وازرة التعليم العالي والبحث العلمي
جهاز الإشارف والتقويم العلمي دائرة
ضمان الجودة والاعتماد الأكاديمي

استمارة وصف البرنامج الأكاديمي للكليات والمعاهد

للعام الدراسي2023/2022

الجامعة : بغداد

الكلية /المعهد: الهندسة

القسم العلمي : الهندسة الالكترونية والاتصالات

تاريخ ملء الملف :

التوقيع:

اسم رئيس القسم: د. عقيل نعمة

التاريخ: ٢٠٢٣/٩/٢٠

التوقيع:

اسم المعاون العلمي: أ.د. ضياء جابر كاظم

التاريخ: ٢٠٢٣-٩-٢٠

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي:

التاريخ/١٠/٩/٢٠٢٣

التوقيع

أ.م.د. مرتضى الطائي

رئيس قسم ضمان الجودة

مصادقة السيد العميد

وصف البرنامج الأكاديمي

يوفر وصف البرنامج الأكاديمي هذا ايجازاً مقتضياً لأهم خصائص البرنامج ومخرجات التعلم المتوقعة من الطالب تحقيقهامبرهناً عما إذا كان قد حقق الاستفادة القصوى من الفرص المتاحة . ويصاحبه وصف لكل مقرر ضمن البرنامج

1. المؤسسة التعليمية	جامعة بغداد -كلية الهندسة
2. القسم العلمي / المركز	قسم الهندسة الالكترونية والاتصالا ت
3. اسم البرنامج الأكاديمي اوالمهني	برنامج الهندسة الالكترونية والاتصالا ت
4. اسم الشهادة النهائية	بكالوريوس علوم في الهندسة الالكترونية والاتصالا ت
5. النظام الدراسي : سنوي /مقررات/اخرى	سنو ي
6. برنامج الاعتما د المعتمد	• UNESCO – Iraq Office • NISA (Network of Iraqi Scientists Abroad)
7. المؤثرات الخارجية الأخرى	N/A
8. تاريخ إعداد الوصف	7-5-2022
9. أهداف البرنامج الأكاديمي	

ا .تهيئة الطلبة المتقدمين ليكونوا مهندسي الكترونيك واتصالات ذو مؤهلات تسمح لهم للعمل في الصناعة والأوساط الأكاديمية والقطاعات الأخرى.

ب .تحسين مخرجات العملية التعليمية والأنشطة الإدارية لتلبية معايير الاعتماد الدولية.

ت. تطوير القدرات الأكاديمية لأعضاء الهيئة التدريسية وجذب موظفين ذوي مهارات عالية.

ث. تحسين القدرات الادارية والتقنية للموظفين واستقطاب المتميزين منهم.

ج. الاستخدام الأمثل للموارد والإمكانيات العلمية والادارية والمادية للمؤسسة.

ح. برامج التعاون والتبادل الأكاديمي بين مؤسساتنا التعليمية من جهة والشراكات والجامعات والمراكز الأكاديمية في الدو ل المتقدمة الأخرى من جهة اخرى.

خ .تشجيع البحوث التطبيقية القابلة للتطبيق الذي يتيح تطوير واستقطاب الأسواق المحلية والأجنبية

10. مخرجات البرنامج المطلوبة وطرائق التعليم والتعلم والتقيي م

أ-ا الاهداف المعرفية.

١. القدرة على تطبيق المعرفة في الرياضيات والعلوم والهندسة.
٢. القدرة على تصميم وإجراء التجارب، وكذلك لتحليل وتفسير البيانات.
٣. القدرة على تصميم نظام أو مكون أو عملية لتلبية الاحتياجات المطلوبة.
٤. القدرة على العمل ضمن فرق متعددة التخصصات)تفسيرنا للفرق متعددة التخصصات تشمل فرق من الأفراد من ذوي الخلفيات التعليمية مماثلة مع التركيز على الجوانب المختلفة للمشروع وكذلك فرق من الأفراد م ن ذوي الخلفيات التعليمية المختلفة).
٥. القدرة على تحديد وصياغة وحل المشاكل الهندسية.
٦. فهم المسؤولية المهنية والأخلاقية .
٧. القدرة على التواصل بشكل فعال.
٨. تعليم واسع وضروري لفهم تأثير الهندسة لإيجاد الحلول في السياق العالمي والمجتمعي

