for the Social Sciences</i> . OUP Cotton, D. et al. <i>Business Class</i> . Nelson	No
Recommended Texts	An appropriate selection of Collins Specialist English Dictionaries, ArangeofA-leveltypeStudyGuides	No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف مادة

اللغة العربية

Module Information			
معلومات المادة الدراسية			
Module Title	اللغة العربية		Module Delivery
Module Type	Basic		☐ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	KUS12010		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	Semester of Delivery	2
Administering Department	Medical Physics	College	Science
Module Leader	Dr. Ahmed kahlaf	e-mail	Ahmed.k@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	-----	e-mail	-----
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/5/2026	Version Number	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- تعلم العربية السليمة كونها اللغة الرسمية للوطن 2- اللغة جوهر الهوية ورمزها 3- اللغة تختلف عن اللهجة، فالأولى عالمية والثانية محلية 4- توظيف المفردات الفصيحة في الصياغة الأكاديمية للبحوث العلمية مترجمة بنظيرها الفصيح 5- التمكن من كتابة البحوث والمقالات ذات المحتوى العلمي الصرف باللغة العربية الفصحى 6- تجنب الأخطاء الشائعة في الكتابة واختيار المفردات الصائبة 7- إثراء الخزين المعجمي لدى الطالب للمساعدة في بناء كاريما التواصل الكلامي 8- الاطلاع على نماذج من الأدب العربي شعرا ونثرا لما لها من أساس في بناء الجانب الثقافي المتنوع لدى الطالب 9- كتابة الأعداد بتمكن فضلا الكتابة الصحيحة في صياغة الطلبات الرسمية 10- التعرف على الدرس الصوتي في اللغة العربية وعلاقته بعلم الفيزياء
Module Learning outcomes مخرجات التعلم المادة الدراسية	عند انتهاء مفردات المادة الدراسية يكون الطالب متمكنا من: 1- الكتابة السليمة خالية من الأخطاء 2- التعبير العلمي الأكاديمي الصحيح 3- استعمال المفردات الفصيحة توظيفا ونطقا 4- إضافة رصيد لغوي ومفاهيم جديدة لمعاني الكلمات 5- القدرة على المخاطبة الإدارية في الطلبات الرسمية
Indicative Contents المحتويات الإرشادية	1- لكل تخصص لغته التي تؤمى إليه، وتدل عليه، ولغة كل علم تتبع من طبيعة كنهه، فالاختصاصات العلمية لها معجم خاص بها يعبر عن جوهرها ومضمونها، فضلا عن المصطلحات الخاصة بها التي تدل عليها، وكذلك المصادر العلمية التي يُرجع إليها، والحال كما في اللغة الأدبية؛ فهي أيضا لها مفرداتها وطريقة كتابتها والتعبير بها وعبرها، ومصطلحاتها الخاصة بها التي تعبر عنها وتدل عليها. [4 hrs] 2- المعاجم – بشكل عام - على اختلاف موارها تمثل محتوى وكفا لمفردات أي لغة مقترنة بالشرح والتفسير لتلك المفردات، أما المعاجم في اللغة العربية فهي واسعة ومتنوعة؛ فهناك معاجم غير معجمات اللغة، فالعربية فيها أول معجم جغرافي في التاريخ، معجم البلدان لـ (ياقوت الحموي)، فضلا عن المعاجم المتخصصة في جزئية معينة، مثل معجم البلاغة، فضلا عن تنوع المدارس في تأليف المعاجم وتبويبها وطريقة البحث عن المفردة فيها. [4 hrs] 3- العلامة تدرج ضمن حقل علم السيمياء أو السيميائية، وعلامات الترقيم من المواضيع المهمة بالأخص في البحوث الأكاديمية، بغض النظر عن التخصص، سواء كان التخصص علميا، أو انمائيا، من هنا تأتي أهمية علامات الترقيم؛ فلها دور سيميائي، ودلالي مهم في الكتابة النصية وفي بناء النص، فهي تُسهّل الفهم على القارئ، وتوضح المعنى المقصود، عبر القراءة والتلفظ بالعبار، فعلامات الترقيم خير وسيلة لإظهار الصراحة وبيان الوضوح في الكلام المكتوب؛ لأنه يدل الناظر إلى تلك العلامات الاصطلاحية وعلى العلاقات التي تربط أجزاء الكلام بعضها ببعض بوجه عام، وأجزاء كل جملة بوجه خاص، وكما يقول المتخصصون عن علامات الترقيم: بأن الوقف ليس مستقلاً، وإنما هو من توابع التفكير، أي: إنّ السكتات المقررة بمقادير مضبوطة في مواضع معينة، ليست مجرد محطات تنفسية بالمعنى البيولوجي للتنفس، وإنما في المقام الأول وقفات معنوية. فالعبارة من الناحية اللغوية ليست بأن يستعيز القارئ نفسه، بل المهم أن يتعاطى القارئ السكت بمقادير معلومة، وفي مواضع محددة من السلسلة المنطوقة رفعا للبس، وصونا لمقصد المتكلم عن التبذل، فهذه العلامات تجسّد لمشاعر الكاتب وقصدياته فيها. [6 hrs]

4- الأسلوب الكتابي يمثل بصمة للكاتب الذي يصدر عنه، ويتجسد عند القارئ، ولكل كاتب أسلوبه الخاص به، ينعكس ذلك في نتاج الكاتب، وللأسلوب أنواع مختلفة، فهناك الأسلوب العلمي، والأسلوب الأدبي، والأسلوب الخطابي، ولكل نوع خصائصه، وقالبه الذي يتكون فيه. [4 hrs]

5- الأحداث التي تقترب بالزمن تمثل الأفعال، والأفعال في العربية تنظر الأزمنة في اللغات الأخرى من جانب معين، أو من جزئية معينة، والعربية تحتوي على عدد كبير من الجذور، جذور الأفعال، ففي العربية أفعال ثلاثية ورباعية وخماسية وسداسية، والفعل جزء مهم من أجزاء الكلام الأساسية، فضلا عن الجانب الصوتي في هذه الجذور، فعلم (الأصوات الفيزيائي) من العلوم المهمة في اللغة العربية، إذ يُعد علم (الأصوات الأكوستيكي) علما أقرب إلى الفيزياء منه للعلوم الإنسانية، وهو يمثل المرحلة الوسطى بين علم الأصوات النطقي وعلم الأصوات السمعي، وعلاقته مع اللغة العربية انطلاقا من البذرة الأولى في دراسة مخارج الحروف فيزيائيا ودلاليا. [4 hrs]

6- الكلام عن الشعر لا ينتهي؛ فالشعر تجسيد لمشاعر الفرد المتمثل بالشاعر، والمشاعر الجمعية للإنسانية جمعاء، فهو موجود لدى كل بني البشر، والشعر العربي القديم كان بمثابة نشيدا وطنيا لهم، يمثل هويتهم الثقافية الرصينة ويمثل سجلا لتاريخهم وأمجادهم، على اختلاف أغراضه من غزل ومدح وثناء وغير ذلك، وبحور الشعر في الشعر العربي مبنية بناء صوتيا فريدا عبر التفعيلات التي وضعها الخليل بن أحمد الفراهيدي ووضع فلسفتها وكنهها وقواعدها، والشعر رصيد ثقافي، وحجة في الكلام، وزينة ورونقا يضاف على شخصية الفرد والمجتمع بشكل عام. [4 hrs]

7- الهمزة من المواضيع الإجرائية لدى الفرد الكاتب، بغض النظر عن التخصص، فيحتاجها كل فرد ناطق كاتب بها، فلها قواعدها التي تصدر عنها، وتُكتب بالشكل السليم منها، فموضوع رسم الهمزة من الأهمية بمكان؛ فرسمها يغير من المعنى، فلا بد من وضعها ورسمها بالشكل الصحيح لتوخي التعبير الدقيق عن المعنى المقصود. [4 hrs]

8- المفاعيل في اللغة العربية، من الموضوعات المهمة في درس اللغة العربية، ولا بد لكل دارس من معرفتها بشكل عام، وهناك آراء مختلفة بين البلاغيين والنحويين عن المفاعيل، هل أن تلك المفعولات فضلة، أم أنها ركن رئيس في الجملة؛ فالنحويون يرون أنها فضلة في الجملة، وأن ركني الجملة الأساسيين هما: الفعل، والفاعل، وأما البلاغيون فيرون: إنها ليست فضلة، وإنما هي ركن أساسي في الجملة؛ لأن كل كلمة تُدَل على معنى في الجملة، وإذا ما دلت على معنى فلا تُعد فضلة، وإنما هي ركن رئيس في الجملة وبنائها، ورأي البلاغيين أقرب للصواب من رأي النحويين، فدراستها في العربية لغير المختصين مما يضيف لهم خزينا تعبيريا متنوعا. [4 hrs]

9- من المعروف وجود ظاهرة الأخطاء اللغوية نحوية كانت أو املائية أو أسلوبية، عند متحدثي اللغة العربية وبالأخص عند غير المختصين بها ولا سيما من يعملون في مجال الاعلام، وهذه الظاهرة اتسعت وزاد انتشارها في العصر الحديث، فأخذت هذه الأخطاء تغزو مجالات الدراسة جميعها، من ذلك موضوع (العدد) في اللغة العربية، فنجد كثيرا من الطلبة وكذلك من عامة الناس يستعملون الأرقام بدلا من كتابتها بالحروف؛ وذلك لتجنب الوقوع في الخطأ وهذا دليل ضعف لا يليق بالدارس أيا كان تخصصه؛ ولهذا فموضوع العدد وقواعد كتابته في اللغة العربية موضوع لا غنى عنه في زمن لغة الأرقام. [4 hrs]

10- هناك مجموعة من الالفاظ متداولة بشكل كبير، تُستعمل في غير مكانها الصحيح، وفي غير ما وُضعت له وهذه الالفاظ تُستعمل في المخاطبات الرسمية الإدارية بالمعنى غير الصحيح أو الدقيق الذي تحمله تلك الالفاظ من معاني، فضلا عن أهمية توخي الدقة في هذه الالفاظ وتوظيفها في الطلبات الرسمية التي تُقدم على اختلاف موضوعاتها، فالطلب لا بد من أن يكون مختصرا مركزا، يعطي الفكرة الموجزة، والهدف المقصود منه ازاء صاحب الإدارة الذي تُقدم اليه الطلبات، وما في ذلك من إيجابيات العمل في التخفيف واختصار للجهد والوقت في تنفيذ المهام الإدارية الموكلة الافراد على اختلاف درجاتهم. [4 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

صناعة شخصية متكاملة للطالب الجامعي من حيث التخصص العلمي الدقيق والتخصص المساند

Student Work load (SWL) الحمل الدراسي للطالب ل 15 اسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقيم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	Lo #1,#2,#10 and 11
	Assignments	2	10% (10)	2 and 12	Lo #3,#4,#6, and #7
	Projects / tutorial	1	10%(10)	Continuous	All
	Report	1	10% (10)	13	Lo #5, #8 and #10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	Lo #1-7
	Final Exam	3hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	الفرق بين اللغة العلمية واللغة الأدبية
Week 2	المعاجم العربية وأنواعها
Week 3	علامات الترقيم
Week 4	الاسلوب
Week 5	الأفعال أنواعها وتقسيماتها
Week 6	نماذج مختارة من الشعر العربي القديم - الشعر الإسلامي - الشعر الأموي
Week 7	Mid-term Exam
Week 8	رسم الهمزة / همزة الوصل وهمزة القطع
Week 9	كتابة الهمزة بداية الكلام وآخره

Week 10	المبتدأ والخبر - مهارات كتابة العدد
Week 11	المفاعيل / المفعول به - المفعول لأجله
Week 12	المفعول معه - المفعول فيه - المفعول المطلق
Week 13	النثر العربي
Week 14	الخطأ الشائعة - طريقة كتابة الطلبات الرسمية
Week 15	نماذج مختارة من الشعر العباسي والشعر الحديث
Week 16	final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	كتاب : العربية الجامعية لغير المتخصصين / د. عبده الراجحي كتاب : النحو التطبيقي / د. عبده الراجحي	كلا
Recommended Texts	الصرف التطبيقي / د. عبده الراجحي / النحو الوافي / عباس حسن / تاريخ الادب العربي / شوقي ضيف	كلا
Websites	شبكة الفصحى لعلوم اللغة العربية	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

المستوى الثاني

Module Description Form

نموذج وصف المادة الدراسية

جرائم نظام البعث في العراق

Module Information			
معلومات المادة الدراسية			
Module Title	Crimes of Baath Regime in Iraq		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	KUS23016		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2 nd	Semester of Delivery	1 st
Administering Department	Medical Physics	College	Science
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/5 /2026	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- ان يتعرف الطالب على جرائم نظام البعث في العراق 2- ادراك الطالب لتاريخ الحقبة التيعاشها العراق خلال فترة نظام البعث 3- ادراك الطالب لكم الجرائم النفسية والاجتماعية التي ارتكبها النظام

	4- ادراك الطالب للجرائم التي ارتكبت بحق البيئة من قبل النظام 5- ادراك الطالب للجرائم الوحشية التي حصلت في المقابر الجماعية
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- معرفة الجرائم التي ارتكبت من قبل نظام البعث 2- معرفة انواع الظلم والاضطهاد الذي ارتكب بحق العراقيين
Indicative Contents المحتويات الإرشادية	1- اسلوب الحوار بين الطالب والاستاذ 2- عرض الآراء ومناقشة نقاط القوة والضعف لكل منها 3- اتاحة الفرصة للطالب بالتفكير وتبني الخيارات الصحيحة

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	من خلال مقاييس اسلوب المناقشة والاختبارات اليومية

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2
	Assignments	2	10% (10)	2, 12	LO # 1,2
	Projects				
	Report	1	20% (20)	13	LO # 1,2
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-2
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المناهج الاسبوعي النظري	
	Material Covered
Week 1	تعريف الجريمة لغة واصطلاحا واقسام الجرائم
Week 2	جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا 2005 م 1- انواع الجرائم الدولية 2- القرارات الصادرة من المحكمة الجنائية العليا
Week 3	الجرائم النفسية والاجتماعية (آلياتها واثارها)
Week 4	موقف النظام البعثي من الدين
Week 5	عسكرة المجتمع وانتهاكات القوانين العراقية
Week 6	صور انتهاكات حقوق الانسان وجرائم السلطة
Week 7	قرارات الانتهاكات السياسية والعسكرية والتطرق الى اماكن السجون والاحتجاز
Week 8	امتحان
Week 9	الجرائم بحق البيئة وتشمل التلوث الحربي والاشعاعي وانفجار الالغام
Week 10	الجرائم بحق البيئة وتشمل تدمير المدن والقرى (سياسة الارض المحروقة)
Week 11	الجرائم بحق البيئة وتشمل تجفيف الاهوار
Week 12	جرائم تجريف بساتين النخيل والاشجار
Week 13	جرائم المقابر الجماعية
Week 14	جرائم المقابر الجماعية وتشمل التصنيف الزمني لمقابر الابادة الجماعية في العراق
Week 15	مراجعة

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	كتاب جرائم البعث في العراق الصادر من وزارة التعليم العالي والبحث العلمي	No
Recommended Texts		No
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية

معادلات تفاضلية

Module Information					
معلومات المادة الدراسية					
Module Title	Differential Equations		Module Delivery		
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	MPHY21013				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		2 nd	Semester of Delivery		1 st
Administering Department		Medical Physics	College	Science	
Module Leader	Dr. Nasma A. Jaber		e-mail	nasmaadnan@kus.edu.iq	
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor			e-mail		
Peer Reviewer Name		Dr. Sabah Ibrahim Abbas	e-mail	sabahibrahim@kus.edu.iq	
Scientific Committee Approval Date		1/5/2026	Version Number		

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Mathematics	Semester	Module level one
Co-requisites module	None	Semester	Non

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Learn the concept of differential equations and their applications in medical physics. 2. Learn the initial and boundary values problems of differential equations. 3. Learn the classification of ordinary differential equations. 4. Learn the types of first-order and second-order linear differential equations. 5. Learn methods for solving first-order ordinary differential equations. 5. Learn methods for solving higher and second-order differential equations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student will be able to: Understand the mathematical concepts and definitions in ordinary differential equations (ODEs). 2. Understand the classification of ODEs and relate them to applications in medical physics. 3. Understand the types of initial and boundary values problems for ODEs. 4. Distinguish between mathematical concepts in differential equations and apply them to solving first- and second-order ODEs. 5. Develop the student's ability to solve various types of first- and second-order ODEs. 6. Analyze physics problems to find the best solutions based on expected outcomes. 7. Develop the student's ability to discuss expected solutions to problems. 8. Improve the student's ability to solve various types of differential equation problems without errors.
Indicative Contents المحتويات الإرشادية	1. Introduction to types of functions and their inverses, such as logarithmic, exponential, and trigonometric polynomials, and the inverse of symmetric functions. 2. Types of differentiation of all types of functions. 3. Methods and techniques for integrating all types of functions.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	6. Lecture Method 7. Practice Examples 8. Discussion 9. Homework 10. Brainstorming
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/week) الحمل الدراسي المنتظم للطالب اسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	Unstructured SWL (h/week) الحمل الدراسي غير المنتظم للطالب اسبوعياً	4.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب في الفصل	100 (h/sem)		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	5% (20)	4,7,9,11	LO#1-3, #4-6,#6-8 and #9-10
	Assignments	5	2% (10)	,1,3 4,7,9,11	LO#1-3, #4-6,#6-8 ,#9-10 and #10-12
	Projects / Lab.				
	Report	1	10% (10)	13	LO#1-2-3-4-5-6-7-8-9-10
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO,#1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to differential equation , Definition and terminology differential equation, initial-value problems, boundary-value problems.
Week 2	First order differential equation ,Solutions O.D.E. of order one
Week 3	Separable of variables
Week 4	Homogeneous function
Week 5	Equation with Homogeneous coefficients
Week 6	Exact equation, the linear equation of order one
Week 7	The Linear equations, the general solution of linear equation.
Week 8	Not Exact equation, the general solution of not exact equation
Week 9	Not Exact equation, determination of integrating factor
Week 10	Bernoullis equation, solution O.D.E of order one Bernoullis equation

Week 11	High-order differential equation, general solution Homogeneous linear equations with constant coefficients
Week 12	The Auxiliary equation :distinct root, repeated root ,imaginary roots
Week 13	second-order differential equation, general solution non Homogeneous linear equation with constant coefficients
Week 14	Undetermined coefficients
Week 15	Variation of parameters
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Differential Equation with Boundary-value problems Dennis G. Zill , 'Michael R. Cullen	Non
Recommended Texts	Elementary Differential Equations Earl D. Rainville, Phillip E. Bedient, Richard E. Bedient	Non
Websites	http://www.uop.edu.pk/ocontents/DIFFERENTIAL%20EQUATIONS%20with%20Boundary-Value%20Problemsa%20Zill%20Cullen(1).pdf	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية

بصريات

Module Information			
معلومات المادة الدراسية			
Module Title	Optics		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MPH21014		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	2 nd	Semester of Delivery	1 st
Administering Department	Medical Physics	College	Science
Module Leader	Dr. Sabah I. Abbas	e-mail	sabahibrahim@kus.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/05/2026	Version Number	1.0

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Understand the fundamental of optics that representing by geometrical optics and waves optics. 2. Increase students' knowledge about optics terms such as refractive index, optical path, critical angle, total internal reflection, thin lenses, mirrors, and image formation by optical elements, as well as Interference phenomena, Diffraction phenomena, polarization phenomena of light. 3. Provide the student with knowledge information about the electromagnetic spectrum and its wide uses in the medical fields (medical imaging and medical treatment as well as medical devices based on light). 4. Preparing the student to deal professionally with optical devices and optical elements, and how to calculate their optical constants.
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	5. Enable the student to distinguish between the Interference phenomena and Diffraction phenomena. 6. Provide the student with knowledge about the most important optical element present in the human body, which is the eye, and how to determine vision defects mathematically.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Distinguish between the ray optics and wave optics. 2. Calculating the refractive index, the optical path and determining the critical angles for light travels between two media. 3. Knowing how to form images in lenses and mirrors, calculating the focal length of optical elements. 4. Determining vision defects and how to calculate the appropriate focal length for each pathological condition of vision defects. 5. Distinguish between interference and diffraction of light and calculation the fringes width. 6. Determine the constructive interference equation for bright fringes and the destructive interference equation for dark fringes. 7. Study the electromagnetic spectrum and determine the photon's energies. 8. Defining polarization, identifying its types, and calculating the intensity of light transmitted by polarizers.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Nature and propagation of light</u> Particle theory of light – Particle theory of light (Newton’s Theory)- Wave theory of Light (Huygens Theory)- Dual Nature of Light De Broglie Hypothesis- Concept of a photon- Energy of photon - Characteristics of light waves- The Electromagnetic Spectrum. [8 hrs] <u>Part B – Geometrical Optics</u> Ray Optics- Refractive Index- Laws of Refraction- Snell’s Law- Optical Path Length- Fermat’s Principle- The Critical Angle - Total internal reflection - Refraction of Light through a Glass Prism. [8 hrs] Dispersion- Color Dispersion - Spherical surfaces - Graphical constructions- Convention of signs for distances- Derivation of the Gaussian formula – Magnification image in spherical surfaces. [8 hrs] Thin lenses -Types of lenses- Image Formation- The lens formula- Image Formation -Derivation of the lens Maker’s formula- Lateral Magnification of Lenses- The Power of thin lens- Thin Lens combinations- Mirror formula- Gaussian formula for spherical mirror. [8 hrs] Spherical Mirrors- Mirror formula - Gaussian formula for spherical mirror- The lateral magnification image of the mirror- Mirror image characteristics. [4 hrs] The Human Eye- Myopia (nearsightedness)- Hypermetropia (farsightedness)- Presbyopia - Cataract- Astigmatism- Types of Astigmatism- Myopic astigmatism- Hyperopic astigmatism- Mixed astigmatism [10 hrs] Revision problem classes [8 hrs] <u>Part C – Waves Optics</u>

	Superposition of waves - Coherent and incoherent sources- Constructive Superposition - Destructive Superposition- Superposition of two waves at the same frequency- Standing Waves- Superposition of two harmonic perpendicular oscillations. [10 hrs] Interference of Light Waves- Types of interference- Conditions for interference- Young's Experiment- Intensity Distribution in the Young's Experiment- Fringe Width and Mathematical Expression. [12 hrs] - Diffraction- Single Slit Diffraction (Fraunhofer Diffraction)- Diffraction by Rectangular Aperture- Resolving Power of a Rectangular and Circular Aperture- Double-Slit Diffraction Pattern- Diffraction Grating- Dispersion power of grating- Resolving Power. [12 hrs] Polarization of light- Types of Polarization -Polaroid- Mal's Law- Brewster's Law- Application of Polarization. [9 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Strategies in teaching optics are centered on the teacher and the students, It depends mainly on equipping the student with theoretical and practical skills in the field of geometric optics and wave optics through the participation of students in preparing reports, assignments, seminars and projects, preparing lectures, solve optics examples and encouraging students' teamwork. And conduct optics experiments in the laboratory and increase their scientific skills and how they deal with devices and optical elements. The strategy of the optics class is to increase students' awareness of the importance of optical laws on which medical devices used in medical clinics and hospitals depend.

Student Workload (SWL) الحمل الدراسي للطلاب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	97	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعياً	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (5)	5, 10	LO #1, 2
	Assignments	2	10% (5)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.		10%(10)	continuous	
	Report	1	10% (10)	13	LO # 5, 8
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All

Total assessment	100% (100 Marks)		
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Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Nature and propagation of light electromagnetic spectrum.
Week 2	Refractive index , Fermat principle ,Critical angles and total internal reflection.
Week 3	Dispersion of light. prism and minimum deviation angle.
Week 4	Reflection and refraction at spherical surfaces.
Week 5	Thin Lenses , Lens maker's equation, Gaussian formula.
Week 6	Lenses combined.
Week 7	Mirrors and Magnification of images in mirrors.
Week 8	Optical Devices, The eye, defect of visions.
Week 9	Waves and Physical Optics, Transverse wave and the hypotheses of light.
Week 10	Superposition of Waves and Coherent and incoherent sources.
Week 11	Interference phenomena, Young's Experiment and Intensity Distribution in the Young's Experiment.
Week 12	Diffraction Phenomena and types of diffractions.
Week 13	Fraunhofer diffraction and Single Slit Diffraction (Fraunhofer Diffraction).
Week 14	Dispersion power of grating and Resolving power of grating.
Week 15	Polarization of light.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Optical path experiment
Week 2	Lab 2: snell's law and critical angle experiment
Week 3	Lab 3: convex lens Determine focal length experiment
Week 4	Lab 4: concave mirror experiment
Week 5	Lab 5: prisms and light dispersion experiment
Week 6	Lab 6: Grating Diffraction experiment
Week 7	Lab 7: Newton's Rings
Week 8	Lab 8: Young's double slit experiment

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	1- Fundamental of Optics, by Jenkins and White Application and Design, 4th Edition, John Wiley, 2010. (R856.M489 2010). 2- Introduction to Modern Optics , 2nd Edition by Grant R. Fowle.	No
Recommended Texts	Handbook of Optics, Third Edition Volume I: Geometrical and Physical Optics, Polarized Light, Components and Instruments(set) , by Michael Bass , Casimer DeCusatis , Jay Enoch .	No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية الفيزياء الذرية

Module Information معلومات المادة الدراسية		
Module Title	Atomic Physics	Module Delivery
Module Type	Core	☒ Theory
Module Code	MPH21015	☐ Lecture

ECTS Credits	7		☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
SWL (hr/sem)	175			
Module Level	2 nd	Semester of Delivery		1 st
Administering Department	Medical Physics	College	Science	
Module Leader	Dr. Bilal K. Jasim		e-mail	
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail	
Peer Reviewer Name	me	e-mail	E-mail	
Scientific Committee Approval Date	1/5 /2026	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Get knowledge about the principles of Atomic Physics
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Knowledge of the atomic structure. 2- Identification the basic atomic physical laws 3- Enrich knowledge about atomic reaction
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. The importance of atomic physics in understanding the atomic structure of materials. The importance of knowing the new techniques in atomic physics Knowing how to conclude from facts to get new principles.

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	

	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2
	Assignments	2	10% (10)	2, 12	LO # 1,2, and 3
	Lab	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 2,3
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Atomic models (Rutherford model)
Week 2	Bohr model
Week 3	Atomic Hydrogen quantization
Week 4	Atomic spectrum of hydrogen atom
Week 5	Correspondence principle, Quantum numbers, Pauli exclusion principle, Hund's rule
Week 6	Exam
Week 7	Plank theory
Week 8	Black body radiation

Week 9	Photoelectric effect
Week 10	X-ray
Week 11	Spin-orbit interaction
Week 12	Selection rules
Week 13	Zeeman effect
Week 14	Stark effect
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Milikan oil drop experiment
Week 3-4	Determination of specific charge e/m the electron experiment
Week 5-6	Frank-Hertz experiment
Week 7	Exam
Week 8-9	Photo- electric effect
Week 10-11	Stephan's law of Black body radiation
Week 12-13	Planck constant
Week 14	Review

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Atomic Physics by C.J. Foot, University of Oxford, 2005	No
Recommended Texts	Atomic and Nuclear Physics, by T.A.Littlefield & N.Thorley	No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Modules Description Form

نموذج وصف المادة الدراسية الكهرومغناطيسية

Modules description Information				
معلومات المادة الدراسية				
Modules Title	Electromagnetics		Modules Delivery	
Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Course Code	MPH21016			
ECTS Credits	4			
SWL (hr/sem)	100			
Modules Level	2 nd	Semester of Delivery	1 st	
Administering Department	Medical Physics	College	Science	
Modules Leader	Prof. Dr. Fadhil K. Farhan	e-mail		
Modules Leader's Acad. Title	Professor	Modules Leader's Qualification	Ph.D.	
Modules Tutor	non	e-mail		
Peer Reviewer Name	non	e-mail		
Scientific Committee Approval Date	1/5/2026	Version Number	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite course	The main goal of study of Electromagnetic Theory course is to identify the basic principles of this theory, as follows: - General study of Vectors in the Cartesian, cylindrical and spherical coordinate systems. Also, addressing the Divergence and Gauss's theorem, Curl and Stokes theorems and Green's theorem. - Study of the Electrostatic field in vacuum and addressing the Laplace and Poisson equations and their solutions in the Cartesian, cylindrical and spherical coordinate systems. Study of the Electrostatic field in the dielectric materials and addressing the phenomenon of polarization in these materials. In addition to calculating the Electrical displacement, Electrical susceptibility, Dielectric constant, and Laplace and Poisson equations in these materials. - Study of Maxwell's equations in their differential and integral forms. Also, study the propagation of plane electromagnetic waves in infinite media and the polarization of these waves	Semester	
Co-requisites course	Non	Semester	

Aims of a Course, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Aims Course أهداف المادة الدراسية	The main goal of study of Electromagnetic Theory course is to identify the basic principles of this theory, as follows: - General study of Vectors in the Cartesian, cylindrical and spherical coordinate systems. Also, addressing the Divergence and Gauss's theorem, Curl and Stokes theorems and Green's theorem. Study of the Electrostatic field in vacuum and addressing the Laplace and Poisson equations and their solutions in the Cartesian, cylindrical and spherical coordinate systems. Study of the Electrostatic field in the dielectric materials and addressing the phenomenon of polarization in these materials. In addition to calculating the Electrical displacement, Electrical susceptibility, Dielectric constant, and Laplace and Poisson equations in these materials. Study of Maxwell's equations in their differential and integral forms. Also, study the propagation of plane electromagnetic waves in infinite media and the polarization of these waves.
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Course Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Enabling students to obtain knowledge and understand the topics of Electromagnet 2- Write and Solve wave equation 3- Show ability of make decisions and work alone or in team.
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Indicative Contents	Indicative content includes the following. Unit 1: Vectors You'll begin your study of vector, divergence, stoks and Green theorems 24 hr's Unit 2: : Electrostatics You'll explore how electric charge can move through an object and the factors that affect the way charge moves and its effects on matter. 24 hr's Unit 3: Maxwell Equations You'll build on your knowledge of Maxwell equation and poynting vector and its relation to wave propagation. 24 hr's
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Method of giving lectures, explanation and clarification. 2- Student groups. 3- E-learning within the university. 4- Application of education.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	5 % (20)	5, 10	LO #1, 2
	Assignments	4	5% (20)	2, 12	LO # 3, 4
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100Marks)		
Delivery Plan (Weekly Syllabus)					
المنهاج الاسبوعي النظري					
Week no.	Material Covered				
Week 1	Coordinate system and Vectors				
Week 2	Gauss theorem and Stoke's theorem and Green theorem				
Week 3	Coulombs and Gauss laws				
Week 4	Poisson's and Laplace equations				
Week 5	Poisson's and Laplace equations in spherical coordinates				
Week 6	Polarization in dielectrics				
Week 7	Mid Exam				
Week 8	Boundary conditions between two different media				
Week 9	Faraday law				
Week 10	Maxwell's Equations				
Week 11	Solve of Maxwell's Equations				
Week 12	Poynting vector				
Week 13	The complex form of the Poynting vector				
Week 14	Propagation of plane electromagnetic waves in infinite media				
Week 15	Solving the wave equation in Infinite media - Examples				
Week 16	Final Exam duration				

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Introduction to Electrodynamics by David J. Griffith, Prentice Hall, 3ed. 1999.	No
Recommended Texts Websites	Electromagnetics by Edward J. Rothwell & Michael J. Cloud, CRC press 2001	No

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F - Fail	راسب	(0-44)	Considerable amount of work required

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Module Description Form

نموذج وصف المادة الدراسية الثرموداينمك

Module Information				معلومات المادة الدراسية	
Module Title	Thermodynamics		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture		
Module Code	MPH21017		☒ Lab ☐ Practical		
ECTS Credits	6		☒ Tutorial ☐ Seminar		
SWL (hr/sem)	150				
Module Level	1	Semester of Delivery	1		
Administering Department	Medical Physics	College	Science		
Module Leader	Dr.Bassma Hussain Hamad		e-mail	dr.bassmahussain@kus.edu.iq	
Module Leader's Acad. Title	Ass. Prof.		Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name	Name		e-mail	E-mail	
Scientific Committee Approval Date	1/5/2026		Version Number	1.0	

Relation with other Modules				العلاقة مع المواد الدراسية الأخرى	
Prerequisite module	None		Semester		
Co-requisites module	None		Semester		

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. The course aims to provide 2nd stage students with basic knowledge of thermodynamics. 2. To understand that everything related to energy and understand the concepts such as the first law of thermodynamics and the second law and its applications. 3. To enable students to access the science of thermodynamics by understanding how to correct engineering analysis and how to deal with laws, equations, illustrations and other data. 4. Enabling the student to be able to analyze, devise and draw conclusions. theory through the application of techniques 5. Follow-up of scientific development through the Internet and keeping pace with scientific development by setting up experiments synchronized with theoretical topics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning the basic concepts of thermodynamics and the properties of substances using property tables or property relations. 2. Understanding the different forms of energy, energy interactions by heat and work transfer, and the 1st law of thermodynamics. 3. Solving real world engineering problems related to energy by applying the 1st law thermodynamics to closed and open systems like piston-cylinder devices, turbines, and charging/discharging processes. 4. Understanding the 2nd law of thermodynamics and quantifying the performance of heat engines, heat pumps and refrigerators, reversible and irreversible processes 5. Defining entropy, developing entropy change relations, and deriving the increase of entropy principle, 6. Performing 2nd law analysis of engineering processes by quantifying entropy generation. 7. Analyzing some basic thermodynamics cycles like the Otto, Diesel, Brayton cycles for power production and the vapor compression refrigeration cycle for cooling applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A -Thermodynamic systems</u>

	Thermodynamic systems (closed and open), Thermodynamic properties and equilibrium, State of a system, state postulate for simple compressible substances, state diagrams, paths and processes on state diagrams, Concepts of heat and work, different modes of work, Concept of temperature [15 hrs]. Concept of energy and various forms of energy, Internal energy, enthalpy, Specific heats, First law applied to elementary processes, closed systems and control volumes, steady and unsteady flow analysis [13 hrs] <u>Part B -Thermodynamic properties</u> Thermodynamic properties of pure substances in solid, liquid and vapor phases, P-vT behaviour of simple compressible substances, phase rule [10hrs]. Thermodynamic property tables and charts, ideal and real gases, ideal gas equation of state and van der Waals equation of state, Law of corresponding states, compressibility factor and generalized compressibility chart [15 hrs] <u>Part C: laws of thermodynamics</u> Limitations of the first law of thermodynamics , Concepts of heat engines and heat pumps/refrigerators, Kelvin-Planck and Clausius statements and their equivalence, Reversible and irreversible processes, Carnot cycle and Carnot principles/theorems, Thermodynamic temperature scale, Clausius inequality and concept of entropy, Microscopic interpretation of entropy (The principle of increase of entropy) and (T-s diagrams), Second law analysis of control volume, Availability and irreversibility, Third law of thermodynamics [20 hrs].
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Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	The main strategy in delivering this course is to encourage students to participate in thermodynamic problem solving, while simultaneously improving and expanding their critical thinking skills through training in the correct way of thinking to solve complex problems. This is achieved through classes and practical experiments matched with theoretical studies and by thinking about the type of scientific experiments that include some applications of thermodynamic laws that are of interest to students.

Student Workload (SWL)				الحمل الدراسي للطالب
Structured SWL (h/sem)	77	Structured SWL (h/w)	5	
الحمل الدراسي المنتظم للطالب خلال الفصل	-	الحمل الدراسي المنتظم للطالب أسبوعيا	-	
Unstructured SWL (h/sem)	73	Unstructured SWL (h/w)	4.8	
الحمل الدراسي غير المنتظم للطالب خلال الفصل	-	الحمل الدراسي غير المنتظم للطالب أسبوعيا	-	
Total SWL (h/sem)	150			
الحمل الدراسي الكلي للطالب خلال الفصل				

Module Evaluation						تقييم المادة الدراسية
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome	
Formative assessment	Quizzes	4	10% (10)	2,6,10,12	LO #1, 2, 10 and 11	
	Assignments	1	10% (10)	2, 12	LO # 3, 4, 6 and 7	
	Projects / Lab.	1	10% (10)	Continuous		
	Report	1	10% (10)	13	LO # 5, 8 and 10	
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7	
	Final Exam	3 hr	50% (50)	16	All	
Total assessment			100% (100 Marks)			

Delivery Plan (Weekly Syllabus)		المنهاج الأسبوعي النظري
	Material Covered	
Week 1	General Introduction Basic definitions of thermodynamics	
Week 2	Definitions and concept for microscopic properties	
Week 3	Zeroth law of thermodynamics and general law of gases	
Week 4	Equation state and work	
Week 5	1 st law of thermodynamics and the internal energy function	
Week 6	Heat transfer and the specific heat capacity at constant pressure	
Week 7	Phase Diagram	
Week 8	2 nd law of thermodynamics and irreversible processes	

Week 9	Carnot cycle
Week 10	Gibbs and Helmholtz free energy
Week 11	Entropy
Week 12	Enthalpy
Week 13	Maxwell equations
Week 14	3rd law of thermodynamics
Week 15	Nernst principle
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)		المناهج الاسبوعي للمختبر
	Material Covered	
Week 1	Lab 1: Measurement of Thermal Conductivity by Lee's Disc method.	
Week 2	Lab 2: Specific Heat Capacity of liquid by cooling method Experiment	
Week 3	Lab 3: Determination of the coefficient of apparent cubic expansivity of a liquid by Mathiessen's sinker method.	
Week 4	Lab 4: Entropy of system.	
Week 5	Lab 5: Experiment to measure Specific Heat Capacity of a Metal by Method of Mixtures.	
Week 6	Lab 6: Measuring the Specific Heat Capacity for Different material	
Week 7	Lab 7: Coefficient of Linear Expansion of copper	

Learning and Teaching Resources			مصادر التعلم والتدريس
	Text	Available in the Library?	
Required Texts	Fundamental of thermodynamics (6 th edition) S. BORGNACKE and VAN WYLEN	Yes	
Recommended Texts	Thermodynamics: An Engineering Approach, 9th ed in SI Units Yunus A. Çengel, Michael A. Boles, M. Kanoğlu, McGraw-Hill Education.	No	
Websites	https://www.tutorialspoint.com/gate_syllabus/gate_xe_thermodynamics_syllabus.htm		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية

علم المواد

Module Information معلومات المادة الدراسية						
Module Title	Materials Science		Module Delivery			
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar			
Module Code	MPH22018					
ECTS Credits	5					
SWL (hr/sem)	125					
Module Level	2 nd	Semester of Delivery		2 nd		
Administering Department	Medical Physics	College	Science			
Module Leader	Dr. Abdulmohaimen W. Fakhry		e-mail	Mohamenw2@kus.edu.iq		
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification		Ph.D.		
Module Tutor	Name (if available)		e-mail	E-mail		

Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/5/ /2026	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- Describe the important quantum-mechanical principle that relates to electron energies. 2- Briefly describe ionic, covalent, metallic, hydrogen, and van der Waals bonds. 3- Describe the atomic/molecular structure difference between crystalline and noncrystalline materials. 4- Draw unit cells for face-centered cubic, body-centered cubic, and hexagonal close-packed crystal structures. 5- Specify the Miller indices for a plane that has been drawn within a unit cell. 6- Classification of crystalline imperfections, calculate the weight percent and atom percent for each element in a metal alloy. 7- Explain the use of X-ray diffraction measurements in determining crystalline structures.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the basic concepts in materials science (the purpose of studying materials science and engineering, classification of materials, interatomic bonds, metallic crystal structures, and crystal systems) and relating them to the materials' properties. 2. Understanding of the basic concepts in crystalline defects and analysis of the materials using optical and electron microscopes and x-ray diffraction characterization. 3. Compute ionic radii using unit cell dimensions. 4. Given the masses and atomic weights of two or more elements in a metal alloy, calculate the weight percent and atom percent for each element.
Indicative Contents المحتويات الإرشادية	Atomic Structure and Interatomic Bonding: Atomic Structure: Fundamental Concepts, Electrons in Atoms, The Periodic Table Atomic Bonding in Solids: Bonding Forces and Energies, Primary Interatomic Bonds, Secondary Bonding or van der Waals Bonding. The Structure of Crystalline Solids: Crystal Structures: Fundamental Concepts, Unit Cells, Metallic Crystal Structures, Density Computations, Polymorphism and Allotropy, Crystal Systems. Crystallographic Points, Directions, and Planes: Point Coordinates, Crystallographic Directions, Crystallographic Planes, Linear and Planar Densities, Close-Packed Crystal Structures. Crystalline And Noncrystalline Materials: Single Crystals, Polycrystalline Materials, X-Ray Diffraction: Determination of Crystal Structures, Noncrystalline Solids. Imperfections in Solids:

	Point Defects: Vacancies and Self-Interstitials, Impurities in Solids, Specification of Composition. Miscellaneous Imperfections: Dislocations–Linear Defects, Interfacial Defects, Surface Defects, Bulk or Volume Defects, Atomic Vibrations. Microscopic Examination: Basic Concepts of Microscopy, Microscopic Techniques, Grain Size Determination.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Establish a positive learning environment: Create an atmosphere of respect, collaboration, and inclusion. 2. Use a variety of teaching methods: Incorporate lectures, discussions, demonstrations, experiments, and hands-on activities to keep students engaged. 3. Set clear expectations: Explain the goals of the lesson and the criteria for success. 4. Provide feedback: Give timely and constructive feedback to help students learn from their mistakes. 5. Encourage active learning: Ask questions and provide opportunities for students to practice and apply their knowledge. 6. Promote critical thinking: Challenge students to think critically and analyze information. 7. Foster collaboration: Encourage students to work together to solve problems and share ideas. 8. Utilize technology: Incorporate technology into the classroom to enhance the learning experience

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, and 4
	Assignments	2	10% (10)	2, 12	LO # 3, 4

	lab				
	Report	1	20% (20)	13	LO # 3, 4
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to the Materials Science
Week 2	Classification of Materials
Week 3	Atomic Structure and Interatomic Bonding (Electrons in Solids)
Week 4	Atomic Structure and Interatomic Bonding (Interatomic Bonds)
Week 5	The Structure of Crystalline Solids, Unit Cells, Metallic Crystal Structures
Week 6	Density Computations, Polymorphism and Allotropy, Crystal Systems
Week 7	Crystallographic Planes and Directions
Week 8	Single and Polycrystalline Materials
Week 9	X-ray Diffraction Analysis of Crystal Structures
Week 10	Imperfections in Solids, Point Defects
Week 11	Specification of Composition
Week 12	Linear Defects
Week 13	Bulk Defects
Week 14	Grain-size Determination
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	J. C. Williams and G. R. David, <i>Materials Science and Engineering: An Introduction</i> , 9th ed. USA: John Wiley & Sons, Inc., 2013.	No

Recommended Texts	D. R. Askeland, P. P. Fulay, and D. K. Bhattacharya, <i>Essentials of Materials Science and Engineering</i> . USA: Cengage Learning, 2010.	No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية فيزياء الليزر

Module Information					
معلومات المادة الدراسية					
Module Title	Physics of Laser		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☒ Seminar		
Module Code	MPH22019				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		2	Semester of Delivery		2
Administering Department		Medical Physics	College	Science	

Module Leader	Dr. Aliaa Majid Yahya	e-mail	Dr.amzaki1@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/05/2026	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Non	Semester	
Co-requisites module	Non	Semester	1

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1 - Description of the origin of the physical processes in laser systems. 2-Explanation of physics concepts for gain and amplification in different lasers 3-Explanation of the concepts of generation short pulses in laser devices 4 - using mathematical equations to calculate different physical parameters of laser systems
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	9. Define the meaning of laser. 10.Develop a clear understanding of basic physical phenomena in thermal physics and materials science as an integral part of the student's overall education 11.2. Explain natural phenomena using simple physics concepts. 12.Compare between laser and other sources of light. 13.Calculate and find the ratio of atoms population in the energy levels. 14.Use algebra, trigonometry, and basic calculus, in solving problems in Laser physics and Laser cavity 15.Provide detailed and accurate description of ABCD ray tracing in an optical cavity 16.Classify the laser types according to active medium materials. 17.List and give details of different applications of laser
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – light principle</u> Basic of light phenomena, the electromagnetic radiation theory and equations, the properties of photon, laser definition, laser hazard, safety of laser and classification of laser [15 hrs] <u>Part B- Laser Properties</u>

	Laser history, coherence light, directionality of light, monochromatic light, brightness, interaction of radiation with atom, normal population, population inversion, laser levels, Einstein relation, laser elements, laser cavity, the modes inside the cavity, types of cavity, stability of laser resonators, laser gain and laser losses, continuous wave laser (CW), pulsed laser operation, laser spikes, Q-switched mode and modes locking, propagation of Gaussian profile. [30 hrs]. <u>Part C- laser types:</u> Gas laser, He-Ne laser, CO₂ laser, Argon ion laser, Solid state laser, ruby laser, Nd:YAG laser, liquid laser, dye laser, semiconductors laser. [10 hrs] <u>Part D- Laser applications:</u> Laser matter interaction, absorption of laser radiations, thermal effect, laser vaporization and plasma formation, laser ablation, scientific application, Hologram, industrial application, drilling and cutting, communication application, laser in military [17 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course will be delivered through a combination between theoretical lectures in the classroom and experimental lectures in the Lab. The students will receive the outcome of each lecture through discussions, videos related to the subject and questions. In addition, the information will be developed by self-learning through reading and searching to hand in the essay and home works.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	6.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6,10	LO #1-2, 4-5, 6-7, 9-10
	Assignments	5	10% (10)	2,3,5,6,7	LO #1, 2, 4, 5, 6
	Projects / Lab.	15	10% (10)	Continuous	
	Report	1	10% (10)		
Summative assessment	Midterm Exam	1	10 % (10)	7	LO # 1-6
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Properties of light
Week 2	Laser properties
Week 3	Interaction of radiation with atoms
Week 4	Population of atoms
Week 5	Laser levels, three level laser and four level lasers.
Week 6	Elements of laser.
Week 7	Midterm exam
Week 8	Lasing action
Week 9	Laser cavity
Week 10	Modes of the resonators
Week 11	Laser gain
Week 12	Laser operation
Week 13	The properties and propagations of Gaussian beam
Week 14	Laser types
Week 15	Laser applications
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to laser lab.
Week 2	Lab 2: diffraction from single slit.
Week 3	Lab 3: measuring the diameter of human hair by laser diffraction
Week 4	Lab 4: determination of wavelength of laser light by using diffraction grating.
Week 5	Lab 5: Laser beam divergence
Week 6	Lab 6: laser spot size
Week 7	Lab 7: laser spot size Measurement of the absorption coefficient of material By Using Laser light

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Laser Principles, Types & Applications: K R Nambiar, New Age International, 2004	No
Recommended Texts	Lasers: Theory and Applications : A K Ghatak and K Thyagarajan, McMillan, 2003	No
Websites	https://www.keyence.eu/ss/products/marketing/lasermarker/knowledge/principle.jsp	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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Module Description Form

نموذج وصف مادة اللغة العربية 2

Module Information			
معلومات المادة الدراسية			
Module Title	اللغة العربية 2	Module Delivery	
Module Type	Basic	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	KUS24020		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	2
Administering Department	Medical Physics	College	Science
Module Leader	Dr. Ahmed kahlaf	e-mail	Ahmed.k@kus.edu.iq
Module Leader's Acad. Title	Assistant lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/5/2026	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- تعلم العربية السليمة كونها اللغة الرسمية للوطن 2- اللغة جوهر الهوية ورمزها 3- اللغة تختلف عن اللهجة، فالأولى عالمية والثانية محلية 4- توظيف المفردات الفصيحة في الصياغة الأكاديمية للبحوث العلمية مترجمة بنظيرها الفصح 5- التمكن من كتابة البحوث والمقالات ذات المحتوى العلمي الصرف باللغة العربية الفصحى

	6- تجنب الاخطاء الشائعة في الكتابة واختيار المفردات الصائبة 7- اثناء الخزين المعجمي لدى الطالب للمساعدة في بناء كاريهما التواصل الكلامي 8- الاطلاع على نماذج من الادب العربي شعرا ونثرا لما لها من اساس في بناء الجانب الثقافي المتنوع لدى الطالب 9- كتابة الاعداد بتمكّن فضلا الكتابة الصحيحة في صياغة الطلبات الرسمية 10- التعرف على الدرس الصوتي في اللغة العربية وعلاقته بعلم الفيزياء
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	عند انتهاء مفردات المادة الدراسية يكون الطالب متمكنا من: 1- الكتابة السليمة خالية من الاخطاء 2- التعبير العلمي الاكاديمي الصحيح 3- استعمال المفردات الفصيحة توظيفا ونطقا 4- اضافة رصيد لغوي ومفاهيم جديدة لمعاني الكلمات 5- القدرة على المخاطبة الادارية في الطلبات الرسمية
Indicative Contents المحتويات الإرشادية	1- لكل تخصص لغته التي تومئ اليه، وتدل عليه، ولغة كل علم تنبع من طبيعة كنهه، فالاختصاصات العلمية لها معجم خاص بها يعبر عن جوهرها ومضمونها، فضلا عن المصطلحات الخاصة بها التي تدل عليها، وكذلك المصادر العلمية التي يُرجع اليها، والحال كما في اللغة الادبية؛ فهي ايضا لها مفرداتها وطريقة كتابتها والتعبير بها وعبرها، ومصطلحاتها الخاصة بها التي تعبر عنها وتدل عليها. 2- المعاجم - بشكل عام - على اختلاف موارها تمثل محتوى وكفا لمفردات اي لغة مقترنة بالشرح والتفسير لتلك المفردات، اما المعاجم في اللغة العربية فهي واسعة ومتنوعة؛ فهناك معاجم غير معجمات اللغة، فالعربية فيها اول معجم جغرافي في التاريخ، معجم البلدان لـ (ياقوت الحموي)، فضلا عن المعاجم المتخصصة في جزئية معينة، مثل معاجم البلاغة، فضلا عن تنوع المدارس في تأليف المعاجم وتبويبها وطريقة البحث عن المفردة فيها. 3- العلامة تدرج ضمن حقل علم السيمياء او السيميائية، وعلامات الترقيم من المواضيع المهمة بالأخص في البحوث الاكاديمية، بغض النظر عن التخصص، سواء كان التخصص علميا، او انسانيا، من هنا تأتي اهمية علامات الترقيم؛ فلها دور سيميائي، ودلالي مهم في الكتابة النصية وفي بناء النص، فهي تُسهّل الفهم على القارئ، وتوضح المعنى المقصود، عبر القراءة والتلفظ بالعبارة، فعلامات الترقيم خير وسيلة لإظهار الصراحة وبيان الوضوح في الكلام المكتوب؛ لأنه يدلّ الناظر إلى تلك العلامات الاصطلاحية وعلى العلاقات التي تربط أجزاء الكلام بعضها ببعض بوجه عام، وأجزاء كلّ جملة بوجه خاص، وكما يقول المتخصصون عن علامات الترقيم: بأن الوقف ليس مستقلاً، وإنما هو من توابع التفكير، أي: إنّ السكتات المقررة بمقادير مضبوطة في مواضع معينة، ليست مجرد محطات تنفسية بالمعنى البيولوجي للتنفس، وإنما في المقام الأول وقفات معنوية. فالعبارة من الناحية اللغوية ليست بأن يستعيد القارئ نفسه، بل المهم أن يتعاطى القارئ السكت بمقادير معلومة، وفي مواضع محددة من السلسلة المنطوقة رفعا للبس، وصونا لمقصد المتكلم عن التبديل، فهذه العلامات تجسيد لمشاعر الكاتب وقصدياته فيها. 4- الاسلوب الكتابي يمثل بصمة للكاتب الذي يصدر عنه، ويتجسد عند القارئ، ولكل كاتب اسلوبه الخاص به، ينعكس ذلك في نتاج الكاتب، وللأسلوب انواع مختلفة، فهناك الاسلوب العلمي، والاسلوب الادبي، والاسلوب الخطابي، ولكل نوع خصائصه، وقالبه الذي يتكون فيه. 5- الاحداث التي تقتدرن بالزمن تمثل الافعال، والافعال في العربية تناظر الازمنة في اللغات الاخرى من جانب معين، او من جزئية معينة، والعربية تحتوي على عدد كبير من الجذور، جذور الافعال، ففي العربية أفعال ثلاثية ورباعية وخماسية وسداسية، والفعل جزء مهم من اجزاء الكلام الاساسية، فضلا عن الجانب الصوتي في هذه الجذور، فعلم (الأصوات الفيزيائي) من العلوم المهمة في اللغة العربية، إذ يُعد علم (الأصوات الأكوستيكي) علما أقرب إلى الفيزياء منه للعلوم الإنسانية، وهو يمثل المرحلة الوسطى بين علم الأصوات النطقي وعلم الأصوات السمعي، وعلاقته مع اللغة العربية انطلقا من البذرة الاولى في دراسة مخارج الحروف فيزيائيا ودلاليا. 6- الكلام عن الشعر لا ينتهي؛ فالشعر تجسيد لمشاعر الفرد المتمثل بالشاعر، والمشاعر الجمعية للانسانية جمعاء، فهو موجود لدى كل بني البشر، والشعر العربي القديم كان بمثابة نشيدا وطنيا لهم، يمثل هويتهم الثقافية الرصينة ويمثل سجلا لتاريخهم وأمجادهم، على اختلاف اغراضه من غزل ومدح ورناء وغير ذلك، وبحور الشعر في الشعر العربي مبنية بناء صوتيا فريدا عبر التفعيلات التي وضعها الخليل بن احمد الفراهيدي ووضع فلسفتها وكنهها وقواعدها، والشعر رصيد ثقافي، وحجة في الكلام، وزينة ورونقا يضاف على شخصية الفرد والمجتمع بشكل عام. 7- الهمزة من المواضيع الاجرائية لدى الفرد الكاتب، بغض النظر عن التخصص، فيحتاجها كل فرد ناطق كاتب بها، فلها قواعد التي تصدر عنها، وتكتب بالشكل السليم منها، فموضوع رسم الهمزة من الاهمية بمكان؛ فرسمها يغير من المعنى، فلا بد من وضعها ورسمها بالشكل الصحيح لتوخي التعبير الدقيق عن المعنى المقصود.