ب -الاهداف المهاراتية الخاصة بالبرنامج:

١. تطبيق المفاهيم الرياضية والخوارزميات الأساسية لوصف وحل المشاكل الهندسية.
٢. تطوير الكفاءة الأولية في تخصصات الهندسة الالكترونية والاتصالات.
٣. تطوير القدرة على إجراء التجارب، وتحليل وتفسير البيانات.
٤. أداء الهندسة الالكترونية والاتصالات التصميم المتكامل للأنظمة والمكونات أو العمليات عن طريق الخبرات العملية (مشاريع المجموعة)
٥. تحديد وصياغة وحل المشاكل الهندسية للحاسوب باستخدام الأدوات الهندسية الحديثة، والتقنيات، والمهارات.
٦. التعاون في مشاريع المجموعة
٧. تطوير مهارات الاتصال الكتابية والشفوية من خلال العروض من نتائج المشروع.
٨. الحصول على تقدير لبعض المشاكل الأخلاقية التي تنشأ في ممارسة المهنة

طرائق التعليم والتعلم

١. المحاضرات.
٢. البرامج التعليمية.
٣. الواجبات والمهام.
٤. مختبرات علمية وعملية لأجراء التجارب.
٥. الاختبارات والامتحانات.

٦. الأسئلة والمناقشات.
٧. اتصال بين النظرية والتطبيق.
٨. الرحلات الميدانية.
٩. الأنشطة اللامنهجية.
١٠. الندوات.
١١. الحلقات النقاشية والمحادثات الشفوية.
١٢. تقارير، عروض وملصقات

طرائق التقييم

١. متابعة ما وصل اليه الخريجين السابقين في ميدان العمل.
٢. لجان ذات صلة بالإدارة مثل scientific, QA.
٣. متابعة توجهات الموظفين من خريجي قسمنا في مكان العمل والمسمى الوظيفي كل عام لتقييم تقدمهم الوظيفي وربطه بالبرنامج العلمي.
٤. استبانة آراء ارباب العمل عن مستوى تقدم وتطور الخريجين سنويا لتحديد ما إذا كانت اتجاهات عملهم ذات صل ه باختصاصه.
٥. تقييم الخريجين للبرنامج الأكاديمي ولأعضاء الهيئة التدريسية وتحليل النتائج لرفع مستوى الأداء العلمي.

ج-الاهداف الوجدانية والقيمية:
١. تقييم الطلبة علميا وعمليا للوقوف على أبرز نتائج تطبيق البرنامج.
٢. اجراء مسح سنوي لآراء الطلبة لتحديد مدى تحقق النتائج المرجوة من البرنامج الأكاديمي.
٣. اجراء دراسة موضوعية للإحصاءات والاستبانات الخاصة بتطبيق البرنامج

طرائق التعليم والتعلم

١. المحاضرا ت
٢. البرامج التعليمية.
٣. الواجبات والمهام.
٤. مختبرات علمية وعملية لأجراء التجارب.
٥. الاختبارات والامتحانات.
٦. الأسئلة والمناقشات.
٧. اتصال بين النظرية والتطبيق.
٨. الرحلات الميدانية.
٩. الأنشطة اللامنهجية.
١٠ .الندوات.
١١ .الحلقات النقاشية والمحادثات الشفوية.
١٢ .تقارير، عروض وملصقات.

طرائق التقييم

١. متابعة ما وصل اليه الخريجين السابقين في ميدان العمل.
٢. لجان ذات صلة بالإدارة مثل scientific, QA.
٣. متابعة توجهات الموظفين من خريجي قسمنا في مكان العمل والمسمى الوظيفي كل عام لتقييم تقدمهم الوظيفي وربطه
٤. لبرنامج العلمي.