Indicative Contents المحتويات الإرشادية	8- المفاعيل في اللغة العربية، من الموضوعات المهمة في درس اللغة العربية، ولا بد لكل دارس من معرفتها بشكل عام، وهناك آراء مختلفة بين البلاغيين والنحويين عن المفاعيل، هل ان تلك المفعولات فضلة، أم أنها ركن رئيس في الجملة ؛ فالنحويون يرون انها فضلة في الجملة، وأن ركني الجملة الأساسيين هما: الفعل، والفاعل ، وأما البلاغيون فيرون :إنها ليست فضلة، وإنما هي ركن أساسي في الجملة؛ لأن كل كلمة تدل على معنى في الجملة، وإذا ما دلت على معنى فلا تُعد فضلة، وإنما هي ركن رئيس في الجملة وبنائها، ورأي البلاغيين أقرب للصواب من رأي النحويين، فدراساتها في العربية لغير المختصين مما يضيف لهم خزيناً تعبيرياً متنوعاً. 9- من المعروف وجود ظاهرة الأخطاء اللغوية نحوية كانت أو املائية أو اسلوبية، عند متحدثي اللغة العربية وبالأخص عند غير المختصين بها ولا سيما من يعملون في مجال الاعلام، وهذه الظاهرة اتسعت وزاد انتشارها في العصر الحديث، فأخذت هذه الأخطاء تغزو مجالات الدراسة جميعها، من ذلك موضوع (العدد) في اللغة العربية، فنجد كثيراً من الطلبة وكذلك من عامة الناس يستعملون الأرقام بدلاً من كتابتها بالحروف؛ وذلك لتجنب الوقوع في الخطأ وهذا دليل ضعف لا يليق بالدارس أياً كان تخصصه؛ ولهذا فموضوع العدد وقواعد كتابته في اللغة العربية موضوع لا غنى عنه في زمن لغة الأرقام. 10- هناك مجموعة من الالفاظ متداولة بشكل كبير، تُستعمل في غير مكانها الصحيح، وفي غير ما وُضعت له وهذه الالفاظ تُستعمل في المخاطبات الرسمية الادارية بالمعنى غير الصحيح او الدقيق الذي تحمله تلك الالفاظ من معاني، فضلاً عن أهمية توخي الدقة في هذه الالفاظ توظيفاً لها في الطلبات الرسمية التي تُقدم على اختلاف موضوعاتها، فالطلب لا بد من ان يكون مختصراً مركزاً، يعطي الفكرة الموجزة، والهدف المقصود منه ازاء صاحب الادارة الذي تُقدم اليه الطلبات، وما في ذلك من ايجابيات العمل في التخفيف واختصار للجهد والوقت في تنفيذ المهام الادارية المؤكدة الافراد على اختلاف درجاتهم.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	صناعة شخصية متكاملة للطالب الجامعي من حيث التخصص العلمي الدقيق والتخصص المساند

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome	
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment		100% (100 Marks)			

Delivery Plan (Weekly Syllabus)

المناهج الأسبوعي النظري

	Material Covered
Week 1	الجموع في اللغة العربية / الجمع المذكر السالم
Week 2	الجمع المؤنث السالم
Week 3	جمع التكسير
Week 4	نماذج من الصيغ الصرفية وتوظيفها دلاليا
Week 5	الأفعال الخمسة وتقسيماتها
Week 6	نماذج مختارة من الشعر العربي القديم - الشعر العباسي
Week 7	Mid-term Exam
Week 8	التوابع / التوكيد
Week 9	العطف
Week 10	البدل
Week 11	الاسماء الخمسة
Week 12	نماذج من الشعر الحديث
Week 13	النثر العربي / الرواية الحديثة
Week 14	الترادف – المشترك اللفظي
Week 15	الأخطاء الشائعة الجزء الثاني – طريقة كتابة الطلبات الرسمية
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	1- كتاب: العربية الجامعية لغير المتخصصين / د. عبده الراجحي 2- كتاب: النحو التطبيقي / د. عبده الراجحي 3- الصرف التطبيقي / د. عبده الراجحي 4- النحو الوافي / عباس حسن 5- تاريخ الادب العربي / شوقي ضيف	Available in the Library?
Required Texts		
Recommended Texts		
Websites	شبكة الفصحى لعلوم اللغة العربية	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors

	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية اللغة الانكليزية 2

Module Information				
معلومات المادة الدراسية				
Module Title	English Language2		Module Delivery	
Module Type	Basic		☐ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	KUS24021			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	2 nd	Semester of Delivery		2 nd
Administering Department	Medical Physics	College	Science	
Module Leader	Jafer Fadhel Odah		e-mail	
Module Leader's Acad. Title	Professor	Module Leader's Qualification		Ph.D.
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date	1/5/2026	Version Number	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Build a foundational vocabulary for everyday topics such as family, work, shopping, and travel. 2. Master essential grammar structures, including the present simple, present continuous, past simple, and basic prepositions. 3. Listen for key information in simple conversations and audio texts, such as directions, introductions, and short dialogues. 4. Practice speaking in structured activities, including introductions, asking questions, and participating in short exchanges. 5. Write simple sentences and short texts, such as postcards, emails, and personal descriptions. 6. Read and understand short texts, notices, and articles on familiar topics. 7. Use practical language for daily interactions, like ordering food, asking for directions, or making plans. 8. Explore cultural differences and similarities through lessons that introduce English-speaking traditions and lifestyles
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introduce themselves and others, ask and answer basic personal questions, and use the verb to be in simple sentences. 2. Describe possessions and family relationships, using possessive adjectives and singular/plural nouns correctly. 3. Talk about daily routines, times, and schedules while using the present simple tense and frequency adverbs. 4. Discuss abilities, skills, and permissions using can and can't, and learn functional language for making requests. 5. Describe places and homes, use there is/there are with prepositions of place, and ask for and give directions. 6. Talk about past experiences and events using the past simple tense (regular verbs) and vocabulary for historical events. 7. Express preferences, likes, and dislikes, and practice using verbs followed by -ing or to forms. 8. Ask about prices, and use countable/uncountable nouns with some, any, and much/many. 9. Describe current actions using the present continuous tense and compare it with the present simple. 10. Talk about future plans and intentions using going to, and learn vocabulary for travel and holidays. 11. Discuss past events using the past simple tense (irregular verbs) and share personal experiences.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Each unit will focus on its primary learning outcomes, with about 10-15 minutes spent on introducing vocabulary and grammar, 20-25 minutes on practicing listening and speaking, and the remaining 20-25 minutes on reading comprehension, writing, and functional language exercises. To maximize time, more complex topics like past tense or future forms will be prioritized over less frequent structures. The course will include a brief warm-up activity at the start of each session, followed by targeted practice and ending with a summary or real-life application task. [10 hours] The review sessions will consolidate key language skills from multiple units, focusing on active practice through games, discussions, or role-plays. The final 2 hours will involve assessments, such as short quizzes and oral presentations, and a practical activity like creating or responding to functional language scenarios. [7 hours]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- Lectures - Role playing - Flipped classroom approach - Time management - Immediate feedback - Group work

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	5, 10	LO #1, 2, 4,5 and 6
	Assignments	2	10% (10)	3,12	LO # 3, 4, 6 and 7

	Projects	1	10% (10)	Continuous	LO #1- 11
	Report				
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO # 1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Greetings, introductions, and the verb to be.
Week 2	Learn vocabulary for family, countries, and possessive adjectives.
Week 3	Practice the present simple tense, frequency adverbs, and time expressions.
Week 4	Explore the use of can/can't for abilities and making polite requests.
Week 5	Learn vocabulary for homes, prepositions of place, and asking for/giving directions.
Week 6	Introduce the past simple tense (regular verbs) and key time expressions.
Week 7	Express opinions using verbs like like, love, hate followed by -ing.
Week 8	Focus on countable/uncountable nouns, quantifiers (some, any, much, many), and shopping conversations.
Week 9	Compare the present simple and present continuous tenses in context.
Week 10	Discuss future plans using going to and vocabulary for travel and holidays.
Week 11	Focus on irregular past simple verbs and sharing personal experiences.
Week 12	Practice practical language for real-life scenarios like ordering food and making arrangements
Week 13	Use comparative adjectives and simple future forms (will) to talk about hopes and predictions.
Week 14	Revisit and reinforce grammar, vocabulary, and skills learned in previous lectures.
Week 15	oral presentations, or role-plays to assess learners' progress
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	Soars, L., Soars, J. (2002). New Headway: Beginner: Student's Book B. Spain: OUP Oxford.	No
Recommended Texts	Cunningham, S., Redston, C., Moor, P. (2002). Cutting Edge: Starter. United Kingdom: Longman.	No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية تطبيقات علم الحاسوب

Module Information					
معلومات المادة الدراسية					
Module Title	Applications of Computer Science		Module Delivery		
Module Type	Support		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	KUS24022				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		2 nd	Semester of Delivery		2 nd
Administering Department		Medical Physics	College	Science	

Module Leader	Mustafa Ayad Anwer	e-mail	Mustafa.alani@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Lec. Mustafa Ayad Anwer	e-mail	Mustafa.alani@kus.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/5/2026	Version Number	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Security and Networking: - To introduce students to computer networks, their components, and basic security principles. - To prepare students for managing and mitigating network threats. 2. Computer Troubleshooting: - To equip learners with the ability to diagnose and resolve common hardware and software issues. 3. E-Commerce: - To familiarize learners with electronic banking services, including online and mobile banking. 4. Introduction to AI: - To provide an overview of artificial intelligence and its applications in everyday life. - To introduce key ethical considerations, societal impacts, and future developments in AI.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Security and Networks: - Describe different types of networks and their components. - Implement basic security measures to protect network integrity. 2. Computer Troubleshooting: - Apply diagnostic tools to identify hardware/software problems. - Use practical methods to resolve technical issues. 3. E-Commerce: - Utilize electronic banking services for transactions. - Explain the mechanisms behind online banking and security. 4. Artificial Intelligence:

	• Identify applications of AI in daily life, such as smartphones and healthcare. • Discuss the ethical and societal challenges posed by AI technologies. • Predict future trends and innovations in AI.
Indicative Contents المحتويات الإرشادية	1. Network security principles: (4 hrs) • Understanding threats such as malware, phishing, and hacking. • Fundamentals of networking and its components. 2. E-Commerce: (2 hrs) • Fundamentals of online banking: • Online and mobile banking. • Debit and credit card services. • Use of electronic alerts for secure banking. 2. Computer Troubleshooting: (4 hrs) • Identifying common hardware and software problems: Troubleshooting hardware issues (e.g., printers, keyboards, connectivity). • Resolving software conflicts (e.g., operating system errors, application crashes). • Diagnostic tools: Usage of built-in system tools for troubleshooting (e.g., Task Manager, disk utilities). • Introduction to third-party diagnostic software. 3. Introduction to Artificial Intelligence (AI): (4 hrs) • AI in Daily Life: Applications of AI in smartphones, virtual assistants (e.g., Siri, Google Assistant). 4. The Role of AI in Modern Smartphones: (4 hrs) • How AI is utilized in Modern Smartphones. 5. Applications and Tools of AI: (4 hrs) • AI applications. • AI tools. 6. AI and Society: (2 hrs) • How AI affects the social life. • AI and the future of humanity. 7. Ethical Challenges in AI: (2 hrs) • Issues of privacy, surveillance, and the job market. 8. Future of AI: (2 hrs) • Trends, recent research, and emerging technologies.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Deliver theoretical content through structured lectures. 2. Use multimedia aids (e.g., presentations, videos) to enhance understanding of abstract topics like AI and networking. 3. Hands-on practice for email setup, document collaboration, and troubleshooting. 4. Lab-based exercises to simulate network setups and resolve network issues.

	5. Demonstrations of e-commerce tools, such as secure online banking and mobile payment systems. 6. Collaborative problem-solving for troubleshooting real-life IT issues. 7. Group discussions on AI's impact on society and ethical challenges. 8. Present real-world scenarios of AI applications in healthcare, finance, and transportation. 9. Analyze security breaches and propose preventive measures for network security. 10. Assign projects such as: ○ Designing secure email workflows. ○ Developing troubleshooting guides for common computer issues. ○ Proposing solutions for AI-related societal challenges. 11. Assign readings from textbooks and reference materials for self-study. 12. Encourage the use of online tutorials and open-source tools for further exploration. 13. Formative Assessment: ○ In-class quizzes and practical evaluations. ○ Group presentations on assigned topics. 14. Summative Assessment: ○ Final theoretical exams to assess understanding. ○ Practical tests to evaluate troubleshooting and application skills.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
	Quizzes	3	15% (15)	5,7,10	LO#1,2,10 and 11

Formative assessment	Assignments	1	5% (5)	12	LO#3,4,6 and 7
	Projects / Lab.	1	10% (10)	15	LO # 4,14
	Report	1	10% (10)	13	LO#5,8, and 10
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO,#1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Networking, Overview of networks and types of networks.
Week 2	Network Security Basics, understanding network threats.
Week 3	Introduction to E-Commerce and Online Banking, Concepts of electronic banking, online banking basics
Week 4	Computer Troubleshooting: Identifying software and hardware issues and solving them.
Week 5	Basic Troubleshooting Techniques, Tools and techniques for diagnosing issues.
Week 6	Introduction to Artificial Intelligence, Definition, history, and overview of AI.
Week 7	Key Characteristics of AI, benefits of AI, Challenges and ethical considerations.
Week 8	The role of AI in modern smartphones, virtual assistants.
Week 9	Adaptive learning, Real-Time Translation Services.
Week 10	Applications of AI, AI in education, healthcare, finance, and marketing
Week 11	Further Applications of AI, AI in transportation and advertising
Week 12	Applications of AI: Finance, Robotics and Automation Technologies.
Week 13	AI and Society, AI's impact on social and international relations
Week 14	Ethical Challenges in AI, Ethical concerns, privacy, and AI's impact on jobs
Week 15	The Future of AI, Future trends, research, and emerging technologies
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Weeks 1	Definition of programming and MATLAB environment
Week 2	Variables
Weeks 3	Using MATLAB a calculator

Weeks 4	Vectors and matrices
Weeks 5	Decision making: If statement, if...else statement, nested if
Weeks 6	Loops: for loop, nested for loop
Week 7	Graphical User Interface
Week 8	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology," 3rd Edition (2020). 2. Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology In Action Complete," 16th Edition (2020). 3. Ahmed Banafa, "Introduction to Artificial Intelligence (AI)," 1st Edition (2024).	No
Recommended Texts	1. الخضر علي الخضر بحات, " أساسيات الحاسوب ", 2016. 2. الدكتور عادل عبدالنور, "مدخل إلى عالم الذكاء الاصطناعي", 2005.	No
Websites	• https://www.mathworks.com/ • https://www.wix.com/blog/ecommerce/2023/12/ai-in-ecommerce • https://boostcommerce.net/resources/ai-ecommerce	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية

التصوير الطبي

Module Information			
معلومات المادة الدراسية			
Module Title	Medical Imaging		Module Deliver
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MPH22023		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2 nd	Semester of Delivery	2 nd
Administering Department	Medical Physics	College	Science
Module Leader	Dr. Ghaiath A. Fadhil	e-mail	Ghaiath.fadhil@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	-	e-mail	-
Peer Reviewer Name	-	e-mail	-
Scientific Committee Approval Date	01/5/2026	Version Number	1.0

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To develop a basic understanding to the basic physics of medical imaging. 2. To understand the relationship between electromagnetic radiation and biological tissues. 3. To distinguish between the various interactions occurring in tissues and to be able to identify beneficial ones from the non-beneficial for medical imaging. 4. To gain basic understanding to medical imaging techniques employed in modern hospitals, including x-ray imaging, computed tomography, magnetic resonance imaging, ultrasound and nuclear isotope imaging. 5. To provide you with sufficient knowledge of introductory radiation biology and physics to allow you an appreciation of safe and optimal use of radiation imaging techniques.
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Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the role of medical physicist in the medical imaging process. 2. Understand the concept of ionizing radiation. 3. Distinguish between different interactions of x-ray with matter. 4. Understand the outcome of each x-ray interaction with matter. 5. Differentiate the main terms related to radiation attenuation. 6. Understand x-ray production process. 7. Appreciate the main features of x-ray images. 8. Classify x-ray modalities. 9. Review CT system design. 10. Differentiate between different modes of CT acquisition. 11. Comprehend the approach of nuclear imaging 12. Differentiate between different types of medial nuclear imaging. 13. Review the principles of ultrasound imaging. 14. Distinguish between different types of MRI. 15. Define the main concepts of radiation biology
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: <u>Part A – Medical Imaging principles</u> The basis of medical imaging, The role of a Medical Physicist, Electromagnetic Radiation, Radiation from Electron Transitions, Characteristic x-rays and Auger Electrons [15 hours] <u>Part B – Medical Imaging with Ionizing Radiation</u> Interaction of x-ray Radiation with Matter, Kerma, Radiation Dose, X-ray Production, X-ray Detection, Computed (digital) Radiography, Radiographic image, Mammography, Computed Tomography, Modes of CT Acquisition, Clinical use of CT scans, Nuclear physics, Tomography with radionuclides, SPECT and PET [30 hours] <u>Part C – Medical Imaging with non-Ionizing Radiation</u> Ultrasound waves, Ultrasound Transducers, 3D-Ultrasound, Doppler-ultrasound, Magnetic Resonance Imaging and Clinical applications of MRI [20 hours] <u>Part D- Radiation Biology</u> Classification of Biologic Effects, Stochastic effects, Deterministic effects, Radiation Protection, Attenuation of X-rays and Gamma Rays,, Half-Value Layer [7 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will be delivered through a combination of lectures, discussions and web-based learning. At the end of each lecture, students will receive more specific learning outcomes for the lecture and be expected to undertake self-directed further reading and research.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	5, 10	LO #1-4, 5-9 and 10-14
	Assignments	2	10% (10)	6,10	LO #3-5
	Projects / Lab.	1	10% (10)	Continuous	
	Report				
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO # 1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المناهج الأسبوعية النظرية	
	Material Covered
Week 1	Introduction to Medical Imaging
Week 2	Electromagnetic Radiation
Week 3	Radiation interaction with matter
Week 4	X-ray Production
Week 5	X-ray interaction with matter
Week 6	X-ray Detection
Week 7	X-ray Modalities
Week 8	Midterm Exam
Week 9	Computed Tomography
Week 10	Nuclear Imaging
Week 11	Ultrasound Imaging

Week 12	Magnetic Resonance Imaging
Week 13	Radiation Biology & Protection
Week 14	Radiation Attenuation
Week 15	Overview of future developments in medical imaging
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to medical imaging lab
Week 2	Lab 2: Features of Medical images
Week 3	Lab 3: X-ray positioning
Week 4	Lab 4: CT positioning and imaging procedures
Week 5	Lab 5: MRI positioning and imaging procedures
Week 6	Lab 6: PET scan Procedure
Week 7	Lab 7: Medical imaging standard practices

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Samei, Ehsan, and Donald J. Peck. Hendee's physics of medical imaging. John Wiley & Sons, 2019. 2. Alisy-Roberts, P., and J. Williams. "Farr's Physics for Medical Imaging." (2008).	No
Recommended Texts	Dendy, Philip Palin, and Brian Heaton. Physics for diagnostic radiology. CRC press, 2011.	No
Websites	https://www.iomp.org/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings

	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية الفيزياء الطبية I

Module Information معلومات المادة الدراسية				
Module Title	Medical Physics I		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH22024			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	2	Semester of Delivery		
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr. Ashraf M. Alattar		e-mail	Ashraf_alattar2000@kus.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/05/2026		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Non	Semester	2
Co-requisites module	Non	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Cognitive objectives A1- That the student understands the fundamental physics ideas connected to medicine. A2- To comprehend the physical relationship and how to medically communicate it. A3- Relationship between physical attributes and medical device uses. The fundamental aims. B1 - Recognize the fundamental physical rules and their application to the human body. B2 - Understanding of physical aspects influencing the human body and their relationship to the appearance of disease indications on the body.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Obtaining a prominent scientific staff that tries to understand the nature of the physical work of the human body by being acquainted with each of 1- The influence of gravity forces on bone formation and blood circulation 2- The electrical influence on the nature of the body's work 3- The impact of heat on the nature of the body's work 4- Investigating mathematical physical relationships and their computerized diagnosis in illnesses caused by these impacts.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – medical physics:</u> Medical Physics: Aims of the Medical physics, Physics of the body, Application of physics in medicine, i. Diagnostic, ii. Therapy, iii. Patient monitoring [8 hrs]. Forces on and in the Body: Forces, Fundamental Forces, Forces Affect the Body, Some Effects of Gravity on the Body, varicose veins, The electrical force, nuclear forces, Strong nuclear forces [8 hrs]. Physics of Skeleton: Bone functions in the body, Bone remodeling, Bone mineral, advantages of trabecular bone over compact bone, Hooks law Lubrication of Bone Joints, synovial fluid, lubricating material, lubricating properties a fluid, viscosity of synovial fluid, coefficient of friction, using an x-ray image to measure the amount of bone mineral, review questions. [8 hrs] conservation of energy: Introduction to Energy, conservation of energy in medical physics, energy of interacting bodies, potential energy, 3 laws of conservation of energy Work: Kinetic Energy, equation of Kinetic Energy, amount of energy in body system, non-isolated equation, Isolated System [8 hrs]. Power: power of the body, ratio of power in the body, rate of energy as power, equations of power in the body, solved problem.

	Pressure: pressure in the body, pressure on the body, Typical pressure in the normal body, Arterial blood pressure, Venous blood pressure, Middle ear pressure, Eye pressure.
	Variation of Pressure with Depth, atmospheric pressure, Pressure Measurements, Barometer, Manometer, sphygmomanometer, Blood pressure, some solved problems [8 hrs] Revision problem classes [2 hrs] <u>Part B -</u> Fluid Mechanics: States of Matter, Density Notes, Viscosity, Dynamic Viscosity Kinematic Viscosity, Surface tension, Surface tension, definition, Capillary Action [6 hrs]. Buoyant Force and Archimedes' Principle, Archimedes' Principle: Totally Submerged Object, Archimedes Principle: Floating Object, Archimedes Principle, Iceberg Example Types of Fluid Flow, Ideal Fluid Flow, Equation of Continuity.,[6 hrs]. Laminar Flow, equations and explanations . Laminar Flow in a Tube, Bernoulli's Equation, examples and solved problems [8 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in introducing this unit is to introduce
	students to the physical principles upon which medical physics depends and how to deal with them in a scientifically rigorous manner. Encouraging students to discover how the human body works with physical laws and its physiological and therapeutic effects by themselves through understanding the general laws of physics. This is done through scientific discussions in class as well as through practical application in hospitals and medical clinics.