٥. استبانة آراء ارباب العمل عن مستوى تقدم وتطور الخريجين سنويا لتحديد ما إذا كانت اتجاهات عملهم ذات صله باختصاصهم.
٦. تقييم الخريجين للبرنامج الأكاديم ي ولأعضاء الهيئة التدريسية وتحليل النتائج لرفع مستوى الأداء العلمي

د -المهارات العامة والتأهيلية المنقولة (المهارا ت الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي).

١. تغييرات شاملة في المناهج الدراسية ابتداء من العام الدراسي 2008-2009واعادة مراجعتها خلال العام الدراس ي 2015-2016.
٢. التطوير المستمر لأعضاء هيئة التدريس من خلال برامج التدريب.
٣. تعزيز عدد من أعضاء هيئة التدريس للصفوف العلمية العليا.
٤. توفير عدد من المعدات المختبرية وأدوات القياس.
٥. توفير عدد من الكتب لمكتبة القسم.
٦. توفير عدد من أجهزة الكمبيوتر.
٧. إنشاء شبكة انترنت لاسلكية في القسم ضمن شبكة كلية الهندسة.
٨. توظيف عدد من أعضاء هيئة التدريس والملاكات الهندسية والفنية.
٩. زيادة عدد الأنشطة اللاصفية للطلاب مثل إقامة المؤتمرات والندوات العلمية.
١٠. إعادة إعمار وتأهيل الفصول الدراسية وغرف القسم العلمي، بالإضافة للخدمات والبنية التحتية

طرائق التعليم والتعلم

١. المحاضرا ت
٢. البرامج التعليمية.
٣. الواجبات والمهام.
٤. مختبرات علمية وعملية لأجراء التجارب.
٥. الاختبارات والامتحانات.
٦. الأسئلة والمناقشات.
٧. اتصال بين النظرية والتطبيق.
٨. الرحلات الميدانية.
٩. الأنشطة اللامنهجية.
١٠ .الندوات.
١١ .الحلقات النقاشية والمحادثات الشفوية.
١٢ .تقارير، عروض وملصقات.

طرائق التقييم

١. متابعة ما وصل اليه الخريجين السابقين في ميدان العمل.
٢. لجان ذات صلة بالإدارة مثل scientific, QA.
٣. متابعة توجهات الموظفين من خريجي قسمنا في مكان العمل والمسمى الوظيفي كل عام لتقييم تقدمهم الوظيفي وربطه
٤. لبرنامج العلمي.
٥. استبانة آراء ارباب العمل عن مستوى تقدم وتطور الخريجين سنويا لتحديد ما إذا كانت اتجاهات عملهم ذات صل ه باختصاصهم.
٦. تقييم الخريجين للبرنامج الأكاديمي ولأعضاء الهيئة التدريسية وتحليل النتائج لرفع مستوى الأداء العلمي

11. بنية البرنامج

المرحلة الدراسية	رمز المقرر أو المساق	اسم المقرر أو المساق	الساعات المعتمدة	
			نظر ي	عمل ي
الاولى	GS101	حقوق الانسان	1	
الاولى	GS102	اللغة الإنكليزية 1	1	
الاولى	GS103	الحاسوب 1	1	
الاولى	GS104	التربية الرياضي ة	-	
الاولى	ECE101	الرياضيات 1	4	
الاولى	ECE102	الدوائر المنطقية	2	2
الاولى	ECE103	الالكترونيك 1	4	
الاولى	ECE104	برمجة الحاسوب 1	2	2