Student Workload (SWL) الحمل الدراسي للطلاب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Medical Physics: Aims of the Medical physics, Physics of the body, Application of physics in medicine, i. Diagnostic, ii. Therapy, iii. Patient monitoring
Week 2	Forces on and in the Body: Forces, Fundamental Forces, Forces Affect the Body, Some Effects of Gravity on the Body, varicose veins, The electrical force, nuclear forces, Strong nuclear forces
Week 3	Physics of Skeleton: Bone functions in the body, Bone remodeling, Bone mineral, advantages of trabecular bone over compact bone, Hooks law
Week 4	Lubrication of Bone Joints, synovial fluid, lubricating material, lubricating properties a fluid, viscosity of synovial fluid, coefficient of friction, using an x-ray image to measure the amount of bone mineral, review questions
Week 5	conservation of energy: Introduction to Energy, conservation of energy in medical physics, energy of interacting bodies, potential energy, 3 laws of conservation of energy
Week 6	Work: Kinetic Energy, equation of Kinetic Energy, amount of energy in body system, nonisolated equation, Isolated System
Week 7	Power: power of the body, ratio of power in the body, rate of energy as power, equations of power in the body, solved problem.
Week 8	Pressure: pressure in the body, pressure on the body, Typical pressure in the normal body, Arterial blood pressure, Venous blood pressure, Middle ear pressure, Eye pressure
Week 9	Variation of Pressure with Depth, <i>atmospheric pressure</i> , Pressure Measurements, Barometer, Manometer, sphygmomanometer, Blood pressure, some solved problems
Week 10	Fluid Mechanics: States of Matter, Density Notes, Viscosity, Dynamic Viscosity
Week 11	Kinematic Viscosity, Surface tension, Surface tension, definition, Capillary Action
Week 12	Buoyant Force and Archimedes' Principle, Archimedes' Principle: Totally Submerged Object, Archimedes Principle: Floating Object, Archimedes Principle, Iceberg Example
Week 13	Types of Fluid Flow, Ideal Fluid Flow, Equation of Continuity.
Week 14	Laminar Flow, equations and explanations .

Week 15	Laminar Flow in a Tube, Bernoulli’s Equation, examples and solved problems
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Laboratory safety
Week 2	First exp. Manual Sphygmomanometer
Week 3	Second exp. Digital Sphygmomanometer
Week 4	Third exp. Glucose level monitoring
Week 5	Fourth exp. Venipuncture
Week 6	Exam
Week 7	Fifth exp. Hemoglobin A1C (HbA1c) Test
Week 8	Sixth exp. Oximeter
Week 9	Seventh exp. Study of Phonocardiograph System - observe Phonocardiogram waveforms (PCG)
Week 10	Eighth exp. Study of Phonocardiograph System - hear the Phonocardiogram signals (PCG)
Week 11	Exam
Week 12	Review
Week 13	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1.Medical Physics by John R. Cameron, International Publication. 2. Elements of Biophysics Randall 1998 3. Medical Physics Data Book, Thomas N. Padikal, Editor MD 20205 and Sherman P. Fivozinsky, Associate Editor Office of Standard Reference Data National Bureau of Standards Washington, DC 20234 4- A Wiley-interscience publication JOHN WILEY & SONS	Yes

Recommended Texts	1. Brown B H, Medical Physics and Biomedical Engineering, Institute Of Physics, 1999. (R895.M489). 2. Bushberg Jerrold T, Seibert J A, Leidholdt E M and Boone J M, The Essential Physics of Medical Imaging, 2nd Edition, Lippincott Williams & Wilkins, 2002. (RC78.7.D53E78). 3. Ganong William F, Ganong's Review of Medical Physiology, 24th Edition, McGraw-Hill Medical, 2012.	yes
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	(راسب) قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

المستوى الثالث

Module Description Form

نموذج وصف المادة الدراسية

احصاء حيوي

Module Information			
معلومات المادة الدراسية			
Module Title	Biostatistics		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	MPH31025		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	3 rd	Semester of Delivery	1 st
Administering Department	Medical Physics	College	Science
Module Leader	Dr. Arkan jebur saeed	e-mail	arkan.jebur@kus.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/05/2026	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Biostatistics provides the basic framework for thinking about data in a rigorous fashion. This course is intended both as a refresher course and as a first course in the application of statistical thinking to biological problems.

	Descriptive and inferential statistics will be covered, with topics including confidence intervals, basic probability, discrete and continuous distributions, t-tests, correlation, regression, chi-square tests.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	· define, explain the scope and concepts of Biostatistics and its applications. · define data, know the common sources of data and understand the various methods of data collection and presentation. - discuss to a reasonable level the probability theories and population distribution and their applications in health and health related fields. · define and explain the various commonly used test statistics and their applications in analyzing data in public health · acquire the necessary knowledge and skills for data analysis and interpretation of test statistic results.
Indicative Contents المحتويات الإرشادية	<u>Module 1 Introduction to Biostatistics and Data Management</u> 1- Definition and Application of Biostatistics 2- Data, Data Sources 3- Methods of Data Collection <u>Module 2 Organization and Presentation of Data</u> 1- Tabular Presentations 2- Diagrammatic Presentation of Data 3- Graphs <u>Module 3 Numerical Measures</u> 1- Measures of Central Tendency 2- Measures of Dispersion or Variability 3- regression and correlation <u>Module 4 Inferential Biostatistics</u> 1- Hypothesis Testing 2- Test of Significance and Statistical Errors <u>Module 5 Non-Parametric Tests</u> 1-Chi-Square Test (X ²)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in presenting this model is theoretical lectures and encouraging students to participate in the lectures effectively to know the basics of the subject and its vocabulary. Improving thinking skills and encouraging them to participate critically and interactively in the topics raised during the academic weeks in the theoretical and practical parts. This will be achieved through theoretical and practical classes, tutorials, and interactive tutorials by thinking about the type of simple experiments that include some sampling activities that are of interest to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem)	33	Structured SWL (h/w)	2.2

الحمل الدراسي المنتظم للطلاب خلال الفصل		الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2.8
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	4, 8	LO #1, 2, 3, 5,6, and 7
	Assignments	2	10% (10)	5, 10	LO # 2, 4, 6, 8, and 9
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 12
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-9
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Statistics
Week 2	Variables
Week 3	Frequency Distributions
Week 4	Frequency Distributions
Week 5	Types of Graphs
Week 6	Measures of Central Tendency
Week 7	Measures of Central Tendency
Week 8	Measures of dispersion
Week 9	Measures of dispersion
Week 10	Midterm Exam
Week 11	Regression
Week 12	Correlation
Week 13	Hypothesis
Week 14	Chi-Square Test (X ²)

Week 15	General review of the previous lessons
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية

فيزياء الاجهزة الطبية 1

Module Information معلومات المادة الدراسية		
Module Title	Physics of Medical Instruments I	Module Delivery
Module Type	Core	

Module Code	MPH31026			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	3	Semester of Delivery		1
Administering Department	Medical Physics	College	Science	
Module Leader	Nihad K. Ali		e-mail	nihad@kus.edu.iq
Module Leader's Acad. Title	Assoc. Prof.	Module Leader's Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	nihad@kus.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	1/05/2026	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course introduces students to various medical devices that can be found in hospitals and medical institutions. The objective of this subject is to describe the principles, applications and the design of the medical instruments most commonly used in hospitals. Fundamental principles of operation and quantitative analysis and design of medical instrumentation systems for diagnostic and therapeutic medical applications are taught.
Module Learning Outcomes	<i>At the end of the course, students are expected to learn:</i> 1. The basic theorem and laws to explain concepts, functions, behavior and characteristics of biomedical circuits and devices.

مخرجات التعلم للمادة الدراسية	2. Formulate and solve electrical and mechanical problems related to biomedical devices. 3. Distinguish between therapeutic, diagnostic and analytical medical devices. 4. Work on device calibration and work on some devices directly in the examination.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Biomedical Instrumentation. Biopotential Electrodes. (9 hrs) Sensors: Electrocardiography. Blood Pressure, Heart Sounds and Blood Flow. (6 hrs) Respiratory System Measurements. (10 hrs) Defibrillator, Pacemaker. (9) Electroencephalogram (EEG) (9 hrs) Respiratory system measurements. (9 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to acquaint the students with the physical principles on which medical devices depend how to deal with them in an accurate scientific method. Encouraging students to discover for themselves how medical devices work by understanding the general laws of physics. This is done through scientific discussions in the classroom and in the laboratory as well as through practical application in hospitals and medical clinics.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, and 3
	Assignments	2	10% (10)	2, 12	LO # 3, 4
	Projects	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 4

Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered
Week 1	Biopotential electrodes: Electrode-electrolyte interface, polarization,
Week 2	Polarization; polarizable and non-polarizable electrodes, electrode circuit models. Biopotential electrodes: skin interface and motion artifact.
Week 3	Types of electrodes; body surface recording electrodes, internal electrodes, micro electrodes, practical hints in using electrodes.
Week 4	Sensors: Oxygen sensor for blood, Carbon dioxide sensor for blood.
Week 5	Heart sound sensor. Piezoelectric heart sound sensor, Fetus heart sound sensor. Blood flow sensor: Respiration sensor, Blood pressure sensor.
Week 6	Enzyme sensor and microbial sensor.
Week 7	Defibrillator, Lown Defibrillator Circuit.
Week 8	Pacemaker, Types of pacemaker, Operating modes.
Week 9	Electroencephalogram (EEG).
Week 10	EEG Rhythms and Waveforms.
Week 11	Electroencephalogram (EEG) components.
Week 12	Respiratory system measurements.
Week 13	Mechanic of breathing.
Week 14	Respiratory transducer and instruments.
Week 15	. Intensive, coronary care units and operating rooms.
Week 16	Preparatory week before the final Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Webster John G and Clark John W, Medical Instrumentation: Application and Design, 4th Edition, John Wiley, 2010.	No
Recommended Texts	Carr, Joseph J and Brown John M, Introduction to Biomedical Equipment Technology, 4th Edition, Prentice Hall 2001.	No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية

الفيزياء الطبية II

Module Information					
معلومات المادة الدراسية					
Module Title	Medical Physics II		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	MPH31027				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		3 rd	Semester of Delivery		1 st
Administering Department		Medical Physics	College	Science	
Module Leader	Dr. Bassma Hussain Hamad		e-mail	dr.bassmahussain@kus.edu.iq	
Module Leader's Acad. Title		Assistant Professor	Module Leader's Qualification		Ph.D.

Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	15/06/2025	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Cognitive objectives A1- That the student understands the fundamental physics ideas connected to medicine. A2- To comprehend the physical relationship and how to medically communicate it. A 3- Relationship between physical attributes and medical device uses. A4- Develop pupils' clinical skills. The fundamental aims. B1 - Recognize the fundamental physical rules and their application to the human body. B2 - Understanding of physical aspects influencing the human body and their relationship to the appearance of disease indications on the body. B3- Integration of fundamental principles and medical devices
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Obtaining a prominent scientific staff that tries to understand the nature of the physical work of the human body by being acquainted with each of 1- The influence of gravity forces on bone formation and blood circulation 2- The electrical influence on the nature of the body's work 3- The impact of heat on the nature of the body's work 4- Investigating mathematical physical relationships and their computerized diagnosis in illnesses caused by these impacts.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – medical physics, basics :</u> Electricity Within the Body: Potential difference between inside and outside the cell, electrical and magnetic effects generated inside the body, applications of electricity and magnetism to the surface of the body. [12 hrs]. Electromyography (EMG): technique of recording electric activity, EMG signal, EMG electrodes [6 hrs]. Electrocardiograph (ECG):, Electrical signals from the heart, atrial depolarization and contraction, The QRS complex, Six frontal plane ECG s for a normal subject . [8hrs].

	Electroencephalograph (EEG): electrical activity of the brain, Electrodes and potential, the frequency of the EEG signals, EEG as investigation method of brain activity, Electrodes used, type and characteristics [10 hrs]. The sound: Physics of Sound Wave, Sonic spectrum, Speed of Sound, Sound wave intensity, acoustic impedance, [8hrs]. Sound in medicine: Sound Intensity Level [Ratio] , Sound Reflection and transmission, General Properties of Sound. [6 hrs]. Sound in Medicine: Infrasound, ultrasound, Pulsed ultrasound, Scattering, Absorption, US attenuation coefficient, examples and solved problems [8 hrs]. Light in medicine: properties used for medicine, Measurement of light and units. [6 hrs]. Applications of visible light in medicine, medical uses of visible light, Transillumination, [6 hrs]. Applications of ultraviolet and infrared light in medicine [6 hrs]. <u>Part B -</u> Eye and vision: The Human Eye, The Retina –The light detector of the eye, [6 hrs]. Eye and vision: Detective vision and its corrections, Physics of eyes vision [6 hrs]. Eye and vision: Difference effects on the eye, Myopia Farsightedness Hyperemia Nearsightedness [8 hrs]. Eye and vision: How sharp are your eyes? Presbyopia (old sight) [6 hrs]. Eye and vision: Astigmatism, examples and solved problems. [4 hrs].
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in introducing this unit is to introduce students to the physical principles upon which medical physics depends and how to deal with them in a scientifically rigorous manner. Encouraging students to discover how the human body works with physical laws and its physiological and therapeutic effects by themselves through understanding the general laws of physics. This is done through scientific discussions in class as well as through practical application in hospitals and medical clinics.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	5, 10	LO #1.2
	Assignments	2	10% (10)	2, 9,12	LO # 3, 4, and 5
	Projects / Lab.	15	10% (10)	Continuous	
	Report				
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Electricity Within the Body: Potential difference between inside and outside the cell, electrical and magnetic effects generated inside the body, applications of electricity and magnetism to the surface of the body.
Week 2	Electromyography (EMG): technique of recording electric activity, EMG signal, EMG electrodes
Week 3	Electrocardiograph (ECG): , Electrical signals from the heart, atrial depolarization and contraction, The QRS complex, Six frontal plane ECG s for a normal subject .
Week 4	Electroencephalograph (EEG): electrical activity of the brain, Electrodes and potential, the frequency of the EEG signals, EEG as investigation method of brain activity, Electrodes used, type and characteristics
Week 5	The sound: Physics of Sound Wave, <i>Sonic spectrum</i> , Speed of Sound, Sound wave intensity, acoustic impedance,
Week 6	Sound in medicine: Sound Intensity Level [Ratio] , Sound Reflection and transmission, General Properties of Sound.
Week 7	Sound in Medicine: Infrasound, ultrasound, Pulsed ultrasound, Scattering, Absorption, US attenuation coefficient, examples and solved problems
Week 8	Light in medicine: properties used for medicine, Measurement of light and units.
Week 9	Applications of visible light in medicine, medical uses of visible light, Transillumination,
Week 10	Applications of ultraviolet and infrared light in medicine
Week 11	Eye and vision: The Human Eye, The Retina –The light detector of the eye,
Week 12	Eye and vision: Detective vision and its corrections, Physics of eyes vision
Week 13	Eye and vision: Difference effects on the eye, Myopia Farsightedness Hyperemia Nearsightedness

Week 14	Eye and vision: How sharp are your eyes? Presbyopia (old sight)
Week 15	Eye and vision: Astigmatism, examples and solved problems.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	تجربة المسارات الكهربائية لجهاز ECG
Week 2	تجربة قياس ضربات القلب بالمحاكاة
Week 3	تجربة لدراسة شكل الموجات الصوتية المنبعثة من القلب
Week 4	تجربة لدراسة شكل الإشارات الكهربائية حسب امراض القلب المختلفة
Week 5	تجربة تأثير العلاج بالتحفيز الكهربائي
Week 6	تجربة محاكاة تخطيط الدماغ
Week 7	تجربة محاكاة تخطيط الاعصاب
Week 8	امتحان Mid
Week 9	تجربة Pacemaker
Week 10	تجربة تأثير العلاج بالموجات فوق الصوتية
Week 11	تجربة قياس فولتيات كهربائية القلب
Week 12	
Week 13	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Medical Physics by John R. Cameron, International Publication. 2. Elements of Biophysics Randall 1998 3. Medical Physics Data Book, Thomas N. Padikal, Editor MD 20205 and Sherman P. Fivozinsky, Associate Editor Office of Standard Reference Data National Bureau of Standards Washington, DC 20234 4- A Wiley-interscience publication JOHN WILEY & SONS	Yes

Recommended Texts	1. Brown B H, Medical Physics and Biomedical Engineering, Institute Of Physics, 1999. (R895.M489). 2. Bushberg Jerrold T, Seibert J A, Leidholdt E M and Boone J M, The Essential Physics of Medical Imaging, 2nd Edition, Lippincott Williams & Wilkins, 2002. (RC78.7.D53E78). 3. Ganong William F, Ganong's Review of Medical Physiology, 24th Edition, McGraw-Hill Medical, 2012.	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية الكترنيات تماثلية

Module Information معلومات المادة الدراسية		
Module Title	Analog Electronics	Module Delivery
Module Type	Core	☒ Theory ☐ Lecture ☒ Lab
Module Code	MPH31028	
ECTS Credits	6	

SWL (hr/sem)	150		☒ Tutorial ☐ Practical ☐ Seminar	
Module Level	3 rd	Semester of Delivery		1 st .
Administering Department	Medical Physics	College	Science	
Module Leader	Dr. Jafer Fahdel Odah		e-mail	hajasafa@kus.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	1/05/2026	Version Number	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	- To develop problem solving skills and understanding of analog electronic circuits through the application of techniques. - To understand voltage, current, power in the transistors and diodes from a given circuit. - This course deals with the basic concept of analog electronics circuits. - This is the basic subject for all electrical and electronic circuits. - To understand and construct all voltage amplifiers problems. - To perform amplifiers types analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Explain the energy levels, conductors, insulator and semiconductors - Recognize how semiconductors devices are built. - List the various terms associated with electronics circuits. - Summarize what is meant by a basic electronics circuit. - Discuss the reaction and involvement of atoms in semiconductors types. - Describe transistors, diodes, and how they work. - Define donors and acceptors atoms in semiconductors. - Identify the basic circuit elements and their applications.

	8. Discuss the operations of voltage amplifiers circuit. 9. Discuss the various properties of transistors and diodes. 10. Explain the efficiency of voltage amplifiers with deep analysis. 11. Identify the oscillators circuit analysis.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Chapter One: Introduction - Introduction about energy levels, Conductors, insulator, semiconductor, intrinsic semiconductor, Extrinsic Semiconductors, N-type and P-type semiconductors, Semiconductor P-N junction diode, Energy Band Diagram of a P-N Junction, Reverse biased diode, Forward biased diode, Diode applications . [10 hrs.] - Transistor (or Bipolar Junction Transistors (BJTs)), Transistor symbols, Common Emitter – dc – analysis, Characteristic curves, Hybrid parameters, Equivalent circuit, Properties of the common emitter (CE) amplifier, Drawing the load line: (Determination of quiescent point Q-point). [8 hrs.] - Transistor biasing, Biasing aims, Bias circuits, Fixed bias circuit, Emitter feedback bias circuit, Collector feedback bias circuit, Voltage divider bias circuit, Voltage divider self-bias bias circuit, examples, Common collector circuit, Common base circuit. [10 hrs.] - Field Effect Transistor (FET), Junction FET (JFET), The output characteristic curves of the JFET, JFET small signal parameters, 1. Low frequencies model, 2. High frequencies model, The purposes of biasing, Biasing circuits, Gate bias circuit, Self-bias circuit, Voltage divider self-bias circuit, Source bias circuit, Current source bias, A. Using one power supply, B. Using two power supplies, Self-bias common source amplifier, Calculation the gain of the amplifier 1. without R_L, 2. with R_L, JFET amplifier 1. Common source amplifier, 2. Common drain amplifier, 3. Common gate amplifier, Applications of JFET at the Ohmic region: 1. Analog switch (A. Shunt switch and B. Series switch), 2. Voltage variable resistance, examples [10 hrs.] - Metal Oxide Semiconductor Field Effect Transistor, 1. Depletion MOSFET (D-MOSFET), D-MOSFET symbols in electric circuits, Characteristic curves of D-MOSFET, Transconduction curve, Biasing circuits, 2. Enhancement MOSFET (E-MOSFET), Characteristic curves and transconduction curve of E-MOSFET, E-MOSFET symbols in electric circuits, Biasing circuits, Examples. [10 hrs.] Chapter Two: Amplifiers - Properties of ideal voltage amplifiers, Frequency response curve, Multistage amplifier, Bandwidth of a multistage amplifier, Ways of coupling in multistage amplifier: 1. RC coupling, 2. Transformer coupling, 3. Direct coupling, Classes of voltage amplifiers, 1. Class A, 2. Class B, 3. Class AB, 4. Class C, Efficiency of amplifier, Power distribution of class A amplifier, Efficiency of class B amplifier,

	Power amplifier (class A), Power amplifier (class B) (push-pull power amplifier), Tuned amplifier, Examples. [10 hrs.] - Feedback, Classification of amplifiers: 1. Voltage amplifier, 2. Current amplifier, 3. Trans-resistance amplifier, 4. Trans-conductance amplifier, Feedback configuration: 1. Shunt derived – Series fed (Voltage amplifier), 2. Shunt derived – Shunt fed (Trans-conductance amplifier), 3. Series derived – Series fed (Trans-resistance amplifier), 4. Series derived – Shunt fed (Current amplifier), Effect of negative feedback on the gain, Effect of negative feedback on the bandwidth, Effect of negative feedback on the noise and distortion, Effect of negative feedback on the R_i and R_o, Examples. [10 hrs.] Chapter Three: Oscillators - Sinusoidal oscillators: 1. Positive feedback oscillators: A. Phase shift oscillators, B. Wien bridge oscillators, C. Twin-T bridge oscillators 2. Resonant oscillators: A. Hartly oscillators, B. Collpitts oscillators, C. Armstrong oscillators 3. Pierce crystal oscillators. [8 hrs.] - Non-sinusoidal oscillators 1. Saw tooth wave oscillators 2. Square wave oscillators. [8 hrs.] Chapter Four: Multivibrators - 1. Astable multivibrator (square wave) - 2. Monostable multivibrator (one shot) - 3. Bistable multivibrator (Flip-Flop) Examples for each type. [8 hrs.]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This subject will be delivered to students through a series of lectures, tutorials, and hands-on activities. Lecture notes and technical demos will be included in the learning materials. Students should study both analogue and digital electronics concurrently throughout the year so that they are exposed to the differences and similarities in both domains and may better reflect on their experiences.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	6.5

Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150
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Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction about energy levels, Conductors, insulator, semiconductor, intrinsic semiconductor, Extrinsic Semiconductors, N-type and P-type semiconductors, Semiconductor P-N junction diode, Energy Band Diagram of a P-N Junction, Reverse biased diode, Forward biased diode, Diode applications
Week 2	Transistor (or Bipolar Junction Transistors (BJTs)), Transistor symbols, Common Emitter – dc analysis, Characteristic curves, Hybrid parameters, Equivalent circuit, Properties of the common emitter (CE) amplifier, Drawing the load line: (Determination of quiescent point Q-point). Transistor biasing, Biasing aims
Week 3	Bias circuits, Fixed bias circuit, Emitter feedback bias circuit, Collector feedback bias circuit, Voltage divider bias circuit, Voltage divider self-bias bias circuit, examples, Common collector circuit, Common base circuit.
Week 4	Field Effect Transistor (FET), Junction FET (JFET), The output characteristic curves of the JFET, JFET small signal parameters, 1. Low frequencies model, 2. High frequencies model
Week 5	The purposes of biasing, Biasing circuits, Gate bias circuit, Self-bias circuit, Voltage divider self-bias circuit, Source bias circuit, Current source bias, A. Using one power supply, B. Using two power supplies, Self-bias common source amplifier,

Week 6	Calculation the gain of the amplifier 1. without RL, 2. with RL, JFET amplifier 1. Common source amplifier, 2. Common drain amplifier, 3. Common gate amplifier, Applications of JFET at the Ohmic region: 1. Analog switch (A. Shunt switch and B. Series switch), 2. Voltage variable resistance, examples
Week 7	Metal Oxide Semiconductor Field Effect Transistor, 1. Depletion MOSFET (D-MOSFET), D-MOSFET symbols in electric circuits, Characteristic curves of D-MOSFET, Transconduction curve, Biasing circuits, 2. Enhancement MOSFET (E-MOSFET), Characteristic curves and transconduction curve of E-MOSFET, E-MOSFET symbols in electric circuits, Biasing circuits, Examples.
Week 8	Properties of ideal voltage amplifiers, Frequency response curve, Multistage amplifier, Bandwidth of a multistage amplifier, Ways of coupling in multistage amplifier: 1. RC coupling, 2. Transformer coupling, 3. Direct coupling, Classes of voltage amplifiers, 1. Class A, 2. Class B, 3. Class AB, 4. Class C
Week 9	Efficiency of amplifier, Power distribution of class A amplifier, Efficiency of class B amplifier, Power amplifier (class A), Power amplifier (class B) (push-pull power amplifier), Tuned amplifier, Examples.
Week 10	Feedback, Classification of amplifiers: 1. Voltage amplifier, 2. Current amplifier, 3. Trans-resistance amplifier, 4. Trans-conductance amplifier, Feedback configuration: 1. Shunt derived – Series fed (Voltage amplifier), 2. Shunt derived – Shunt fed (Trans-conductance amplifier), 3. Series derived – Series fed (Trans-resistance amplifier), 4. Series derived – Shunt fed (Current amplifier),
Week 11	Effect of negative feedback on the gain, Effect of negative feedback on the bandwidth, Effect of negative feedback on the noise and distortion, Effect of negative feedback on the R_i and R_o , Examples.
Week 12	Sinusoidal oscillators: 1. Positive feedback oscillators: A. Phase shift oscillators, B. Wien bridge oscillators, C. Twin-T bridge oscillators
Week 13	2. Resonant oscillators: A. Hartly oscillators, B. Collpitts oscillators, C. Armstrong oscillators 3. Pierce crystal oscillators.
Week 14	Non-sinusoidal oscillators: 1. Saw tooth wave oscillators 2. Square wave oscillators.
Week 15	Multivibrators: 1. Astable multivibrator (square wave 2. Monostable multivibrator (one shot) 3. Bistable multivibrator (Flip-Flop). Examples for each type.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المناهج الأسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Electronics Lab Safety Information. Electric and electronic symbols and its meaning
Week 2	Lab 2: Static characteristics of diode
Week 3	Lab 3: Rectifier circuits
Week 4	Lab 4: Zener diode characteristics
Week 5	Lab 5: Diode limiter circuits
Week 6	Lab 6: Diode voltage multiplier
Week 7	Lab 7: Characteristics of transistor in common emitter connection. Characteristics of transistor in common base connection

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- T. Floyd, Electronic Devices, Pearson Prentice Hall, Inc., 7th Edition 2005. 2- Electronic Principles, A. Malvino & D.J. Bates, McGraw Hill (2007).	Yes
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية

تشرح

Module Information			
معلومات المادة الدراسية			
Module Title	Anatomy		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	MPH31029		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	3	Semester of Delivery	1
Administering Department	Medical Physics	College	Science
Module Leader	Dr. Mahdi Haider	e-mail	Mahdi.h@kus.edu.iq
Module Leader's Acad. Title	Assist professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/05/2026	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To acquaint the students with the components of the body cells and blood in order to prepare them for the practical life 2. To learning how the body organs work together and what the physiological aspect of it 3. To learning the students to perform some blood physiological markers tests 4. Training the students to check some human body vital signs and how to check the human body organs functions
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify what the meaning of physiology science and what the other sciences related with it 2. Identify how the body organs work and what the physiological function of it 3. Study the physiology of the hematopoiesis in human body 4. Study the cardiovascular system and its components 5. Identify how the Central nerve system work and its components 6. Stud the Endocrinology of human body 7. Study how the muscular system works and what the physiological function of its
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> Physiology science- the tools of physiology science, the branches of physiology science, the different between anatomy and physiology , blood components. [18 hrs] <u>Part B - Hematopoiesis</u> Blood - blood components, maturation of blood cells, function of blood and blood cells , Hematocrit, the diseases related with hematocrit. [18 hrs] Revision problem classes. [6 hrs] <u>Part C Cardiovascular system</u> The components of cardiovascular system - the heart, Structure of the heart, How the heart work, the types of cardiac muscle cells, The Action potential role of cardiomyocyte , the blood vessels. [12 hrs] <u>Part D – Cells in Life</u> Neurons – Types of neurons, components of nerve system, the brain components , The spinal nerve, Types of spinal nerves, the cranial nerve, the types of cranial nerves , the meninges and its layers . [18 hrs] <u>Part D – Muscular system</u> The types of muscles - the function of muscular systems , how the muscle works, the contraction and relaxation of muscles, the muscle tetanus and the disease related with muscle disorders . [18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	60	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5, 8	LO #1, 2, 10 and 11
	Assignments	2	5% (5)	6, 10	LO # 3, 4, 6 and 7
	Projects / Lab.	1	20% (20)	Continuous	
	Report	1	5% (5)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	15% (15)	8	LO # 1-5
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction – the Branches of physiology , the different between the physiology and anatomy
Week 2	The tools use in study the human body physiology and types of blood tests
Week 3	Blood components RBC , WBC, Platelet maturation
Week 4	The blood synthesis and maturations of blood cell
Week 5	The blood, functions, components, plasma, functions and serum.