الاولى	ECE105	الدوائر الكهربائية 1	4	
الاولى	ECE106	تحويل الطاق ة	2	
الاولى	ECE107	ورشة الالكترونيك		3
الاولى	ECE108	مختبر القياسات الكهربائية		3
الثانية	GS201	اللغة العربية	1	
الثانية	GS202	اللغة الإنكليزية 2	1	
الثانية	GS203	الحاسوب 2	1	
الثانية	GS204	التربية الرياضي ة	-	
الثانية	ECE201	الرياضيات 2	4	
الثانية	ECE202	برمجة الحاسوب 2	2	2
الثانية	ECE203	المجالات الكهرومغناطيسية	3	
الثانية	ECE204	الالكترونيك 2	4	
الثانية	ECE205	نظرية الاتصالات 1	3	
الثانية	ECE206	الدوائر الكهربائية 2	2	
الثانية	ECE207	معمارية الحاسبة	2	2
الثانية	ECE208	مختبر الالكترونيك		2
الثانية	ECE209	مختبر الاتصالات		2
الثالثة	GS301	اللغة الإنكليزية 3	1	
الثالثة	GS302	التربية الرياضي ة	1	
الثالثة	ECE301	تصميم النظم الرقمية	3	
الثالثة	ECE302	التحليلات الهندسية	3	
الثالثة	ECE303	الاحتمالية والاحصاء	2	
الثالثة	ECE304	الهوائيات والانتشار	3	
الثالثة	ECE305	نظرية الاتصالات 2	4	
الثالثة	ECE306	الالكترونيك 3	4	
الثالثة	ECE307	الكترونيك القدرة	2	
الثالثة	ECE308	نظرية السيطرة	3	
الثالثة	ECE309	مختبر الالكترونيك والاتصالات		3
الثالثة	ECE310	التصميم بواسطة الحاسب ة		2
الرابعة	GS401	اللغة الإنكليزية 4	1	
الرابعة	GS402	التربية الرياضي ة	-	
الرابعة	ECE401	المشروع الهندسي	1	2
الرابعة	ECE402	الموجات الدقيق ة	2	
الرابعة	ECE403	معالجة الإشارة الرقمية	3	
الرابعة	ECE404	الاتصالات الرقمية	4	
الرابعة	ECE405	شبكات الحاسبات	2	
الرابعة	ECE406	الكترونيك الاتصالات	3	
الرابعة	ECE407	اتصالات ضوئية	3	
الرابعة	ECE408	نظرية المعلومات	2	
الرابعة	ECE409	النظم المطمورة	2	
الرابعة	ECE410	مختبر الالكترونيك والاتصالات		3

الرابعة	ECE411	مختبر الموجات الدقيقة		3
الرابعة	ECE412	مختبر شبكات الحاسبات		2

12. التخطيط للتطور الشخصي

١. تغييرات شاملة في المناهج الدراسية ابتداء من العام الدراسي 2008-2009واعادة مراجعتها خلال العام الدراس ي 2015-2016.
٢. التطوير المستمر لأعضاء هيئة التدريس من خلال برامج التدريب.
٣. تعزيز عدد من أعضاء هيئة التدريس للصفوف العلمية العليا.
٤. توفير عدد من المعدات المختبرية وأدوات القياس12-5..توفير عدد من الكتب لمكتبة القسم.
٥. توفير عدد من أجهزة الكمبيوتر12-7..إنشاء شبكة انترنت لاسلكية في القسم ضمن شبكة كلية الهندسة.
٦. توظيف عدد من أعضاء هيئة التدريس والملاكات الهندسية والفنية.
٧. زيادة عدد الأنشطة اللاصفية للطلاب مثل إقامة المؤتمرات والندوات العلمية.
٨. إعادة إعمار وتأهيل الفصول الدراسية وغرف القسم العلمي، بالإضافة للخدمات والبنية التحتية

13. معيار القبول (و ضع الأنظمة المتعلقة بالالتحاق بالكلية أو المعهد)

١. ان يكون المتقدم حاصل على شهادة الدراسة الثانوية العراقية، أو ما يعادلها، بتخصص في العلوم الطبيعية أو التكنولوجيةأو الأحيائية أو التطبيقية.
٢. يجب أن يخضع المتقدم لنظام التنافس الذي تقُره وزارة التعليم العالي والبحث العلمي/ دائرة القبول المركزي، وحسب معدل الطالب ودروس المفاضلة وضمن عدد المقاعد الدراسية المتاحة.
٣. يحدد عدد المقاعد المتاحة وفق ما يقرره مجلس كلية الهندسة في جامعة بغداد بناءا على الطاقة الاستيعابية والموارد البشري ةوالمادية المتوفرة في الكلية. تجدر الاشارة ان الطاقة الاستيعابية لقسم الهندسة الالكترونية والاتصالات تتراوح بين 50-40 طالب سنويا.
٤. تتيح القوانين السارية للأوائل من خريجي المعاهد الفنية التكنولوجية)او من الموظفين المتميزين(والحاصلين على شهاد ة الدبلوم الفني للقبول ضمن خطة القسم بنسبة لا تتجاوز 5%من عدد المقاعد المتاحة.
٥. يجب على الطالب المقبول للدراسة في القسم استيفاء جميع الشروط والتعليمات النافذة وتقديم كافة الوثائق والاوراق الثبوتيةالمطلوبة والالتزام بالتوقيتات الزمنية المحددة لهذا الغرض
٦. مثلَّت معدلات القبول في قسم الهندسة الالكترونية والاتصالات كأعلى المعدلات في المجموعة الهندسة وعلى مر سنوات عديدة لما يتمتع به هذا البرنامج من مخرجات رصينة

14. أهم مصادر المعلومات عن البرنامج

ا. صفحة القسم على الموقع الإلكتروني لكلية الهندسة – جامعة بغداد.
ب. دليل قسم الهندسة الالكترونية والاتصالات.
ج. الدليل السنوي لكلية الهندسة – جامعة بغداد.
د. الندوات والاجتماعات التعريفية بالقسم في المحافل العامة والمعارض السنوية

مخطط مهارات المنهج																							
يرجى وضع اشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم																							
			مخرجات التعلم المطلوبة من البرنامج																				
السنة/ المستوى	رمز المقرر	اسم المقرر	أساسي أم اختياري	الاهداف المعرفي ة				الاهداف المهاراتية الخاصة بالبرنامج				الاهداف الوجدانيةوالقيمية				المهارات العامة والتأهيليةالمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي)							
				أ1	أ2	3أ		ب1	ب2	ب3		ج1	ج2			د1	د2						
الاولى	GS101	حقوق الانسان	اساسي													√							
الاولى	GS102	اللغة الإنكليزية 1	اساسي													√							
الاولى	GS103	الحاسوب 1	اساسي									√	√			√							
الاولى	GS104	التربية الرياضية	اساسي													√							
الاولى	ECE101	الرياضيات 1	اساسي	√	√																		
الاولى	ECE102	الدوائر المنطقية	اساسي	√	√	√		√	√	√							√						
الاولى	ECE103	الالكترونيك 1	اساسي	√	√	√		√	√	√							√						
الاولى	ECE104	برمجة الحاسوب 1	اساسي	√	√	√		√	√	√							√						
الاولى	ECE105	الدوائر الكهربائية 1	اساسي	√	√	√		√	√	√							√						
الاولى	ECE106	تحويل الطاقة	اساسي	√	√	√		√	√	√							√						

الاولى	ECE107	ورشة الالكترونيك	اساسي	√	√	√		√							√				
الاولى	ECE108	مختبر القياسات الكهربائية	اساسي	√	√	√		√							√				
الثانية	GS201	اللغة العربية	اساسي											√					
الثانية	GS202	اللغة الإنكليزية 2	اساسي											√					
الثانية	GS203	الحاسوب 2	اساسي						√	√				√					
الثانية	GS204	التربية الرياضية	اساسي											√					
الثانية	ECE201	الرياضيات 2	اساسي	√	√				√	√					√				
الثانية	ECE202	برمجة الحاسوب 2	اساسي	√	√	√		√	√	√		√	√		√				
الثانية	ECE203	المجالات الكهرومغناطيسية	اساسي	√	√	√		√	√	√		√	√		√				
الثانية	ECE204	الالكترونيك 2	اساسي	√	√	√		√	√	√		√	√		√				
الثانية	ECE205	نظرية الاتصالات 1	اساسي	√	√	√		√	√	√		√	√		√				
الثانية	ECE206	الدوائر الكهربائية 2	اساسي	√	√	√		√	√	√		√	√		√				
الثانية	ECE207	معمارية الحاسبة	اساسي	√	√	√		√	√	√		√	√		√				
الثانية	ECE208	مختبر الالكترونيك	اساسي	√	√	√		√	√	√		√	√		√				
الثانية	ECE209	مختبر الاتصالات	اساسي	√	√	√		√	√	√		√	√		√				
الثالثة	GS301	اللغة الإنكليزية 3	اساسي											√					
الثالثة	GS302	التربية الرياضية	اساسي											√					
الثالثة	ECE301	تصميم النظم الرقمية	اساسي	√	√	√		√	√	√		√	√		√				
الثالثة	ECE302	التحليلات الهندسية	اساسي	√	√	√		√	√	√		√	√		√				
الثالثة	ECE303	الاحتمالية والاحصاء	اساسي	√	√	√		√	√	√		√	√		√				