Week 6	The hematocrit and the diseases related with it
Week 7	Introduction in Cardiovascular system
Week 8	The components of Cardiovascular system and its functions
Week 9	Blood red cells, shape, count, function, origin, the hemoglobin, constituents, normal value, function.
Week 10	Blood white cells, type, number, function, blood groups. Platelets, number, function, blood clotting, anti-coagulants, origin of blood clots.
Week 11	The cardiovascular system, the heart, structure, heart valves, the cardiac cycle, cardiac conductive system, factors affecting heart rate.
Week 12	The heart sounds and murmurs, blood supply to the heart, electrical properties of cardiac muscles E.C.G.
Week 13	The blood vessels, functional classification, structure of the vessels wall, the systemic circuit, pulmonary circuit, regulation of the blood vessels.
Week 14	The nervous system, the nerve cell and its function, the nerve impulse, the synapses, the nerves.
Week 15	The muscular system, types of muscles, characteristics of each type, The skeletal muscle, excitation, contraction coupling in the muscle fatigue, the muscle pain. The endocrine system, the hormone, chemistry, action, types of endocrine glands and their secretion.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to physiology lab
Week 2	Lab 2: Blood Draw
Week 3	Lab 3: ECG TEST
Week 4	Lab 4: EEG test
Week 5	Lab 5: Cardiac markers
Week 6	Lab 6: Troponin test
Week 7	Lab 7CK-MB TEST

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Human physiology , Berne & Levy Physiology 8th Edition 2019	Yes

Recommended Texts	BRS Physiology (Board Review Series) 7th Edition, 2018	No
Websites	https://www.coursera.org/browse/physiologicl-science	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف مادة

الفيزياء النووية

Module Information					
معلومات المادة الدراسية					
Module Title	Nuclear Physics		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	MPH31030				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		3	Semester of Delivery		1
Administering Department		Medical Physics	College	Science	
Module Leader	Dr. Ali Abdulamear Rasheed		e-mail	ali.abdulamear@kus.edu.iq	

Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Non	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/5/2026	Version Number	1.0

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Understand the basic concepts of nuclear physics, with an emphasis on nuclear structure and the interactions of radiation with matter. Nuclear forces; the structure of the nuclear shell; alpha, beta, and gamma radioactive decays; interactions of nuclear radiation (charged particles, gamma rays, and neutrons) with matter; nuclear reactions; fission and fusion. 2. Learn about the designs and technologies of fission and fusion reactors, the types of nuclear accelerators and their main components, some applications of nuclear energy, and the techniques for producing electrical energy from fusion reactors, in addition to the concepts of elementary particles and the fundamental forces of nature.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Graduates should be able to: (a) Infer the existence and smallness of an atomic nucleus. (b) Distinguish between the number of nucleons (mass number) and the number of protons (atomic number). (c) show an understanding of how the conservation laws for energy and momentum in β decay were used to predict the existence of the neutrino (knowledge of antineutrino and antiparticles is not required) (d) define the terms activity and decay constant and recall and solve problems using the equation $A = \lambda N$ and demonstrate an understanding that an element can exist in different isotopic forms, each with a different number of neutrons in the nucleus. (e) Formulate the concept of conservation of nucleon number, charge, and mass-to-energy ratio in nuclear processes, and apply it to problem solving. (f) Demonstrate your understanding of the concept of mass defect. (h) Demonstrate your understanding of the concept of nuclear binding energy and its relationship to mass defect. (i) Draw a diagram showing the variation of binding energy per nucleon with the number of nucleons. (c) Explain the importance of binding energy per nucleon in nuclear fusion and nuclear fission. (k) Demonstrate an understanding of the spontaneous and random nature of nuclear decay. (l) Infer the random nature of radioactive decay from fluctuations in the count rate. (m) Demonstrate an understanding of background radiation. (n) Demonstrate an understanding of the nature of alpha, beta, and gamma radiation

	(knowledge of positron emission is not required). (q) infer and sketch the exponential nature of radioactive decay and solve problems using the relationship $x = x_0 \exp(-\lambda t)$ where x could represent activity, number of undecayed particles or received count rate (r) define and use half-life as the time taken for a quantity x to reduce to half its initial value. (s) Understand fission and fusion techniques and how to control nuclear reactions. (t) Study the conversion of nuclear energy into electrical energy. (u) Learn about nuclear accelerators.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A</u> Nuclear constituents, nuclear sizes and shapes, nuclear radii, nuclear masses. [10 hrs] binding energy /nucleon, nuclear moments, nuclear force. [10 hrs] Nuclear models, radioactivity, radiation decay [10 hrs] Interaction of radiation with matter, fission and fusion reactions. [10 hrs] <u>Part B</u> Nuclear fission and fusion reactors. [10 hrs] Acceleration and accelerators, radiation detectors. [10 hrs] Elementary particles, nuclear phys. Applications, introduction to nuclear medicine. [12 hrs]

Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students’ participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.		
Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)	72	Unstructured SWL (h/w)	5
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem)	150		
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	An Introduction to Nuclear Physics
Week 2	Constituents Of The Nucleus
Week 3	Binding Energy
Week 4	Nuclear Moments and Nuclear Force
Week 5	Stability of the Nucleus & Nuclear Models
Week 6	Radioactivity
Week 7	Nuclear Radiation decay
Week 8	Interaction of Radiations with Matter
Week 9	Nuclear fission reactions and reactors
Week 10	Nuclear Fusion reactions and reactors
Week 11	Acceleration & Accelerators
Week 12	Radiation Detectors
Week 13	Elementary particles
Week 14	Nuclear physics applications
Week 15	Introduction to nuclear medicine
Week 16	Final Examination

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	Lab 1: Introduction to radiation protection & sources of radiation
Week 2	Lab 2: Plotting a GM Plateau
Week 3	Lab 3: Geiger Tube Efficiency
Week 4	Lab 4: Beta Absorption

Week 5	Lab 5: Background detection
Week 6	Lab 6: Inverse Square Law
Week 7	Lab 7: Examination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Introductory nuclear physics, Kenneth S. Krane 1987. Fundamentals in nuclear physics, Jean-Louis Basdavant, James Rich, 2005.	Yes
Recommended Texts	Nuclear Physics, BY IRVING KAPLAN 1962.	No
Websites	https://nap.nationalacademies.org/read/6288/chapter/3 https://en.wikipedia.org/wiki/Nuclear_physics https://en.wikipedia.org/wiki/Nuclear_reactor https://en.wikipedia.org/wiki/Fusion_power	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
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Module Description Form

نموذج وصف المادة الدراسية

الفيزياء الموجية

Module Information			
معلومات المادة الدراسية			
Module Title	Wave physics		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar
Module Code	MPH32031		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3 rd	Semester of Delivery	2 nd
Administering Department	Medical Physics	College	Science
Module Leader	Name: Kauakib Jafar Rasheed	e-mail	E-mail : kewakib.jafar.rasheed@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/05/2026	Version Number	1.0

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The module aims to develop students' understanding of : a) Compare between particle motion and wave motion in different types of waves. b) Distinguish between pulse waves and periodic waves. c) Distinguish between Longitudinal and Transverse waves. d) Relate the speed, frequency and length of a wave. e) Relate the energy carried by a wave to the amplitude of the wave. f) Describe the interaction of sound and soft tissues. g) Explain sound production and propagation. h) Summarize the basic principles and techniques of ultrasound
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Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• 1: The student should be able to describe the nature of a wave and explain the distinction between wave motion and particle motion. • 2: The student should be able to identify and distinguish between contrasting types of waves. • 3: The student should be able to describe the basic characteristics of waves such as frequency, wavelength, amplitude, period, and speed. • 4: The student should be able to utilize mathematical relationships related to wave characteristics. • 5: The student should be able to define wave speed and identify the variables which effect wave speed. • 6: The student should be able to utilize the definition of wave speed to solve simple computational problems involving speed, distance and time. • 7: The student should be able to perform straight-forward calculations using the wave equation. • 8: The student should be able to interpret textual information and diagrams in order to perform mathematical analyses using the wave equation. • 9: The student should be able to predict how alterations in the medium through which a wave is traveling will affect the properties of that wave. • 10: The student should be able to predict the orientation of the reflected pulse at the boundary between two media. • 11: The student should be able to recognize the distinction between constructive and destructive interference. • 12: The student should be able to utilize the principle of superposition to predict the shape and amplitude of a wave form resulting from the interference of two waves. ○ 13: The student should be able to identify Pulsed wave ultrasound. Pulse duration , PRP, PRF and duty factor, Spatial pulse length, Intensities , Methods for measuring intensities
Indicative Contents المحتويات الإرشادية	○ 1)Types of Waves ○ a) Wave - Transmission of energy without transmission of mass. ○ b) Mechanical Wave - A wave that travels through an elastic medium. ○ c) Electromagnetic Wave - Waves that transmit energy without a medium. ○ d) Pulse Wave - Wave consisting of a single energy pulse. ○ e) Periodic Wave - Waves composed of numerous periodic pulses. ○ f) Medium - Material through which a wave travels. ○ 2) Mechanical Wave Forms ○ a) Transverse Wave - Energy transmitted as vibrations of medium at right angles to direction of wave movement (vibrate up and down or side to side). ○ b) Longitudinal Wave - Transmission of energy by vibration of medium particles parallel to wave motion (vibrate back and forth). ○ i) Compression – Area where medium particles are compressed together ○ ii) Rarefaction – Area where medium particles are spread apart ○ iii) Wavelength – Beginning of one compression or rarefaction to the next ○ iv) Amplitude – Is related to how compacted the medium particles are ○ v) Example – Sound waves ○ 3) Electromagnetic Waves ○ a) Produced by energy given off by high energy electrons ○ b) Composed of oscillating electric and magnetic fields

- c) Electric and magnetic fields vibrate perpendicular to each other
- d) Transverse but not mechanical waves
- e) Do not require a medium for transmission
- f) Can travel through space
- g) May carry large amounts of energy (enough to destroy living tissue)
- h) X-rays, gamma rays, UV light all will damage or destroy living tissue
- 4) Particle and Wave Motion
- a) Wave Motion - As waves travel through a medium, the direction of travel is away from the source.
- i) In a linear medium (rope) the wave travels along the medium (in a line).
- ii) In a planar medium (water surface) the wave travels as an ever widening circle.
- iii) In a 3 dimensional medium (air) the wave travels as an ever widening sphere.
- b) Motion of Medium Particles
- i) Transverse (Linear waves) - Medium particles vibrate perpendicular to the wave.
- ii) Longitudinal - Medium particles vibrate back and forth parallel to the direction of wave movement.
- 5) Wave Characteristics
- a) Amplitude - The amount of energy carried by the wave is related to the size of the wave squared.
- b) Speed – Speed that the wave travels through the medium
- i) Electromagnetic Waves – 3×10^8 m/s or 186,000 miles/s
- ii) Sound – 340m/s or 1100ft/s
- iii) Other waves – Varies
- c) Speed, frequency and length of a wave are related by the following formula: $V = f \times \lambda$ V - Speed f - Frequency λ - Wavelength
- Wave Interference
- 6) Learning Objectives
- a) Differentiate between constructive and destructive interference.
- b) Combine multiple waves using the “Superposition” principle.
- c) Describe how waves reflect.
- d) Explain how “Standing” waves are produced.
- e) Label the parts of a standing wave.
- 7) Wave Interference
- a) several waves can be superimposed (occupy the same space at the same time).
- b) When multiple waves occur in the same space and time the interaction is called interference.
- i) Positive Interference - The crests of two or more waves occupy the same space and time. The amplitudes are added together to produce the resulting amplitude.
- ii) Negative Interference - The crest of one wave interferes with the trough of another wave. Addition of the two tends to cancel out.
- iii) Superposition Principle - When 2 waves occupy the same space and time, their amplitudes are added together to produce a resulting amplitude.
- 8) Reflected Waves
- a) When waves strike a surface, they are reflected in the opposite direction.
- i) Reflected wave is a mirror image of the original.
- b) The superposition of an original and reflected wave produces a standing wave.
- i) Waves appear to stand in place while medium vibrates up and down.
- ii) Composed of alternating nodes and antinodes.
- (1) Node - An area of destructive interference.

	○ (2) Antinode - An area of constructive interference. ○ 9) Standing Waves ○ a) When a wave reflects back over itself a standing wave is produced b) Standing Wave Characteristics ○ i) Wave appears to be stationary ○ ii) Superposition of the forward and reverse waves produce a standard wave form ○ (1) Node – Area where the medium does not vibrate ○ (2) Antinode – Area of greatest medium deflection ○ c) Standing waves are commonly produced by musical instruments ○ i) Wind instruments produce standing waves inside the tube ○ ii) String instruments produce standing waves in their strings ○ 10) Key Concepts Review ○ a) Explain the concept of Superposition. ○ b) Know the characteristics of constructive and destructive interference. ○ c) Know how waves are reflected. d) Know how standing waves are produced. ○ e) Be able to label the parts of a standing wave. ○ 11) Describing sound waves ○ a. Parameters ○ i. Period and frequency ○ ii. Amplitude, power and intensity ○ iii. Speed of sound ○ 1. Tissue type ○ 2. Stiffness ○ 12). Density ○ iv. Wavelength ○ E. Pulsed wave ultrasound ○ i. Pulse duration ii. PRP, PRF and duty factor ○ iii. Spatial pulse length ○ F. Intensities a. Methods for measuring intensities ○ i. Spatial ○ ii. Temporal ○ iii. Pulsed ○ b. The ten commandments of intensity ○ 13) . Interaction of Sound and Media
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem)	48	Structured SWL (h/w)	3

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	5, 10	LO #1, 2, 3,4,6,7,8 and 9
	Assignments	2	10% (10)	7, 12	LO # 6, 7, 8 and 10
	Report	1	10% (10)	13	LO #11, 12 and 13
Summative assessment	Midterm Exam	1 hr.	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Waves and wave equation Waves, Transverse and Longitudinal waves. The 1-D wave equation. Phase velocity. Travelling wave on a spring
Week 2	Transmission and reflection of waves on media discontinuities. Power transmission/reflection coefficients.
Week 3	Superposition principle. Standing waves and beats. Group velocity. Fourier decomposition of waves.
Week 4	Doppler effect in sound and electromagnetic waves
Week 5	Doppler ultrasound ,continuous wave Doppler system-pulsed wave Doppler systems
Week 6	Definition of Sound waves and ultrasound waves properties and propagation of ultrasonic waves
Week 7	ultrasound waves Production, Piezoelectric effect, transducer probes
Week 8	Mid-term Exam
Week 9	Specific acoustic impedance , Acoustical characteristics of human body
Week 10	Interaction ultrasound with tissues
Week 11	Ultrasonic Dosimetry ,safety of diagnostic ultrasound

Week 12	High power ultrasound in therapy
Week 13	Biological effect of ultrasound waves
Week 14	Discussion
Week 15	Preparatory week before the final Exam
Week 15	final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Tim Freegarde (2012). <i>Introduction to the Physics of Waves</i> . Cambridge: Cambridge University Press. nd 2. W. M. McDicken, Diagnostic Ultrasonic principles and use of Instrument, 2 edition, John Wiley and Sons, New York, 1992 .	Yes
Recommended Texts	Michiel Postema, Fundamentals of Medical Ultrasonics, Taylor & Francis, 2011	No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية المتحسسات الحيوية

Module Information			
معلومات المادة الدراسية			
Module Title	Biosensor		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar
Module Code	MPH32032		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3 th	Semester of Delivery	2 nd
Administering Department	Medical Physics	College	College of Science
Module Leader	Dr. Abdulmohaimen W Fakhri	e-mail	mohamenw2@kus.edu.iq
Module Leader's Acad. Title	Assist professor	Module Leader's Qualification	Ph.D.
Module Tutor	Non	e-mail	E-mail
Peer Reviewer Name	Non	e-mail	E-mail
Scientific Committee Approval Date	01/05/2026	Version Number	1.0

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To understand the principles of biosensors and their applications in various fields. 2. To learn about the different types of biosensors and their working mechanisms. 3. To analyze the performance characteristics of biosensors, such as sensitivity, selectivity, and stability. 4. To evaluate the challenges associated with biosensor development, such as biocompatibility and signal interference. 5. To apply knowledge gained from biosensor studies to real-world problems in healthcare, environmental monitoring, food safety, and other fields.
Module Learning Outcomes	1. Enabling students to obtain knowledge and understanding of the topics of principles of biosensors. 2. Obtaining a prominent scientific staff that tries to understand the biosensors and

مخرجات التعلم للمادة الدراسية	its applications 3. Enable students to obtain knowledge and understanding of biosensors applications and conduct various practical experiments. 4. Enable students to obtain knowledge and understanding of the use of basic
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Biosensors:</u> Description of biosensors, Biomolecules used in biosensors, Types of biosensor, Define of immobilization and methods, bio-receptors, Characteristic of biosensor performance factors, enzymatic biosensors, Biosensors Technology, Using of biosensor [8 hrs]. Biomolecules used in biosensors, these biomolecules are typically enzymes, antibodies, nucleic acids, or other proteins and types of biosensors is electrochemical biosensors, optical biosensors, piezoelectric biosensors,, ion-sensitive field-effect transistors, etc [10 hrs]. Immobilization methods are techniques used to attach biomolecules as well Bio-receptors are biomolecules used to bind target molecules in biosensors as well Characteristic of biosensors include high sensitivity, selectivity, and specificity, Performance factors affecting the performance of biosensors include the choice of bio-receptors, immobilization method and Enzymatic biosensors use enzymes as bio-receptors to catalyze a reaction between the target molecule and a substrate. Biosensors technology involves the integration of bio-receptors, immobilization methods, transducing elements, and electronics[10 hrs]. There are many different types of biosensors, but they all generally work by using a biological sensing element [8 hrs]. <u>Part B -</u> One important application of biosensors is in the field of immune-biosensor [8 hrs]. In conclusion, biosensors are powerful tools with a wide range of applications in fields such as medicine, environmental monitoring, and food safety [8 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Providing students with basics and specifications 2. Encouraging students to discover how the understand biosensor works with physical laws and its physiological and therapeutic effects by themselves through 3. Understanding the general laws of physics. This is done through scientific discussions in class as well as through practical application in hospitals and medical clinics. 4. Forming discussion groups during the lectures to discuss the topics raised during the lecture 5. Explanation and clarification 6. Thinking questions such as what, how, when and why for specific topics

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15% (10)	5, 10	LO #1, 2, 9 and 10
	Assignments	2	15% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO # 1-8
	Final Exam	3hr	50% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Description of biosensors
Week 2	Biomolecules used in biosensors
Week 3	Types of biosensor
Week 4	Define of immobilization
Week 5	immobilization methods
Week 6	Bio-receptors
Week 7	Characteristic of biosensor performance factors
Week 8	Enzymatic biosensors
Week 9	Biosensors Technology
Week 10	Using of biosensor
Week 11	Applications of biosensor

Week 12	Immune-biosensors
Week 13	Introduction of DNA
Week 14	DNA biosensors
Week 15	Electrochemical sensors
Week 16	Final Exam duration

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Biosensors fundamentals and application, antony P.F.Turner ,Isao K. and George S. Wilson ,Oxford Scince Puplication 1987	Yes
Recommended Texts	Essentials (lecture nots in chemistry V84) Gennady Evtugyn , Springer 2014	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

ميكانيك الكم في الطب

Module Information			
معلومات المادة الدراسية			
Module Title	Quantum Mechanics		Module Delivery
Module Type	Elective		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☒ ☒ Practical ☒ Seminar
Module Code	MPH32033		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3 th	Semester of Delivery	2 nd
Administering Department	Medical Physics	College	Science
Module Leader	Prof.Dr. Fadhil K. Farhan	e-mail	Dr.fadhil1966@kus.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Non	e-mail	Non
Peer Reviewer Name	non	e-mail	E-mail
Scientific Committee Approval Date	01/05/2026	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Non	Semester	
Co-requisites module	Non	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- Providing the student with a cognitive skill about the basic concepts of physics in general. 2- Introducing students to the most important principles of quantum mechanics. 3- Introducing the student to the wave properties included in the Schrödinger equation and the wave function.

	4- Providing the student with knowledge of how to calculate the wave function and the time-dependent and non-time-dependent Schrödinger equation. 5- Introducing the student to the expected value and variance and deriving the mathematical relations for these phenomena. 6. 6- Introducing the student to the mathematical laws and relations that relate to the constant of motion and the Hermitian influences.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A- Cognitive goals A1- That the student understand the basic concepts of spectrum science. A2- To describe the relationship between the incident energy and the absorption spectrum. A 3- The link between material properties and their emission spectrum. A 4- To recognize the most important laws and relationships that link the spectrum of molecules. B - The soft skills objectives of the course. B1 - The applied side in practical hours B2 - Comprehension, comprehension and cognitive analysis. B3 - Observation and perception
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - An introduction to the principles and fundamentals of quantum mechanics An introduction to the atom and the hypotheses that describe particle motion, The most important hypotheses that dealt with the nature of the atom, [8 h/w], Wave nature and matter, wave function, Definition and description of the wave function from quantum mechanics, properties of wave functions, [7 h/w], Comparison of quantum mechanics and classical mechanics on the behavior of particles within an atom, Physical phenomena and their interpretation of energies and wave motion according to quantum mechanics and clas Schrödinger sical mechanics, [10 h/w], Part B - Wave functions and the Schödienger equation The mathematical formula for the wave function, wave function equation , Derivation of the wave function with respect to energy and momentum [10h/w], Solve the time dependent Schödienger equation, Derivation of the position dependent Schrödinger equation , Applications to the Schrödinger equation [8 h/w], Hermetic influences, Characteristics of Hermetic Effects in Quantum Mechanics, Characteristics of Hermetic Effects in Quantum Mechanics , Variance and covariance in quantum mechanics , [7 h/w], Equation of motion and motion constant , Self and non-self-functions in quantum mechanics , [7 h/w], Applications of eigenvectors and motion constants[7 h/ w].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive educational programs and by thinking about linking the course content with the

	devices and equipment that depend on the principles and laws of the course for their work.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	61	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	64	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4, 9	LO #1, 2, 9 and 10
	Assignments	2	10% (10)	2, 10	LO # 3, 4, 6 and 7
	Projects	1	10% (10)	Continuous	
	Report	1	10% (10)	12	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO # 1-8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to the wave function
Week 2	The wave field of the function
Week 3	Operators Types
Week 4	Absorber quantities
Week 5	Schrödinger equation
Week 6	Solve the time dependent Schrödinger equation
Week 7	Solve the position-dependent Schrödinger equation
Week 8	expected values in quantum mechanic

Week 9	Variation in values and The kinematic equation
Week 10	solve problems
Week 11	Properties of Hermetic operators
Week 12	Applications of Hermetic operators
Week 13	hydrogen atom
Week 14	Angular momentum and linear momentum
Week 15	Calculate the power and wave function of a voltage barrier
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- A.C. Philips and John Wiley 2- Introduction to Quantum Mechanics	NO
Recommended Texts	1- Mohammad Reza Pahlavani 2- Theoretical Concepts of Quantum Mechanics 2012	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية

تقنيات العلاج الطبيعي

Module Information			
معلومات المادة الدراسية			
Module Title	Physiotherapy Techniques		Module Delivery
Module Type	Support		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MPH32034		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3 rd	Semester of Delivery	2 nd
Administering Department	Medical Physics	College	Science
Module Leader	Dr. Nasma Adnan	e-mail	nasmaadnan@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Non	e-mail	Non
Peer Reviewer Name	Non	e-mail	Non
Scientific Committee Approval Date	1\5\2026	Version Number	1.0

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To provide students with the cognitive skills based on scientific foundations and practical experience necessary to achieve the desired results in the physical therapy profession and gain patient satisfaction. 2. To provide students with and enable them to apply critical analysis skills to solve clinical problems by developing appropriate treatment plans based on patient needs. 3. To develop students' abilities to conduct clinical assessments and appropriate, evidence-based therapeutic interventions. 4. To acquire a comprehensive knowledge of internal, neurological, surgical, and pediatric diseases, for which physical therapy is an essential component of rehabilitation.
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	5. To encourage students to adhere to the Code of Professional Conduct and legal and ethical responsibilities when practicing physical therapy.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Knowledge of the techniques of physiotherapy. 2- Identification the refractive electrotherapy, thermotherapy, cryotherapy. 3- knowledge in principals of physiotherapy and medical physics. 4- Develop strong fundamentals of physiotherapy
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>I. Physical Therapy</u> A. What is Physical Therapy? B. What is the purpose of Physical Therapy? C. Who are Physical Therapists? D. What does the Physical Therapist do? [15 hrs] <u>II. Electrotherapy</u> Electric current, Electromotive Force (EMF) (E), Resistance (R), relationship among magnitude of current flow, Voltage and resistance, types of currents. [15 hrs] Low Frequency Currents Used in Physiotherapy, Transcutaneous Electrical Nerve Stimulation (TENS), Interferential Therapy (IFT) [7 hrs] Thermotherapy, short wave diathermy (S.W.D), microwave diathermy, Ultrasound Therapy [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	2, 4, 8,10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	5, 11	LO # 3, 4, 6 and 7
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to physiotherapy
Week 2	Electrotherapy, objectives of electrotherapy, fundamental concept of electricity
Week 3	Faradic current, Interrupted direct current, galvanic current, Interferential current
Week 4	Transcutaneous Electrical Nerve Stimulation (TENS)
Week 5	Heat Therapy , physiological effect of heat thermal, objective of using thermal method
Week 6	Cases that are treated with heat, contraindication to the use of heat therapy.
Week 7	Mid-term Exam
Week 8	Types of thermal heating, Surface thermal treatment , hot water therapy, hot compresses.
Week 9	Dry hot compresses, moist hot compresses, hot tube, hot baths.
Week 10	Treatment with water or contrast temperature (comparative)
Week 11	Wax and paraffin bath, paraffin wax uses, How is paraffin wax used, benefits of paraffin wax.
Week 12	Infrared types, the physiological effect of infrared radiation.
Week 13	Ultra violet rays, ultra violet types, the physiological effect of ultraviolet
Week 14	Short wave therapy, contraindication to the use of short wave.
Week 15	Micro wave , micro wave uses, ultrasound wave.
Week 16	final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-Physics for Physiotherapy Technology, by Chris Roderick, Ph.D. Created 2017 August 3 rd	Yes
Recommended Texts	2- A handbook of physiotherapy, B.K. Choudhury, First Edition: 2006 ISBN 81-8061-683-5	YES
Websites	Physical therapy Nancy Carney, RN Batten Disease Support and Research 2004	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Modules Description Form

نموذج وصف المادة الدراسية

الالكترونيات الرقمية

Modules description Information معلومات المادة الدراسية		
Modules Title	Digital Electronics	Modules Delivery
Type	Core	☒ Theory ☒ Lecture ☒ Lab
Course Code	MPH32035	
ECTS Credits	6	

SWL (hr/sem)	150	☒ Tutorial ☐ Practical ☐ Seminar	
Modules Level	3 rd	Semester of Delivery	2 nd
Administering Department	Medical Physics	College	Science
Modules Leader	Prof. Dr. Jafer F. Odah	e-mail	
Modules Leader's Acad. Title	Professor	Modules Leader's Qualification	Ph.D.
Modules Tutor	Non	e-mail	
Peer Reviewer Name	Non	e-mail	
Scientific Committee Approval Date	01/05/2026	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite course	The course to develop the student's ability to understand and apply a number of issues based on basic digital electronics principles, and to provide the student with the ability to interpret some applications, and to build the basic for understanding the subsequent courses.	Semester	
Co-requisites course	Analog Electronics	Semester	1 st

Aims of a Course, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
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Aims Course أهداف المادة الدراسية	1- Providing the student with a cognitive skill about the basic concepts of digital electronics. 2- Introduce the student to the digital logic gates properties and methods of their application. 3- Providing the student with knowledge of how to calculate the laws of logic algebra and solving 4- Introducing the student to digital logic conversion systems.
Course Learning Outcomes مخرجات التعلم للمادة الدراسية	Enabling students to obtain knowledge and understanding of the topics of digital electronics. 1- Enable students to obtain knowledge and understanding of logic gates practical experiments. 2- Enable students to obtain knowledge and understanding of the use of basic algebra laws in digital logic and their use in solving problems.
Indicative Contents	Indicative content includes the following. Part A – Introduction in digital logic gates and Conversion systems [12 hrs] Applications of Conversion systems [10 hrs] Types of Logic Gates [12 hrs] Boolean algebra and De Morgan Theorems [15 hrs] Application of Boolean algebra and DeMorgan theorems [15hrs] Subtraction and Addition System [12 hrs] Networks [15 hrs] Part B- Types of Flib-Flop and Applications [15hrs] Counter and Registration [10 hrs] Solve Applications [10hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Method of giving lectures, explanation and clarification. 2- Student groups. 3- E-learning within the university. 4- Application of education. 5- Experiential learning.

Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/ Nu mbe r	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10 % (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10 % (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week no.	Material Covered
Week 1	Introduction, Fundamental of Digital Electronics
Week 2	Conversion Systems, Decimal and Binary Systems
Week 3	Conversion Systems, Octal and Hexadecimal Systems
Week 4	Logic Gates Basic Logic Gates NOT, OR, AND
Week 5	Exclusive Logic Gates, EX-OR and EX-NOR
Week 6	Universal Logic Gates NAND and NOR
Week 7	Boolean algebra and De Morgan Theorem
Week 8	Applications Boolean algebra and De Morgan Theorem in Simplifications equation logic gates
Week 9	Substraction and Addition Operation in Logic Gates
Week 10	Karnaugh Maps and Application to Simplification equations
Week 11	NAND-NAND and NOR-NOR networks
Week 12	Types of Flip-Flop (D flip-flop, RS flip-flop and K flip-flop)

Week 13	Counter and their applications
Week 14	Rigistration and their applicatiois
Week 15	Solve Applications
Week 16	Final Exam duration

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week no.	Material Covered
Week 1	Lab 1: Basic Logic Gate
Week 2	Practical Application
Week 3	Lab 2: Exclusive and Universal logic gates
Week 4	Practical Application
Week 5	Lab 3: Boolean al gebra and De Morgan Theorems
Week 6	Practical Application
7	Lab 4: Coding and Decoding Systems

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Digital Electronics: Principles, Devices and Applications by Anil K. Maini, 2007	Yes
Recommended Texts	1. Digital Electronics Logic and Design by Cherry Bhargava, 2019.	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F - Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية

الفسلجة

Module Information معلومات المادة الدراسية		
Module Title	Basic Physiology	Module Delivery
Module Type	Core	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MPH32036	
ECTS Credits	6	
SWL (hr/sem)	150	

Module Level	3 rd	Semester of Delivery	2 nd
Administering Department	Medical Physics	College	SC
Module Leader	Dr. Mahdi Haider	e-mail	Mahdi.h@kus.edu.iq
Module Leader's Acad. Title	Assist professor	Module Leader's Qualification	Ph.D.
Module Tutor	-----	e-mail	-----
Peer Reviewer Name	Dr. Saad Hussein	e-mail	saad_2019@ku.edu.iq
Scientific Committee Approval Date	1/05/2026	Version Number	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	7. To acquaint the students with the components of the body cells and blood in order to prepare them for the practical life 8. To learning how the body organs work together and what the physiological aspect of it 9. To learning the students to perform some blood physiological markers tests 10. Training the students to check some human body vital signs and how to check the human body organs functions
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	20. Identify what the meaning of physiology science and what the other sciences related with it 21. Identify how the body organs work and what the physiological function of it 22. Study the physiology of the hematopoiesis in human body 23. Study the cardiovascular system and its components 24. Identify how the Central nerve system work and its components

	25. Stud the Endocrinology of human body 26. Study how the muscular system works and what the physiological function of its
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> Physiology science- the tools of physiology science, the branches of physiology science, the different between anatomy and physiology , blood components. [12 hrs] <u>Part B - Hematopoiesis</u> Blood - blood components, maturation of blood cells, function of blood and blood cells ,Hematocrit, the diseases related with hematocrit. [14 hrs] Revision problem classes. [6 hrs] <u>Part C Cardiovascular system</u> The components of cardiovascular system - the heart, Structure of the heart, How the heart work, the types of cardiac muscle cells, The Action potential role of cardiomyocyte , the blood vessels. [18 hrs] <u>Part D – Cells in Life</u> Neurons – Types of neurons, components of nerve system, the brain components , The spinal nerve, Types of spinal nerves, the cranial nerve, the types of cranial nerves , the meninges and its layers.[12 hrs] <u>Part D – Muscular system</u> The types of muscles - the function of muscular systems , how the muscle works, the contraction and relaxation of muscles, the muscle tetanus and the disease related with muscle disorders.[10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 8	LO #1, 2, 10 and 11
	Assignments	1	5% (5)	6, 10	LO # 3, 4, 6 and 7
	Projects / Lab.	1	20% (20)	Continuous	
	Report	1	5% (5)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO # 1-5
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction – the Branches of physiology , the different between the physiology and anatomy
Week 2	The tools use in study the human body physiology and types of blood tests
Week 3	Blood components RBC , WBC, Platelet maturation
Week 4	The blood synthesis and maturations of blood cell
Week 5	The blood, functions, components, plasma, functions and serum.
Week 6	The hematocrit and the diseases related with it
Week 7	Introduction in Cardiovascular system
Week 8	The components of Cardiovascular system and its functions
Week 9	Blood red cells, shape, count, function, origin, the hemoglobin, constituents, normal value, function.
Week 10	Blood white cells, type, number, function, blood groups. Platelets, number, function, blood clotting, anti-coagulants, origin of blood clots.
Week 11	The cardiovascular system, the heart, structure, heart valves, the cardiac cycle, cardiac conductive system, factors affecting heart rate.
Week 12	The heart sounds and murmurs, blood supply to the heart, electrical properties of cardiac muscles E.C.G.
Week 13	The blood vessels, functional classification, structure of the vessels wall, the systemic circuit, pulmonary circuit, regulation of the blood vessels.
Week 14	The nervous system, the nerve cell and its function, the nerve impulse, the synapses, the nerves.

Week 15	The muscular system, types of muscles, characteristics of each type, The skeletal muscle, excitation, contraction coupling in the muscle fatigue, the muscle pain. The endocrine system, the hormone, chemistry, action, types of endocrine glands and their secretion.
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1,2: Introduction to physiology lab
Week 3,4	Lab 3,4: Blood Draw
Week 5,6	Lab 5,6: ECG TEST
Week 7,8	Lab 7,8: EEG test
Week 9,10	Lab 9,10: Cardiac markers
Week 11,12	Lab 11,12: Troponin test
Week 13,14	Lab 13,14: CK-MB TEST
Week 15	Lab 15: Revision

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Human physiology , Berne & Levy Physiology 8th Edition 2019	Yes
Recommended Texts	BRS Physiology (Board Review Series) 7th Edition, 2018	No
Websites	https://www.coursera.org/browse/physiologicl-science	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية منهجية البحث العلمي

Module Information				
معلومات المادة الدراسية				
Module Title	Scientific Research Methodology		Module Delivery	
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH32037			
ECTS Credits	1			
SWL (hr/sem)	25			
Module Level	3	Semester of Delivery		2
Administering Department	Medical Physics department		College	Science
Module Leader	Dr. Sabah I. Abbas		e-mail	sabahibrahim@kus.edu.iq
Module Leader's Acad. Title	Professor		Module Leader's Qualification	Ph.D.
Module Tutor	1		e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date	1/5/2026		Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None		Semester

Co-requisites module	None	Semester	
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Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- تعليم الطالب بأساليب وأخلاقيات البحث العلمي ليستفيد من قدرته في كتابة البحوث العلمية وأيجاد الحلول المناسبة لحل المشكلات والمعضلات التي تواجه المجتمع . 2- العمل على زيادة القدرة في كتابة البحوث العلمية و أيجاد الحلول لمشكلة البحث. 3- معالجة المعضلات والمشكلات التي تواجه المجتمع 4- جمع المعلومات بشكل دقيق وبالتالي دراستها فيما يخص المشكلة المبحوثة .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- تعريف الطالب بأساليب ومفاهيم أخلاقيات البحث العلمي والحفاظ على الامانة العلمية. 2- التعرف على التطبيقات المنهجية التي يدرسها الباحث والعمل على اتخاذ الاجراءات الصحيحة لحل المشاكل التي تواجه الفرد والمجتمع. 3- بناء القدرات والمهارات العلمية للطالب في كتابة البحوث العلمية . 4- تهدف المادة المعرفية الى تطبيق المنهجية العلمية ذات العلاقة بأسس ومتطلبات مناهج البحث العلمي. 5- تهدف المادة المعرفية الى التزام الباحث وعلى وجه التحديد الطالب بنزاهة وأدراك اهمية المنهج العلمي. 6 - تهدف المادة المعرفية الى معالجة مشاكل واقعية والعمل على ايجاد الحلول لها .
Indicative Contents المحتويات الإرشادية	معنى العلم والبحث العلمي، تعريف المنهج (مناهج البحث العلمي). أهمية تحديد منهج البحث العلمي، الأسس التي يبنى عليها اختيار منهج البحث العلمي. مناهج البحث : البحث التاريخي، البحوث الوصفية، البحث التجريبي، البحث النوعي. (ساعة واحدة) هيكلية البحث وتشمل: عنوان البحث، المقدمة. مشكلة البحث . فرضيات البحث، أهمية البحث ، أهداف البحث.(ساعة واحدة) امتحان نصف فصلي. (ساعة واحدة) الدراسات السابقة ،منهجية وإجراءات البحث ادوات ووسائل جمع البيانات ، الملاحظة، المقابلة، الاستبيان (ساعة واحدة) كتابة تقرير البحث: كتابة مشكلة البحث: وتتضمن: مقدمة البحث ، تحديد المشكلة وأسئلتها، الغرض من البحث (مبررات البحث)، أهمية البحث، وفرضيات البحث وأسئلته مراجعة أدبيات الدراسة: الإطار النظري، والدراسات السابقة ،(ساعة واحدة) إجراءات البحث: وتشمل منهج البحث وتصميمه، والعينة، ومواد وأدوات البحث والإجراءات، والضبط التجريبي للبحث، وتحليل البيانات نتائج البحث: التحليل الإحصائي وقراءة النتائج وتفسيرها.(ساعة واحدة) خلاصة البحث. قائمة المراجع. الملاحق الصفحات التمهيدية والخاتامية يكتب الطالب تقريراً حول تقييم بحث(ساعة واحدة) مناقشة عناوين مقترحة. يراجع الطالب المنهج الدراسي والتهيؤ لامتحان النهائي.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	يُعد هذا المقرر من أهم المقررات الدراسية كونه يمكن الطالب الجامعي من المهارات التي تساعد على انجاز بحث التخرج، وهو يعمل على إكسابه مجموعة من المعلومات والمعارف حول العلم والمعرفة، والبحث العلمي ومناهجه، وينمي الاتجاهات الإيجابية لدى المتعلم تجاه البحث العلمي، ويتحقق ذلك من خلال مجموعة من الأنشطة الفاعلة (طرائق وأساليب تدريس، ووسائل) كطريقة الحوار والمناقشة، والتعلم الذاتي، والبحث، والتطبيقات، مع استخدام الباوربوينت عند العرض، وتقييم الطالب من خلال المشاركة الصفية والتكليفات المصاحبة - الصفية واللاصفية - والاختبار النصفى والنهائي.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	18	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	1.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	7	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.46
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	25		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	5	
	Assignments	1	10% (10)	5, 10	
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	
Summative assessment	Midterm Exam	1 hr	10% (10)	7	
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	معنى العلم والبحث العلمي، تعريف المنهج (مناهج البحث العلمي).
Week 2	أهمية تحديد منهج البحث العلمي، الأسس التي يبنى عليها اختيار منهج البحث العلمي.
Week 3	مناهج البحث : البحث التاريخي، البحوث الوصفية، البحث التجريبي، البحث النوعي .
Week 4	هيكلية البحث وتشمل: عنوان البحث، المقدمة.

Week 5	مشكلة البحث.
Week 6	فرضيات البحث، أهمية البحث ، أهداف البحث.
Week 7	امتحان نصف فصلي.
Week 8	الدراسات السابقة ،منهجية وإجراءات البحث.
Week 9	ادوات ووسائل جمع البيانات ، الملاحظة، المقابلة، الاستبيان.
Week 10	كتابة تقرير البحث: كتابة مشكلة البحث: وتتضمن: مقدمة البحث ، تحديد المشكلة وأسئلتها، الغرض من البحث (مبررات البحث)، أهمية البحث، وفرضيات البحث وأسئلته.
Week 11	مراجعة أدبيات الدراسة: الإطار النظري، والدراسات السابقة ، إجراءات البحث: وتشمل منهج البحث وتصميمه، والعينة، ومواد وأدوات البحث والإجراءات، والضبط التجريبي للبحث، وتحليل البيانات.
Week 12	نتائج البحث: التحليل الإحصائي وقراءة النتائج وتفسيرها. خلاصة البحث. قائمة المراجع. الملاحق. الصفحات التمهيدية والختامية.
Week 13	يكتب الطالب تقريراً حول تقييم بحث.
Week 14	مناقشة عناوين مقترحة.
Week 15	يراجع الطالب المنهج الدراسي والتهيؤ لامتحان النهائي.
Week 16	امتحان نهائي

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	- منهجية البحث العلمي (د.عبد القادر مندو) - مناهج البحث العلمي (عبد الرحمن بدوي) - محمد سعيد ابو طالب ، علم مناهج البحث - موفق الحمداني وآخرون ، مناهج البحث العلمي : اساسيات البحث العلمي - جمال زكي والسيد يسين ، اسس البحث الاجتماعي - أسس البحث العلمي (د.مروان عبد المجيد إبراهيم) - منهج البحث بين النظرية والتطبيق (د.حامد طاهر) - مناهج البحث العلمي د.محمد سرحان علي المحمداوي	
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition

Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

المستوى الرابع

Module Description Form

نموذج وصف المادة الدراسية

الفيزياء الطبية III

Module Information			
معلومات المادة الدراسية			
Module Title	Medical Physics III		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MPH41038		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	4 th	Semester of Delivery	1 st (7 th)
Administering Department	Medical Physics	College	Science
Module Leader	M. Kawakib Jafar Rashid	e-mail	Kewakib.jafar.rasheed@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/05/2026	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Medical Physics II	Semester	5 th
Co-requisites module	Medical Physics IV	Semester	8 th

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Cognitive objectives 1. To develop the ability of the student. 2. To understand the aim of the medical physics. 3. This course deals with the basic concept of medical physics. 4. This is the basic subject for approximate the medical subjects. 5. Develop students' ability to understand the concepts of medical diagnosis. 6. Develop students' ability to understand medical treatment methods.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student should learn kind of radiations. 2. The student should learn the different effect of each kind of radiations 3. The student should learn the different Dosimetric Quantities 4. The student should learn the Relationship between Dosimetric Quantities 5. The student should learn the Types of Radiations Interaction with Matter 6. The student should learn Photoelectric Absorption in the matter 7. The student should learn the technique of Electron Beam Treatment Planning 8. The student should learn the X-ray Generator 9. The student should learn the Major Types of radiation Interactions with matter. 10. The student should learn the concept of Half-Value Layer and Tenth-Value Layer.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A –:</u> Classification of Radiation, Types of Ionizing Radiation, Definitions of Dosimetry Quantities, Units of Dosimetric Quantities, Relationship between Dosimetric Quantities. [12 hrs]. Interaction of Gamma Rays and X-Rays with Matter, Treatment Planning in Radiation Therapy. [6 hrs] Relative Biological Effectiveness, Types of Interaction with Matter, Photoelectric Absorption [6 hrs]. Overall Interaction of Photons with Matter, Electron Beam Treatment Planning. [8hrs]. <u>Part B -</u> X-ray Generator, Major Types of Interactions, [6 hrs]. Half-Value Layer and Tenth-Value Layer, Photo-stimulable Phosphor (PSP) [6 hrs]. Interaction of Gamma Rays and X-Rays with Matter, Treatment Planning in Radiation Therapy, Introduction to Radiological Images, eyes vision. [8hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in introducing this unit is to introduce students to the physical principles upon which medical physics depends and how to deal with them in a scientifically rigorous manner. Encouraging students to discover how the human body works with physical laws and its physiological and therapeutic effects by themselves through understanding the general laws of physics. This is done through scientific discussions in class as well as through practical application in hospitals and medical clinics.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	6.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	5, 10	LO #1.2
	Assignments	2	10% (10)	2, 9,12	LO # 3, 4, and 5
	Projects / Lab.	15	10% (10)	continuous	
	Report				
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Classification of Radiation
Week 2	Types of Ionizing Radiation
Week 3	Definitions of Dosimetric Quantities

Week 4	Units of Dosimetric Quantities
Week 5	Relationship between Dosimetric Quantities
Week 6	Relative Biological Effectiveness
Week 7	Types of Interaction with Matter
Week 8	Photoelectric Absorption.
Week 9	Overall Interaction of Photons with Matter,
Week 10	Electron Beam Treatment Planning
Week 11	X-ray Generator
Week 12	Major Types of Interactions
Week 13	Half-Value Layer and Tenth-Value Layer
Week 14	Photo-stimulable Phosphor (PSP)
Week 15	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	An Introduction to Medical Physics, Muhammed Maqbool Editor	
Recommended Texts		
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية فيزياء الاجهزة الطبية II

Module Information		
معلومات المادة الدراسية		
Module Title	Physics of Medical Instrumentation II	Module Delivery
Module Type	Core	☒ Theory
Module Code		

	MPH41039		☒ Lecture ☒ Lab ☒ Tutorial ☒ Practical ☒ Seminar		
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		4	Semester of Delivery		1
Administering Department		Type Dept. Code	College	Type College Code	
Module Leader	Dr. Ashraf M. Alattar		e-mail	Ashraf_alattar2000@kus.edu.iq	
Module Leader's Acad. Title		Assistant Professor	Module Leader's Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		01/05/2026	Version Number		1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	1
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Understand the fundamental components of medical devices, as well as how to connect these components and integrate them with the human body to create an integrated application. 2. Connecting the device's physical application to the physics of the human body by connecting information about the physics of medical devices to medical physics and other materials such as biosensors, medical electronics, medical communications, biological materials, and life physics such as 3. Classify medical devices based on their physical action and the direct physical application of therapeutic, analytical, or diagnostic dosage estimations. 4. Developing the student's ability to calibrate the medical equipment from both a physical and technical standpoint. 5. enhance students' understanding of how to use physics to construct, enhance, or design a future medical device.
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	6. Inform pupils about the medical gadget's uses in the human body and how to physically read the device. 7. Obtaining an integrated scientific knowledge of the device by connecting the study material with the rest of the subjects via knowledge of the electronic digital medical device, the mechanism of the device's operation, the sensors used in the device, the biological and biological materials used for each device, and the direct physical application of each device via the characteristics and physical features used for each device type.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Obtaining a distinguished scientific staff that works directly on the equipment and is a link between the attending physician and the medical engineer 2. Distinguish between therapeutic, diagnostic and analytical medical devices 3. Work on device calibration and work on some devices directly in the examination. 4. Medical analysis of accurate extracted readings by knowing therapeutic doses based on accurate mathematical calculations.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Physics of medical devices:</u> Ophthalmic system: Slit Lamp, Description of major subsystems, The Illumination System, The Magnification System, Mechanical System, Troubleshooting & Repair, Fault in electrical system, Tonometer [8 hrs] Laser in Ophthalmic Surgery: The main characteristics of LASER light, Basic laser components, Laser tissue Interaction. [3 hrs] Laser in Ophthalmic Surgery: Photocoagulation Therapy, Photo vaporization Therapy, Photo disruption Therapy, Photo ablative Therapy, Components of a Typical Laser System in Ophthalmology [6 hrs] Endoscopy system: Types of Endoscopes, Flexible Endoscopy, Fiber Optics, Illumination, Basic Components of an Endoscope, Distal End, Angulation Control, Capsule Endoscopy. [8 hrs] Shortwave Diathermy: Introduction, frequency currents for therapeutic purposes, Heating with continuous short-wave diathermy (CSWD), The physiological effects of CSWD on tissue are (thermal), Heating with pulsed short-wave diathermy (PSWD), Parts of short-wave device, Circuit Diagram between Patient System and Automatic Tuning Unit, The Capacitive electrode [6 hrs] Shortwave Diathermy: Heating with pulsed short-wave diathermy (PSWD), Parts of short-wave device, Circuit Diagram between Patient System and Automatic Tuning Unit, The Capacitive electrode [8 hrs] Revision problem classes [8 hrs] <u>Part B -</u> Ultrasound: Physical principle of diagnostic ultrasound (ultrasound as a wave), Generation and detection of ultrasound, Ultrasonography, Advantages of ultrasonography, A (amplitude)-mode and B (brightness)-mode imaging [8 hrs]