الثالثة	ECE304	الهوائيات والانتشار	اساسي	√	√		√	√		√	√	√		√	√		√			
الثالثة	ECE305	نظرية الاتصالات 2	اساسي	√	√		√	√		√	√	√		√	√		√			
الثالثة	ECE306	الالكترونيك 3	اساسي	√	√		√	√		√	√	√		√	√		√			
الثالثة	ECE307	الكترونيك القدرة	اساسي	√	√		√	√		√	√	√		√	√		√			
الثالثة	ECE308	نظرية السيطرة	اساسي	√	√		√	√		√	√	√		√	√		√			
الثالثة	ECE309	مختبر الالكترونيك والاتصالات	اساسي	√	√		√	√		√	√	√		√	√		√			
الثالثة	ECE310	التصميم بواسطة الحاسبة	اساسي	√	√		√	√		√	√	√		√	√		√			

الرابعة	GS401	اللغة الإنكليزية 4	اساسي												√			
الرابعة	GS402	التربية الرياضية	اساسي												√			
الرابعة	ECE401	المشروع الهندسي	اساسي	√	√	√								√	√		√	
الرابعة	ECE402	الموجات الدقيقة	اساسي	√	√	√		√	√	√	√	√		√			√	
الرابعة	ECE403	معالجة الإشارة الرقمية	اساسي	√	√	√		√	√	√	√	√		√			√	
الرابعة	ECE404	الاتصالات الرقمية	اساسي	√	√	√		√	√	√	√	√		√			√	
الرابعة	ECE405	شيكات الحاسبات	اساسي	√	√	√		√	√	√	√	√		√			√	
الرابعة	ECE406	الكترونيك الاتصالات	اساسي	√	√	√		√	√	√	√	√		√			√	
الرابعة	ECE407	اتصالات ضوئية	اساسي	√	√	√		√	√	√	√	√		√			√	
الرابعة	ECE408	نظرية المعلومات	اساسي	√	√	√		√	√	√	√	√		√			□	

الرابعة	ECE409	النظم المطمورة	اساسي	√	√	√		√	√	√		√	√				√		
الرابعة	ECE410	مختبر الالكترونيك والاتصالات	اساسي	√	√	√		√	√	√		√	√				√		
الرابعة	ECE411	مختبر الموجات الدقيقة	اساسي	√	√	√		√	√	√		√	√				√		
الرابعة	ECE412	مختبر شبكات الحاسبات	اساسي	√	√	√		√	√	√		√	√				√		

نموذج وصف المقرر

وصف المقرر

يوفر وصف المقرر هذا إيجازاً مقتضياً لأهم خصائص المقرر ومخرجات التعلم المتوقعة من الطالب تحقيقهامبرهناً عما إذا كان قد حقق الاستفادة القصوى من فرص التعلم المتاحة. ولابد من الربط بينها وبين وصف البرنامج.

1. المؤسسة التعليمي ة	جامعة بغداد / كلية الهندس ة
2. القسم العلمي / المركز	قسم الهندسة الالكترونية والاتصالا ت
3. اسم / رمز المقرر	التحليلات الهندسية / ECE302
4. أشكال الحضور المتاحة	صف ي
5. الفصل / السنة	سنو ي
6. عدد الساعات الدراسية (الكلي)	3 ساعات أسبوعيا / 90 ساعة سنوي ا
7. تاريخ إعداد هذا الوصف	2022/9/7
8. أهداف المقرر	الغرض من هذا المقرر الدراسي هو تزويد الطلاب بموضوعاتریاضية هندسية أكثر تقدمًا والأدوات الرياضية ذات الصلةالمطلوبة في تحليل وحل المشكلات في المهن الهندسية والعلميةالتطبيقية.