	Computed tomography): Spiral / Helical Scanning, X-Ray Source, X-Ray Detectors, Quantum efficiency. [3 hrs] Imaging tech (Computed tomography), Conversion efficiency, Overall efficiency, dose efficiency, Solid-State Detectors, Gas Ionization Detectors, Data-Acquisition System, [8 hrs] Computed tomography: Introduction, the gantry contains, Data-Acquisition Geometries, First Generation: Parallel-Beam Geometry, Second Generation: Fan Beam, Multiple Detectors, Third Generation: Fan Beam, Rotating Detectors, Fourth Generation: Fan Beam, Fixed Detectors, Fifth Generation: Scanning Electron Beam [8 hrs] Electrocardiograph: ECG readout device, ECG machine. The heart and potential source, the ECG waveform, the standard lead system. ECG readout device, ECG machine. [8 hrs] Electromyogram: EMG electrode, Needle electrodes, Surface EMG electrode, Location and orientation of the electrode, EMG signal acquisition circuitry and configurations, Monopolar configuration, Multipolar configurations [6 hrs] EEG: Introduction, EEG rhythms, the spectrum of alpha waves, Beta waves, Theta potentials, Delta waves, mode of EEG recording [6hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to acquaint the students with the physical principles on which medical devices depend how to deal with them in an accurate scientific method. Encouraging students to discover for themselves how medical devices work by understanding the general laws of physics. This is done through scientific discussions in the classroom and in the laboratory as well as through practical application in hospitals and medical clinics.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	81	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	94	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	6.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Physics of medical devices: Biopotential electrodes, Electrode-electrolyte interface, polarization, polarizable and non-polarizable electrodes, electrode circuit models.
Week 2	Ophthalmic system : Slit Lamp, Description of major subsystems, The Illumination System, The Magnification System, Mechanical System, Troubleshooting & Repair, Fault in electrical system, Tonometer
Week 3	Laser in Ophthalmic Surgery: The main characteristics of LASER light, Basic laser components, Laser tissue Interaction.
Week 4	Laser in Ophthalmic Surgery: Photocoagulation Therapy, Photo vaporization Therapy, Photo disruption Therapy, Photo ablative Therapy, Components of a Typical Laser System in Ophthalmology
Week 5	Endoscopy system :Types of Endoscopes, Flexible Endoscopy, Fiber Optics, Illumination
Week 6	Endoscopy system: Basic Components of an Endoscope, Distal End, Angulation Control, Capsule Endoscopy.
Week 7	Shortwave Diathermy: Introduction, frequency currents for therapeutic purposes, Heating with continuous short-wave diathermy (CSWD), The physiological effects of CSWD on tissue are (thermal), Heating with pulsed short-wave diathermy (PSWD), Parts of short-wave device, Circuit Diagram between Patient System and Automatic Tuning Unit, The Capacitive electrode
Week 8	Shortwave Diathermy: Heating with pulsed short-wave diathermy (PSWD), Parts of short-wave device, Circuit Diagram between Patient System and Automatic Tuning Unit, The Capacitive electrode
Week 9	Ultrasound: Physical principle of diagnostic ultrasound (ultrasound as a wave), Generation and detection of ultrasound, Ultrasonography, Advantages of ultrasonography, A (amplitude)-mode and B (brightness)-mode imaging

Week 10	Computed tomography): Spiral / Helical Scanning, X-Ray Source, X-Ray Detectors, Quantum efficiency
Week 11	Imaging tech (Computed tomography): Conversion efficiency, Overall efficiency, dose efficiency, Solid-State Detectors, Gas Ionization Detectors, Data-Acquisition System,
Week 12	Computed tomography: Introduction, the gantry contains, Data-Acquisition Geometries, First Generation: Parallel-Beam Geometry, Second Generation: Fan Beam, Multiple Detectors, Third Generation: Fan Beam, Rotating Detectors, Fourth Generation: Fan Beam, Fixed Detectors, Fifth Generation: Scanning Electron Beam
Week 13	Electrocardiograph: ECG readout device, ECG machine. The heart and potential source, the ECG waveform, the standard lead system. ECG readout device, ECG machine.
Week 14	Electromyogram : EMG electrode, Needle electrodes, Surface EMG electrode, Location and orientation of the electrode, EMG signal acquisition circuitry and configurations, Monopolar configuration, Multipolar configurations
Week 15	EEG: Introduction, EEG rhythms, the spectrum of alpha waves, Beta waves, Theta potentials, Delta waves, mode of EEG recording
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction electrodes and how works with biopotential on the body
Week 2	Lab 2: ECG Knowing and analyzing heart signals using mathematical calculations and physical linkages when working on an ECG equipment
Week 3	Lab 3: Learn about the basic components of a sonar instrument, including acoustic impedance and the pulse back transducer.
Week 4	Lab 4: Knowing the frequencies that are used and designating particular frequencies to each organ, as well as diagnosing continuous and pulsed sound waves and calibrating the device
Week 5	Lab 5: Seminar for medical device (simulation) of endoscopy device types.
Week 6	Lab 6: Diathermy apparatus the type of diathermy employed, an explanation of pulsed and continuous diathermy, and how electrical energy are turned into heat treatment dosages.
Week 7	Lab 7: Mathematical calculations and correlations for determining therapeutic doses on the diathermy device using the frequencies utilized with the amount of current and voltage for each part of the body and calculating the quantity of heat and time for each area of the body
Week 8	Lab 8: CT SCAN: Practical scientific visit to the hospital to learn about the fundamental components of the CT equipment, direct physical calculations on the device, calibration, and image analysis
Week 9	Lab 9: Shock wave device: developing the mathematical and physical relationships for the device to function with certain waves based on the mechanism of physical action. Understand the particular shock wave for each area of the body.
Week 10	Lab 10: Suction unit jar: The gadget's functioning mechanism, calculating the volume per unit area, the amount of reverse pressure supplied to the pull, and working on calibrating the device

Week 11	Lab 11: Seminar for medical device (simulation) of Ophthalmology system
Week 12	Lab12: EEG : The type of electrodes utilized, how to read for charting, and the mathematical equations required for analysis are all discussed.
Week 13	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	3- Webster John G and Clark John W, Medical Instrumentation: Application and Design, 4th Edition, John Wiley, 2010. (R856.M489 2010). 4- Carr, Joseph J and Brown John M, Introduction to Biomedical Equipment Technology, 4th Edition, Prentice Hall 2001. (R856.C311 2001).	Yes
Recommended Texts	4. Brown B H, Medical Physics and Biomedical Engineering, Institute Of Physics, 1999. (R895.M489). 5. Bushberg Jerrold T, Seibert J A, Leidholdt E M and Boone J M, The Essential Physics of Medical Imaging, 2nd Edition, Lippincott Williams & Wilkins, 2002. (RC78.7.D53E78). 6. Ganong William F, Ganong's Review of Medical Physiology, 24th Edition, McGraw-Hill Medical, 2012.	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية تطبيقات الليزر في الطب

Module Information			
معلومات المادة الدراسية			
Module Title	Laser Application in Medicine		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar
Module Code	MPH41040		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	4	Semester of Delivery	1
Administering Department	Medical physics	College	Science
Module Leader	Dr. Aliaa Majid Yahya	e-mail	Dr.amzaki1@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/05/2026	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Non	Semester	
Co-requisites module	Non	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	

Module Aims أهداف المادة الدراسية	1 - Introduce students to aspects of laser use in medicine considering basic physics, tissue interactions, diagnostics and therapeutics, and therapeutic guidelines. 2- Provide students with the technical basics of medical laser systems, associated instruments, modes of laser light delivery, and endoscopy. 3- Provide students with an introduction to application of lasers to diagnostics and disease treatment in medical sub-disciplines including: ophthalmology, dermatology, cardiovascular disease, urology, otorhinolaryngology, neurology, dentistry, and oncology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain interaction of laser with the biological tissue. 2. List the advantages and disadvantages of using laser in medicine 3. Define eye sight problem 4. compare between different types of eye sight correction by laser 5. Describe the retina problems which caused due to diabetes and how can solve these problems by laser. 6. Define endoscope and how does it work to destroy kidney stones. 7. Provide detailed of treated cancer and tumor by laser 8. Classify the laser that use in dentistry. 9. Describe the benefit of using laser in dermatology 10. Illustrate the hazard of using laser without safety.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – laser tissue interaction</u> Basic of interaction of laser with the biological tissue, beneficial example of reflection, transmission through the biological tissue, the benefit of absorption, laser effects on the tissue, photothermal effect, photochemical effect, advantages and disadvantages of laser medicine [15 hrs] <u>Part B- Laser application in medicine</u> The eye, Eyesight problems, Laser eye treatment, LASIK and PRK surgery, Femto LASIK, Relex Smile, laser treatment for retinal eye conditions, diabetic retinopathy, diabetic maculopathy, retinal vein occlusion, Kidney stones and lithotripsy, types of lithotripsy, endoscope, Holmium laser, laser in cancer treatment, How does laser therapy is given, Types of lasers used in cancer treatment, Treating cancer with lasers, Type of laser in dentistry, Uses of laser in dentistry, Types of dental lasers, Type of laser in dermatology, Laser tattoo removal, Types of tattoo removal lasers. [25 hrs]. <u>Part C- laser Hazard:</u> Laser safety, laser hazard, laser eyes hazard for patient and worker, laser skin hazard. Laser classes. [12 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course will be delivered through lectures in the classroom. The students will be receive the outcome of each lecture through discussions, videos related to the subject and questions. In addition, the information will be developed by self-learning through reading and searching to hand in the essay and home works.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	3,6,11,14	LO #1-2, 4-5, 9-10, 11-12
	Assignments	5	10% (10)	2,3,5,6,7	LO #1, 2, 4, 5, 6
	Projects / Lab.				
	Report	1	10% (10)	11	
Summative assessment	Midterm Exam	1	10% (10)	8	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Laser tissue interaction
Week 2	laser eye surgery
Week 3	LASIK, PRK, femto LASIK and Relex Smile
Week 4	Laser in retinal surgery
Week 5	Laser in lithotripsy.
Week 6	Holmium laser
Week 7	Midterm exam
Week 8	Laser in cancer treatment
Week 9	laser therapy
Week 10	Laser in dentistry

Week 11	Types of dental laser
Week 12	laser in dermatology
Week 13	Laser tattoo removal
Week 14	Types of laser tattoo removal
Week 15	laser hazards and safety
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Medical, Metrology and Communication, <u>Chunlei Guo</u> , <u>Chandra Subhash Singh</u> , 2021	No
Recommended Texts	Laser in medicine, G. T Absten and S. N. Joffe	No
Websites	https://www.springer.com/journal/10103	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية الوقاية من الاشعاع

Module Information			
معلومات المادة الدراسية			
Module Title	Radiation protection		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar
Module Code	MPH41041		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	4	Semester of Delivery	1 st
Administering Department	Medical Physics	College	Science
Module Leader	Dr. Alyaa Abd Alrazaq	e-mail	alyaaabdalrazaq@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/05/2026	Version Number	1.0

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course interduces The theory and fundamental principles of radiation ,the concepts, functions, behaviors, and attributes of radiation and devices, Nuclear and environment

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Differentiate between radiations and irradiation ; Explain difference Definition- Sources of natural and man-made radiation. Health effects of radiation on living organisms. Understand the types of radiation and their health effects. -Know the protective measures to minimize radiation exposure. -Apply protective techniques in various scientific and health-related fields. Understand the safety regulations and laws related to radiation .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Unit 1:structure of matter Unit 2:radiation and radioactivity Unit 3:radiation units and biological effect

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The course employs a variety of teaching strategies including interactive lectures , group discussion on radiation safety regulation and case study analysis
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	5, 10	LO #1, 2, and 5
	Assignments	2	10% (10)	2, 12	LO # 3, 4, and 6
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 3, 4 and 6
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction Radioactivity and radiation introduction
Week 2	Radioactive Decay...
Week 3	,Units of Measurement ., Radioactive Decay.
Week 4	Exposure Risks Sources of Radiation, Biological Effects.
Week 5	Dose Limits .
Week 6	Principles of Radiation Protections
Week 7	Internal Radiation Protection
Week 8	External Radiation Protection
Week 9	Radiological Identification System.
Week 10	Radiation Safety Office
Week 11	As Low as Reasonably Achievable (ALARA)...
Week 12	Dosimetry
Week 13	Radiation Survey Meters
Week 14	radiation units and biological effect introduction
Week 15	Emergency Procedures
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	An introduction to radiation protection fourth edition Alan martin and Samuel a. Harbison	No
Recommended Texts		No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group	A - Excellent	امتياز	90 – 100	Outstanding Performance

(50 - 100)	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية الموائع الحيوية

Module Information				
معلومات المادة الدراسية				
Module Title	Biofluid		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	MPH41042			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	4 th	Semester of Delivery		1 st
Administering Department	Medical Physics	College	Science	
Module Leader	Dr. Sabah I. Abbas		e-mail	sabahibrahim@kus.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	02/05/2026		Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	1

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Understand the fundamental of body fluid and biofluid mechanics that representing by bodily fluid and blood components. 2. Increase students' knowledge about blood circulation system and the most important medical terms such as fluid kinematics, viscosity, Newtonian and non-Newtonian fluids , steady unsteady laminar and turbulent flows, Erythrocytes, leukocytes and thrombocytes, Arteries, Veins. 3. Provide the student with knowledge information about the Bernoulli equations, Hagen - Poiseuille equation, Steady Flow along tube. 4. Provide the student with knowledge information about Ematology and blood Rheology. 5. Enable the student to distinguish vascular diseases such as atherosclerosis, stenosis. 6. Provide the student with knowledge about Heart and Cardiovascular System, The Cardiac Cycle, Pressure, Flow and Heart Chambers Volume, Heart Valves Function and Mechanical Properties, Coronary Circulation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Distinguish between the Newtonian and non-Newtonian fluids, laminar and turbulent flows. 2. Calculating the blood velocity, shear stress and viscosity and blood pressure at any point in the vessels. 3. Make the student able to determine the type of blood flow, whether it is laminar and turbulent flows in the vascular vessels. 4. Make the student distinguish between Arteries, Arterioles, Capillaries, Venules and Veins. 5. Distinguish between some vascular diseases such as atherosclerosis, stenosis. 6. Determine the difference between pulmonary circulation, Systemic circulation and Coronary circulation. 7. Study the Cardiac Cycle, Pressure, Flow and Heart Chambers Volume, Heart Valves Function and Mechanical Properties.

	8. Defining the blood Rheology and blood types.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Fluid Mechanics and Biofluids Principles</u> History of body fluid and biofluid mechanics- Review of biofluid mechanics applications- Definition of dimensions and units in engineering- Role of dimensional analysis in engineering equations- Characterization of basic formulas in fluid mechanics-including density, velocity- pressure, volumetric flow rate and mass flow rate. [8 hrs] Fluid kinematics and its aspects such as Lagrangian and Eulerian methods-velocity and acceleration fields - flow visualization or flow lines- Definition of viscosity- Behavior of Newtonian and non-Newtonian fluids and their principles - Dimensionless numbers and their role in Biofluid Mechanics- Description of steady, unsteady, laminar and turbulent flows - Explanation of boundary conditions and no slip boundary conditions- Definition of compressible and incompressible flows- Categorizing of viscoelasticity and viscoplasticity- Definition and application of basic equations in fluid mechanics.[9 hrs]. Conservation of Mass, Momentum and Energy- Navier -Stokes equation- Bernoulli equations- Hagen - Poiseuille equation- Steady Flow along Tube- Pulsatile Flow in Rigid and Elastic Tubes- Resistance, Compliance and Inertance.[6 hrs]. <u>Part B – Ematology and Blood Rheology</u> Explanation of bodily fluid and blood components- Categorization of blood types- Definition of pH and bodily fluids pH- Categorization of blood cells and definition of Erythrocytes-leukocytes and thrombocytes- Definition of plasma, electrolytes, proteins of blood- Blood viscosity aspects- Formulation and explanation of rheological models of blood.[9 hrs]. <u>Part C – Microcirculation System</u> Explanation of the blood circulation system- Categorization of blood vessels- Behavior of pulsatile blood flow- Arteries classification and properties- Veins classification and properties- Definition of vascular bifurcations and branches- Curved vessels aspects- Formulation and explanation of mechanical and elasticity properties of vessels- Definition of atherosclerosis-Description of stenosis.[10hrs]. Explanation of the blood microcirculation system- Arterioles and their aspects, such as blood velocity, wall shear stress and pressure drop- Capillaries, their categorization, blood velocity and pressure drop- Venules and their properties- Definition of Fahraeus and Fahraeus Lindqvist effects- Mass transport definitions and equations such as Fick’s law, StokesEinstein equation for diffusion, convection in porous media and biological tissues- Definition of porous medium properties such as porosity, tortuosity and permeability- Formulation and explanation of governing equations in porous media, Darcy’s law and Brinkman equation-Explanation of fluid transport in poroelastic media.[10 hrs].

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Strategies in teaching biofluid are centered on the teacher and the students, It depends mainly on equipping the student with theoretical skills about blood microcirculation system and vessels also determine the diseases that related microcirculation through the participation of students in preparing reports, assignments, seminars and projects, preparing lectures, solve examples. The student will gain knowledge about the laws of physics associated with the movement of blood through blood vessels represented by veins and arteries by determining density, velocity- pressure, volumetric flow rate and mass flow rate. The strategy of the bio fluid class is to increase students' awareness of the important laws of physics through which is determined the blood flow in the blood vessels, as well as the pressures at each region of the blood vessels.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	0		Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered
Week 1	History of body fluid and biofluid mechanics, Review of biofluid mechanics applications. Definition of dimensions and units in engineering. Role of dimensional analysis in engineering equations.
Week 2	Characterization of basic formulas in fluid mechanics, including . density, velocity, pressure, volumetric flow rate and mass flow rate.
Week 3	Fluid kinematics and its aspects such as Lagrangian and Eulerian methods, Definition of viscosity. Behavior of Newtonian and non-Newtonian fluids and their principles.
Week 4	Description of steady, unsteady, laminar and turbulent flows. Definition of compressible and incompressible flows. Categorizing of viscoelasticity and viscoplasticity. Definition and application of basic equations in fluid mechanics.
Week 5	Conservation of Mass, Momentum and Energy . Navier -Stokes equation. Bernoulli equations. Hagen - Poiseuille equation.
Week 6	Steady Flow along Tube. Pulsatile Flow in Rigid and Elastic Tubes. Resistance, Compliance and Inertance.
Week 7	Explanation of bodily fluid and blood components. Categorization of blood types. Definition of pH and bodily fluids pH. Categorization of blood cells and definition of Erythrocytes, leukocytes and thrombocytes.
Week 8	Definition of plasma, electrolytes, proteins of blood, Blood viscosity aspects. Formulation and explanation of rheological models of blood.
Week 9	Explanation of the blood circulation system. Categorization of blood vessels. Behavior of pulsatile blood flow. Arteries classification and properties.
Week 10	Veins classification and properties Definition of vascular bifurcations and branches. Curved vessels aspects. Formulation and explanation of mechanical and elasticity properties of vessels.
Week 11	Definition of atherosclerosis. Description of stenosis.
Week 12	Explanation of the blood microcirculation system. Arterioles and their aspects, such as blood velocity, wall shear stress and pressure drop. Capillaries, their categorization, blood velocity and pressure drop. Venules and their properties.
Week 13	Definition of Fahraeus and Fahraeus Lindqvist effects. Mass transport definitions and equations such as Fick's law, Stokes Einstein equation for diffusion, convection in porous media and biological tissues.
Week 14	Definition of porous medium properties such as porosity, tortuosity and permeability. Formulation and explanation of governing equations in porous media, Darcy's law and Brinkman equation. Explanation of fluid transport in poroelastic media.

Week 15	Heart and Cardiovascular System ,The Cardiac Cycle, Pressure, Flow and Heart Chambers Volume, Heart Valves Function and Mechanical Properties.
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Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	5- Biofluid Mechanics Principles and Applications, by Ali Ostadfar, PhD . Simon Fraser University, 2016. 6- Applied Biofluid Mechanics, 2007 by The McGraw-Hill Companies by LEE WAITE	Non
Recommended Texts	Biofluid Dynamics , Perumal Nithiarasu, Swansea University . by P. Nithiarasu	Non
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية اخلاقيات البحث العلمي

Module Information			
معلومات المادة الدراسية			
Module Title	Ethics of Scientific Research		Module Delivery
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	KUS47043		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	4 th	Semester of Delivery	2 nd (7 th)
Administering Department	Medical Physics	College	Science
Module Leader	M. Zainab Faleh Nazzal	e-mail	Zainab.f.n2022@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/5/2026	Version Number	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. بيان المقصود باخلاقيات البحث العلمي. 2. ايضاح سبيل النهوض باخلاقيات البحث العلمي. 3. تعزيز اخلاقيات الواجب اتباعها في اعداد البحوث العلمية
Module Learning Outcomes	1. زيادة الوعي العلمي حول الاخلاقيات التي يجب التحلي بها من قبل الباحثين. 2. بيان الاخلاقيات الحميدة والسيئة من اجل تنمية الاولى ومكافحة وتجنب الاخيرة. 3. بيان كيفية اعداد البحوث العلمية مع مراعاة الامانة العلمية. 4. بيان كيفية العمل على بحث علمي رصين خال من السرقة العلمية والاستغلال العلمي

مخرجات التعلم للمادة الدراسية	
Indicative Contents المحتويات الإرشادية	تعريف اخلاقيات البحث العلمي مفهوم الاخلاق خصائص البحث العلمي اسلوب التفكير العلمي الحر اهمية البحث العملي البحث العلمي واجراء التجارب العلمية اخلاقيات البحث العلمي والسرقة العلمية اخلاقيات البحث العلمي والسرقة الالكترونية صفات الباحث العلمي

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	يُعد هذا المقرر من أهم المقررات الدراسية كونه يمكن الطالب الجامعي من المهارات التي تساعد على انجاز بحث التخرج، وهو يعمل على إكسابه مجموعة من المعلومات والمعارف حول العلم والمعرفة، والبحث العلمي ومناهجه، وينمي الاتجاهات الإيجابية لدى المتعلم تجاه البحث العلمي، ويتحقق ذلك من خلال مجموعة من الأنشطة الفاعلة (طرائق وأساليب تدريس، ووسائل) كطريقة الحوار والمناقشة، والتعلم الذاتي، والبحث، والتطبيقات، مع استخدام البوربوينت عند العرض، وتقييم الطالب من خلال المشاركة الصفية والتكليفات المصاحبة - الصفية واللاصفية - والاختبار النصفي والنهائي.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	5	
	Assignments	1	10% (10)	5, 10	
	Projects / Lab.				
	Report	1	10% (10)	13	

Summative assessment	Midterm Exam	1 hr	10% (10)	7	
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	تعريف اخلاقيات البحث العلمي
Week 2	مفهوم الاخلاق.
Week 3	خصائص البحث العلمي.
Week 4	اسلوب التفكير العلمي الحر
Week 5	اهمية البحث العملي
Week 6	البحث العلمي واجراء التجارب العلمية
Week 7	امتحان نصف فصلي.
Week 8	اخلاقيات البحث العلمي والسرقة العلمية.
Week 9	اخلاقيات البحث العلمي والسرقة الالكترونية
Week 10	صفات الباحث العلمي.
Week 11	استعمالات الاحرف, الجداول, الاشكال, المخططات, الرسوم وغيرها.
Week 12	الاساليب الاحصائية واستخدام الحاسبات.
Week 13	اسلوب الاشارة الى المراجع والمصادر داخل متن البحث(الاقتباس العلمي).
Week 14	قائمة المصادر, الناحية الجمالية للبحث
Week 15	امتحان نهائي

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. ابو سليمان, عبد الوهاب ابراهيم, كتابة البحث العلمي صياغة جديدة, الطبعة التاسعة, مكتبة الرشد, ناشر, المملكة العربية السعودية, 2005 2. البلداوي, عبد الحميد عبد المجيد, اساليب البحث العلمي والتحليل الاحصائي التخطيط للبحث وجمع البيانات يدويا وباستخدام برنامج SPSS عمان, دار الشروق, 2007 3. زكريا فؤاد, التفكير العلمي, المجلس الوطني للثقافة والفنون والآداب, الكويت, 1978 4. الضامن منذر, اساسيات البحث العلمي, عمان : دار المسيرة للنشر والتوزيع 2016	

Recommended Texts	1. العزاوي, رحيم يونس كرو, مقدمة في منهج البحث العلمي, الطبعة الاولى, دار دجلة, المملكة الاردنية الهاشمية, 2007 2. عقيل حسين, خطوات البحث العلمي من تحديد المشكلة الى تفسير النتيجة, دار ابن كثير, 2012
Websites	مواقع تعليمية من الانترنت, حضور محاضرات وندوات

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
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	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية

الفيزياء الطبية IV

Module Information					
معلومات المادة الدراسية					
Module Title	Medical Physics IV		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	MPH42044				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		4 th	Semester of Delivery		2 nd (8 th)

Administering Department	Medical Physics	College	Science
Module Leader	M. Kawakib Jafar Rashid	e-mail	Kewakib.jafar.rasheed@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/05/2026	Version Number	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Medical Physics III	Semester	7 th
Co-requisites module	Non	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Cognitive objectives 1. Understanding the physical relationships whose applications are medical. 2. Studying the medical part that needs physics for diagnosis and treatment. 3. Training students to understand the link between physics and medicine. 4. Training students to use medical devices related to medical physics. 5. Describe the concept of medical physics. 6. Application of the laws of physics that have to do with the human body. 7. The study of radiation and its relationship to medical physics, whether in diagnosis or treatment. 8. Develop students' ability to understand the physical units of quantities used in treatment, especially their small parts due to their importance in determining doses. 9. Develop students' ability to study and determine doses.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student should learn history of CT. 2. The student should learn the units of Dosimetric Quantities. 3. The student should learn the MR Imaging Principle. 4. The student should learn Introduction about Nuclear Medicine Physics. 5. The student should learn the technique of using Radiation in Nuclear Medicine. 6. The student should learn about Ultrasound Transducer. 7. The student should learn the Fundamental Radiation Protection Principles
Indicative Contents	Indicative content includes the following.

المحتويات الإرشادية	<u>Part A –:</u> Computed Tomography, History and Generations of Computed Tomography CT Numbers, Hounsfield Unit, and Gray Scale. [12 hrs]. Magnetic Resonance Imaging (MRI), MR Imaging Principle, Contrasts in MRI. [8 hrs] Radiation Therapy Process, Radiation in Nuclear Medicine [6 hrs]. Dosimetric Data for Clinical Photon Beams, Practical Applications of Dosimetric Data. [8hrs]. <u>Part B -</u> Photon Beam Treatment Plannin, Isodose Distribution [6 hrs]. Treatment Planning Techniques, Image-Guided Radiation Therapy [6 hrs]. Image-Guided Radiation Therapy [8hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in introducing this unit is to introduce students to the physical principles upon which medical physics depends and how to deal with them in a scientifically rigorous manner. Encouraging students to discover how the human body works with physical laws and its physiological and therapeutic effects by themselves through understanding the general laws of physics. This is done through scientific discussions in class as well as through practical application in hospitals and medical clinics.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	5, 10	LO #1.2
	Assignments	2	10% (10)	2, 9,12	LO # 3, 4, and 5
	Projects / Lab.	15	10% (10)	continuous	

	Report				
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Computed Tomography
Week 2	History and Generations of Computed Tomography
Week 3	CT Numbers, Hounsfield Unit, and Gray Scale
Week 4	Magnetic Resonance Imaging (MRI)
Week 5	MR Imaging Principle
Week 6	Contrasts in MRI
Week 7	Radiation Therapy Process
Week 8	Radiation in Nuclear Medicine
Week 9	Dosimetric Data for Clinical Photon Beams
Week 10	Practical Applications of Dosimetric Data
Week 11	Photon Beam Treatment Planning, Examples
Week 12	Isodose Distribution
Week 13	Treatment Planning Techniques
Week 14	Image-Guided Radiation Therapy
Week 15	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	

Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	An Introduction to Medical Physics, Muhammed Maqbool Editor	
Recommended Texts		
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف المادة الدراسية

تحليل ومعالجة الصور الطبية

Module Information			
معلومات المادة الدراسية			
Module Title	Medical Image Processing and Analysis		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ seminar
Module Code	MPH42045		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	4 th	Semester of Delivery	2 nd
Administering Department	Medical Physics	College	Sciences
Module Leader	Dr. Farah A.lazem		e-mail farahkafi1993@kus.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/5/2026	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	• To provide students with a comprehensive foundation in the principles and methodologies of medical image analysis and processing. • To familiarize students with advanced image enhancement techniques and noise reduction methods. • To enable students to critically understand and effectively apply image segmentation techniques. • To develop students' competencies in extracting and analyzing features from medical images. • To introduce students to the fundamental concepts of image classification using machine learning approaches. • To equip students with the practical skills required to implement image processing algorithms using software tools such as MATLAB. • To integrate theoretical knowledge with practical applications in medical diagnosis and clinical decision support.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define the meaning of mechanics. 2. Develop a clear understanding of basic physical phenomena in thermal physics and materials science as an integral part of the student's overall education 3. Compare between vectors and scalar quantities. 4. Calculate and find the displacement, velocity and acceleration of bodies. 5. Use algebra, trigonometry, and basic calculus, in solving problems in one and two dimensions motion. 6. Provide detailed and accurate description of forces effect on bodies. 7. Classify the energy types. 8. Calculate the work done on subject.
Indicative Contents المحتويات الإرشادية	Introduction to Medical Image Processing Digital Image Representation and Sampling Image Enhancement Techniques Noise Reduction and Filtering Methods Image Segmentation Techniques Edge Detection and Region-Based Segmentation Morphological Image Processing Feature Extraction from Medical Images Image Classification and Pattern Recognition

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Delivery of structured lectures supported by advanced multimedia presentations to ensure systematic coverage of theoretical concepts in medical image analysis and processing. Facilitation of guided discussions to promote critical thinking and deepen conceptual understanding of core methodologies. Implementation of laboratory-based sessions using MATLAB for the practical execution and validation of image processing algorithms. Engagement of students in problem-based learning activities utilizing real-world medical imaging datasets to enhance analytical and diagnostic skills. Adoption of student-centered learning approaches through structured assignments, technical reports, and project-based assessments. Promotion of collaborative learning through group-based tasks aimed at developing teamwork and communication skills. Provision of continuous formative feedback to support progressive learning and performance improvement. Encouragement of independent and self-directed learning through recommended textbooks, scientific articles, and current research in medical imaging.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	60	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	90	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5,10	LO1,LO2
	Assignments	2	2,12	LO3,LO4
	Projects / Lab.	Continuous	Continuous	LO4,LO6
	Report	1	13	LO5,LO7
	Midterm Exam	1 hr	7	LO,1-7

Summative assessment	Final Exam	3hr	50% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Image Processing
Week 2	Image Storage and Transfer
Week 3	Image Compression
Week 4	Image Enhancement
Week 5	Noise Removal
Week 6	Filters.
Week 7	Midterm exam.
Week 8	Edge Detection
Week 9	The Analysis of Medical Images
Week 10	Histogram Equalization
Week 11	Feature Detection
Week 12	Template Matching
Week 13	Image Segmentation
Week 14	Classification and Clustering
Week 15	Create a Perceptron Network (nntool)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Image Processing/MATLAB
Week 2	Storage and Transfer
Week 3	Contrast Manipulation
Week 4	Image Segmentation
Week 5	Rank and Max-Min Filters
Week 6	Blurring and Deblurring

Week 7	Midterm exam.
Week 8	Edge Detection
Week 9	Histogram Equalization
Week 10	Thresholding, Morphological (Dilation and Erosion) Operations and Corners on Image
Week 11	Feature Detection/MATLAB
Week 12	Template Matching
Week 13	Segmentation
Week 14	Classification and Clustering
Week 15	Create a Perceptron Network (nntool)
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Digital Image Processing	Available online
Recommended Texts	Fundamentals of Digital Image Processing	Yes
Websites	Various lectures and lecture notes on the internet.	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Description Form

نموذج وصف مادة

الطب النووي والعلاج الاشعاعي

Module Information				
معلومات المادة الدراسية				
Module Title	Nuclear medicine and radiation therapy		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☒ Practical ☒ Seminar	
Module Code	MPH42046			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	4	Semester of Delivery	2	
Administering Department	Medical Physics	College	Science	
Module Leader	Dr. Ali Abdulamear Rasheed	e-mail	ali.abdulamear@kus.edu.iq	
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)	e-mail	E-mail	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	01/05/2026	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Students are introduced to the subject of nuclear medicine and radiotherapy and its role in understanding modern treatment principles and their daily uses. 2. How to use this knowledge and techniques in treatment and link them to other scientific phenomena
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A- Knowledge and understanding 1. Learn about nuclear medicine and how this science originated and developed into one of the most important branches of physics and its direct connection with modern medical applications. 2. Learn about the basic concepts of nuclear medicine and radiotherapy and how to benefit from modern technologies for treatment. b- Subject-specific skills 1- Providing the student with knowledge in the field of nuclear medicine and radiation therapy, as the student can transform this knowledge into behavior when the situation requires a specific response to solve and treat a specific pathological condition. 2- Provide the student with the necessary skills in employing the acquired knowledge to be a basic pillar in understanding the physical phenomena related to nuclear physics.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – introduction to nuclear medicine and radiation therapy: Nuclear medicine uses radionuclides (unstable forms of elements whose atomic nuclei decay and emit gamma radiation that we can detect with gamma cameras) for diagnosis and treatment of disease. We can use the radionuclides in certain drugs to create radiopharmaceuticals. When radiopharmaceuticals are administered to patients, they accumulate in different organs or tissues. Radioactive iodine will go to the thyroid like normal iodine and show us what parts of the body are taking up iodine. will be taken up like normal glucose and show us what parts of the body have heavy anaerobic metabolism. In radiographs and CT, X-rays are transmitted through the patient's body. In nuclear medicine, gamma rays (from the radiopharmaceutical, presumably localized by physiology) are emitted from the patient's body. They are then detected by a gamma camera [6 hrs]. Nuclear medicine basics: pros : Examine physiology: Sometimes allows us to answer questions not answered by other imaging modalities and Possibility of molecular targeting/precision medicine , take as many images as we want after injection: Since the dose is administered at the time of injection, we can get as many extra pictures as we want without additional radiation. Concentrations are low, so safe for patients in renal or hepatic failure .Less affected by obesity (gamma rays are very penetrating) [6 hrs]. Nuclear medicine basics: cons : Relatively high radiation dose—CT or more •The patient keeps getting radiated by the radiopharmaceutical until it gets excreted, so we have to give relatively little to start with Low spatial resolution ('unclear medicine') Variations in bio-distribution for reasons other than disease As a result,

often extensive preparation (some exams may require the patient to be NPO, others to be off certain medications) [6 hrs].

Nuclear medicine basics: safety : Radiopharmaceuticals are at Nano molar (sub-pharmacologic) concentrations, so we can give pharmacologically active drugs –HIDA is (Hepatobiliary iminodiacetic acid) scan –Thallium is poisonous at higher concentrations Reasonably high radiation dosage (similar to CTs) [5 hrs].

Compositions Of Nucleus: All nuclei are composed of two basic particles, neutrons and protons. Neutrons and protons are almost the same size but differ in their electrical charge. Neutrons have no electrical charge and contribute only mass to the nucleus. Each proton has a positive charge equal in strength to the negative charge carried by an electron. Most physical and chemical characteristics of a substance relate to the nuclei's neutron-proton composition. The number of protons in a nucleus is the atomic number (Z) and establishes the chemical identity of the atom. Each atomic number corresponds to a different chemical element; there are now approximately 106 known chemical elements that correspond to nuclei containing from 1 to 106 protons [5 hrs].

properties of the nuclear binding force: Repulsive electrical force between protons is strong, should blow nucleus apart, There must be a countervailing attractive force between pairs of protons, protons and neutrons, and pairs of neutrons. The force is strongest between p and n, and about a hundred times stronger than the Coulomb force. Very short range – goes zero beyond About 3 fm. Charge independent – does not matter if the particles are protons or neutron Depends on the spin orientation of the nucleons Suspected to be an exchange force in which the attraction is due to an exchange of pions, Saturated—is constant at about 8 MeV/nucleon above A=20 or so - This is why equal numbers of p's and n's are preferred. The simplest complex nucleus is deuteron (2H), the bound state of the neutron-proton system. The two body system does give information on the nucleon-nucleon force [5 hrs].

Radioactivity, also known as radioactive decay, nuclear decay, nuclear disintegration and nuclear transformation, is a spontaneous process by which an unstable parent nucleus emits a particle or electromagnetic radiation and transforms into a more stable daughter nucleus that may or may not be stable. The unstable daughter nucleus will decay further in a decay series until a stable nuclear configuration is reached. Radioactive decay is usually accompanied by emission of energetic particles or γ ray photons or both [5 hrs].

Part B – clinical applications in nuclear medicine

The clinical uses of radioactivity for the diagnosis of disease. -The most useful radio-nuclides for nuclear medicine are those that emit gamma rays. -Since γ -rays is very penetrating γ -emitting radioactive element inside the body can be detected outside the body. In nuclear physics used Geiger counter to detect radiations. **Evaluate thyroid function** (24 hours uptake test). The thyroid uses iodine in the production of hormones that control the metabolic rate of the body: **Hypothyroid**-a person with underactive thyroid will take up less iodine than a person with normal thyroid function (euthyroid). **Hyperthyroid**-a person with over active thyroid will take more iodine For the 24hr uptake to test. [6 hrs].

Kidney function is also often studied with scintillation detectors. About 7MBq (~200 μ ci) of ^{131}I labeled hipuricacid is injected into the bloodstream, and a sit is removed from the blood by the kidneys the radioactivity of each kidney is monitored and record the change in the radioactivity with time.

To Measure Blood Volume: Dilution techniques: The technique is used to determine the blood volume. About 200KBq(5 μ ci) of ^{131}I labeled albumin is injected into an arm vein, and after about 15 min.[5 hrs].

	Radiobiology is the study of the actions of ionizing radiations on living matter. Since radiation has the ability to cause changes in cells which may later cause them to become malignant, or bring about other detrimental functional changes in irradiated tissues and organs, consideration of the associated radiobiology is important in all diagnostic applications of radiation. Additionally, since radiation can lead directly to cell death, consideration of the radiobiological aspects of cell killing is essential in all types of radiation therapy. Cell Types and Organelles: Cells can be simply divided into two categories: Prokaryotic cells. Bacteria and blue–green algae belong in this group. These cells have no nucleus and are surrounded with a nuclear membrane. In addition, they do not have mitochondria. DNA (Deoxyribonucleic acid) – genetic material is scattered within the cytoplasm. These cells do have ribosomes. The vital functions of this type of cell are performed in the cytoplasm and cellular membrane [6 hrs]. Eukaryotic cells. These cells have membranous organelles, so their nuclear material is not scattered within the cytoplasm, and they have a real nucleus. Eukaryotic cells are more highly developed than prokaryotic cells – the cells of animals, plants, fungi are eukaryotic. These cells have organelles in their cytoplasm. Chromosomes, consisting of DNA and proteins, are located in the cell nucleus [4 hrs]. Determination of relative biological effectiveness (RBE): For a given biological, the RBE of the high LET radiation is defined as the ratio of the effective doses for the reference (low LET) and the high LET radiation. Brachy therapy: A short distance therapy .Radium source is put into or on the surface of tumors. Advantage:- of brachy therapy is that gives a very large dose to the tumors with minimum radiation to the surrounding tissue. Megavoltage therapy has three major advantages: The maximum dose occurs below the skin and this skin-sparing effect greatly reduces the pain from the treatment, The high energy is almost completely in the Compton Effect region [5 hrs]. Exposures: Medical exposure, Occupational exposure, Public exposure An individual person may be subject to one or more of these categories of exposure, and for radiation protection purposes such exposures are dealt with separately [4 hrs]. REACTOR PRODUCTION: There are two major ways to produce radionuclides: using reactors (neutrons) or particle accelerators (protons, deuterons, α particles or heavy ions). Since the target is a stable nuclide, either a neutron-rich radionuclide (reactor produced) or a neutron deficient radionuclide (accelerator produced) is generally obtained. RADIOACTIVE PATIENTS ON DIALYSIS: The care of patients receiving radiopharmaceutical therapy and who are on dialysis may require additional consideration. In general, for systemic treatments, these patients will not biologically clear radioactive materials as quickly as typical patients since the clearance is highly dependent on the schedule of the dialysis session. It may be necessary to reduce or otherwise adjust the activity required for a therapy [4 hrs].
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes,

	interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL) الحمل الدراسي للطلاب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	An Introduction to Nuclear Medicine
Week 2	Nuclides and Radioactive Processes
Week 3	Radioactivity
Week 4	Production of radionuclides
Week 5	Radiation dose & Clinical applications
Week 6	Radiopharmaceuticals
Week 7	Mid-term Exam
Week 8	Basic Radiobiology

Week 9	Interactions With Matter
Week 10	Radiation Protection
Week 11	Biological Effects Of Radiation
Week 12	Radiation Therapy
Week 13	Nuclear Medicine Devices
Week 14	Death Of The Patient
Week 15	Worked examples
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Tc-99m generator
Week 2	Lab 2: Detectors of radiation
Week 3	Lab 3: Thyroid test
Week 4	Lab 4: Bone scan update
Week 5	Lab 5: Kidney scan
Week 6	Lab 6: Lunge scan
Week 7	Lab 7: Cardiovascular scan

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية فيزياء الاعصاب

Module Information معلومات المادة الدراسية						
Module Title	Neurophysics		Module Delivery			
Module Type	Support		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar			
Module Code	MPH42047					
ECTS Credits	4					
SWL (hr/sem)	100					
Module Level	4 th	Semester of Delivery		2 nd		
Administering Department	Medical Physics	College	Science			
Module Leader	Dr. Holya A. Lafta		e-mail	holya.a.lafta@kus.edu.iq		
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification		Ph.D.		
Module Tutor	Non		e-mail	Non		

Peer Reviewer Name	Non	e-mail	Non
Scientific Committee Approval Date	1\5\2026	Version Number	1.0

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Provide the student with knowledge of the types of nerve cells 2. Teach the student how the nerve impulse is transmitted 3. Teach the student electrical nerves, resistance and capacitance of the nerve cell 4. - Teaching the student how the nerve impulse is transmitted between the different tissues and organs of the body 5. Teaching the student how to calculate the transmission speed of a nerve impulse and the most important mathematical equations used and how to apply them 6. Teaching the student the physical causes of neurological diseases and how to detect them.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student understands the meaning of Neuro system and its structure. 2. The student understands the location and name the major structures of the mammalian brain (e.g., lobes, brainstem, cerebellum) and explain their primary functions 3. The student learns about the electrochemical process of how a signal starts, travels, and reaches the end of a neuron. 4. The student understand the Resting Membrane Potential and how ion channels regulate the voltage across the cell membrane. 5. The student understands the description of the stages of an action potential (depolarization to repolarization) and how neurons "communicate" at the synapse. 6. The student learns about the analyze how groups of neurons coordinate with each other to process complex information and maintain body functions. 7. The student understands the define of synaptic plasticity and explain how changes in neuronal connections lead to changes in behavior and memory. 8. The students trace the pathway of sound from the ear to the primary auditory cortex and identify the networks involved in hearing. 9. The student studies the map the flow of visual information from the retina to the visual cortex and understand how the brain interprets images. 10. The student Describe the "top-down" pathway of movement, from the motor cortex to the muscles via the spinal cord.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>I. Structure and function of single neurons (dendrites, axons, synapses) and neuronal networks</u> A. Neuroanatomy of the mammalian brain

	B. Neuron and the physiology of nerve impulse C. Basic electrical properties of biological membranes D. The generation and exchange of action potentials. The interactions of neurons within and between neuronal networks. [15 hrs] <u>II. Speed of propagation</u> General principles underlying learning and behavior, Auditory system, anatomy, networks and physiology, Visual system, anatomy, networks and physiology. [15 hrs] Motor system, anatomy, networks and physiology, Most important diseases in the nervous system. [7 hrs] Examination devices for the nervous system, Preparatory week before the final Exam [15 hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	2, 4, 8,10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	5, 11	LO # 3, 4, 6 and 7

	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Structure and function of single neurons (dendrites, axons, synapses) and neuronal networks
Week 2	Neuroanatomy of the mammalian brain
Week 3	Neuron and the physiology of nerve impulse
Week 4	Basic electrical properties of biological membranes
Week 5	The generation and exchange of action potentials
Week 6	The interactions of neurons within and between neuronal networks.
Week 7	Mid-term Exam
Week 8	Speed of propagation.
Week 9	General principles underlying learning and behavior
Week 10	Auditory system, anatomy, networks and physiology
Week 11	Visual system, anatomy, networks and physiology.
Week 12	Motor system, anatomy, networks and physiology
Week 13	Most important diseases in the nervous system
Week 14	Most important diseases in the nervous system
Week 15	final Exam.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Kandel et al: "Principles of Neural Science" (5th ed, 2012), Ch 52-55 - Squire et al.: "Fundamental Neural Science" (3rd ed, 2008), Ch 13-16 - Squire et al.: "Fundamental Neural Science" (4th ed, 2012), Ch 14-17	

	Nicholls et al.: "From Neuron to Brain", (4th ed), Ch 25	
Recommended Texts	Nature Neuroscience, The Journal of Neuroscience (JNeurosci)	
Websites	BrainFacts.org, Minute Neuroscience	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Description Form

نموذج وصف المادة الدراسية مشروع البحث

Module Information				
معلومات المادة الدراسية				
Module Title	Research project		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	MPH42048			
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	4	Semester of Delivery		

Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Sabah I. Abbas Dr. Ashraf M. Alattar	e-mail	sabahibrahim@kus.edu.iq Ashraf_alattar2000@kus.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/05/2026	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Non	Semester	1-2
Co-requisites module	Non	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Understanding the fundamental components of the material in a factor, as well as the technique of the project and the research that will be worked on in particular, and how to connect and integrate these components with the human body to build an integrated application. 2. Connecting the physical application of the equipment, produced material, or practical application to the physics of the human body by connecting all information and scientific and practical analysis of each part under consideration. 3. Improving the student's capacity to collaborate by identifying and diagnosing strengths and shortcomings while looking for the project's assigned section. 5. Improving pupils' grasp of how physics may be utilized to build or improve information. 6. Obtaining integrated scientific knowledge by linking the project's study material with the rest of the study materials, as well as the scientific analysis and how all the study materials are related in promoting systematic and prepared practical research for the purpose of obtaining a scientific product for the student and also preparing it in an important way for the labor market.
Module Learning Outcomes	1. Recruiting expert personnel to work in state institutions in all scientific research domains in the spirit of a research team. 2. Recognizing the significance of collaboration among peers in achieving a remarkable scientific research output 3. Theoretical study and practical research are equally important in achieving the

مخرجات التعلم للمادة الدراسية	findings that the team and the institution that will be working in hope of solving the problem that will be investigated. 4. Understanding that research projects are the first step in correcting thinking and the first step in producing and creating the job to be done.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A –</u> Clarify the project's basic concept as well as the projected objectives and outcomes. [17 hrs] establishing systematic intellectual foundations for work and acquiring unique sources for the project concept [10 hrs] Follow up with the student on finding sources and understanding how to interpret the overview of each research proposal or project received, as well as the abstract. [10 hrs] Starting the project's theoretical or practical work by preparing the fundamental material for the idea and the secondary needs [5hrs] Obtaining initial samples, hypotheses, and fundamental ideas in order to begin methodically organizing scientific thinking for distinct investigation. [10 hrs] Meeting with students and gathering necessary information for each project business plan, as well as examining the work mechanism utilized for the student and how to work on the major points that were assigned to him, and monitoring the percentage of completion [10 hrs] Start obtaining the actual results of the project [5 hrs] Work on carrying out the appropriate laboratory tests in order to evaluate the unique results produced for each project proposal. [10 hrs] Initiating work on conducting theoretical and scientific explanations on the work done from the results obtained [10 hrs] Seminar worked to explain the findings gained and how to condense and clarify the notion in a sequential manner for the goal of publishing it in the future, as well as to uncover scientific explanations for each result produced in an integrated manner. [10 hrs] Start linking research intellectual clarifications and discussions with the results obtained and support them through citations and quotes [10 hrs] Follow up on the student's accomplishment of writing the project in a thorough breakdown of the agreed-upon chapters, and explain the project idea in a simplified and sequential manner. [10 hrs] <u>Part B –</u> Attempting to convey the project's concept by developing a unique research product that will be shared through an intellectual or scientific competition, or

	publishing a portion of the project's idea in a scientific conference within the specialty. [5 hrs] Obtaining the fully obtained scientific output by completing the chapters related to the project in terms of writing and putting all the related results and scientific interpretations and supporting them with references [5 hrs] Conducting scientific and linguistic auditing and fixing faults, if any, in conjunction with finishing the scientific output in an integrated way, and providing the product of the concept to the department in order to prepare a committee to debate proposals within the specialism [5 hrs] Preparatory week before the final Exam [5hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to acquaint the students with the physical principles on which medical devices depend how to deal with them in an accurate scientific method. Encouraging students to discover for themselves how medical devices work by understanding the general laws of physics. This is done through scientific discussions in the classroom and in the laboratory as well as through practical application in hospitals and medical clinics.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	137	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	9.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes				
	Assignments				
	Projects / Lab.				
	Report				
	Midterm Exam				

Summative assessment	Final Exam	3hr	100% (100)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Clarify the project's basic concept as well as the projected objectives and outcomes.
Week 2	establishing systematic intellectual foundations for work and acquiring unique sources for the project concept
Week 3	Follow up with the student on finding sources and understanding how to interpret the overview of each research proposal or project received, as well as the abstract.
Week 4	Starting the project's theoretical or practical work by preparing the fundamental material for the idea and the secondary needs
Week 5	Obtaining initial samples, hypotheses, and fundamental ideas in order to begin methodically organizing scientific thinking for distinct investigation.
Week 6	Meeting with students and gathering necessary information for each project business plan, as well as examining the work mechanism utilized for the student and how to work on the major points that were assigned to him, and monitoring the percentage of completion
Week 7	Start obtaining the actual results of the project
Week 8	Work on carrying out the appropriate laboratory tests in order to evaluate the unique results produced for each project proposal.
Week 9	Initiating work on conducting theoretical and scientific explanations on the work done from the results obtained
Week 10	Seminar worked to explain the findings gained and how to condense and clarify the notion in a sequential manner for the goal of publishing it in the future, as well as to uncover scientific explanations for each result produced in an integrated manner.
Week 11	Start linking research intellectual clarifications and discussions with the results obtained and support them through citations and quotes
Week 12	Follow up on the student's accomplishment of writing the project in a thorough breakdown of the agreed-upon chapters, and explain the project idea in a simplified and sequential manner.

Week 13	Attempting to convey the project's concept by developing a unique research product that will be shared through an intellectual or scientific competition, or publishing a portion of the project's idea in a scientific conference within the speciality.
Week 14	Obtaining the fully obtained scientific output by completing the chapters related to the project in terms of writing and putting all the related results and scientific interpretations and supporting them with sources
Week 15	Conducting scientific and linguistic auditing and fixing faults, if any, in conjunction with finishing the scientific output in an integrated way, and providing the product of the concept to the department in order to prepare a committee to debate proposals within the specialism
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-	Yes
Recommended Texts	1-	Yes
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
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