9. مخرجات المقرر وطرائق التعليم والتعلم والتقييم
1. تحويل لابلاس وتطبيقاته. 2. حل المعادلات التفاضلية بأنواعها. 3. تحويل زد وتطبيقاته. 4. الجبر الخطي .

ب - الاهداف المهاراتية الخاصة بالمقرر
يمكن تطبيق مخرجات المقرر في هندسة الاتصالات وهندسة االسيطرة ومعالجة الإشارات.
طرائق التعليم والتعلم
المحاضرات الصفية، نماذج من الأسئلة الاثرائية وحلولها. التفكير الابداعي والمناقشات الجماعية.
طرائق التقييم
الامتحانات والواجبات المنزلية والأسئلة القصيرة أثناء المحاضرا ت
ج- الاهداف الوجدانية والقيمية
1. مناقشة المشاكل الرياضية والتطبيقية المختلفة و ابتكار حلول مناسبة لها. 2. العمل الجماعي على المسائل ذات التطبيق العلمي التطبيقي. 3. اختبار مدى استيعاب الطلاب بأنواع مختلفة من الأسئلة الصفية والواجبات المنزلي ة
طرائق التعليم والتعلم
الاختبارات الصفية والواجبات المنزلية
طرائق التقييم
الامتحانات الصفية والواجب المنزلي والاختبارات الشهرية والتقييم وفقًا لإجابة الطالب على المسائل المطروحة.
د - المهارات العامة والتأهيلية المنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطورالشخصي) .
1. البحث ضمن الكتب المنهجية ومصادر المعرفة. 2. البحث من خلال مواقع الانترنيت

10. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة / أو الموضو ع	طريقة التعليم	طريقة التقييم
1	3		المعادلات التفاضلية الخطية من الدرجة الثانية	محاضرات صفية	الاختبارات
2	3		طريقة تغيير المعاملات	محاضرات صفية	الاختبارات
3	3		المعادلات التفاضلية غير المتجانسة	محاضرات صفية	الاختبارات
4	3		المعادلات التفاضلية الانية	محاضرات صفية	الاختبارات
5	3		التطبيقات ذات الصلة بالمعادلات التفاضلية	محاضرات صفية	الاختبارات
6	3		معادلات Euler-Cauchy التفاضلية	محاضرات صفية	الاختبارات
7	3		حل المعادلات التفاضلية المتسلسلة	محاضرات صفية	الاختبارات
8	3		المعادلات التفاضلية ذات النقطة العادية	محاضرات صفية	الاختبارات
9	3		طريقة Frobenius	محاضرات صفية	الاختبارات
10	3		المعادلات التفاضلية الجزئية	محاضرات صفية	الاختبارات
11	3		تكوين المعادلات التفاضلية الجزئية	محاضرات صفية	الاختبارات
12	3		تكوين المعادلات التفاضلية الجزئية	محاضرات صفية	الاختبارات
13	3		حل المعادلات التفاضلية الجزئية	محاضرات صفية	الاختبارات
14	3		تحويل لابلاس	محاضرات صفية	الاختبارات
15	3		خصائص تحويل لابلاس	محاضرات صفية	الاختبارات
16	3		خصائص تحويل لابلاس	محاضرات صفية	الاختبارات
17	3		خصائص تحويل لابلاس	محاضرات صفية	الاختبارات
18	3		خصائص تحويل لابلاس	محاضرات صفية	الاختبارات
19	3		تحويل لابلاس العكسي	محاضرات صفية	الاختبارات
20	3		تحويل لابلاس للدوال الدوري ة	محاضرات صفية	الاختبارات
21	3		تحويل لابلاس - الالتفاف	محاضرات صفية	الاختبارات
22	3		تطبيقات تحويل لابلاس	محاضرات صفية	الاختبارات
23	3		تحويل Z	محاضرات صفية	الاختبارات
24	3		خصائص تحويل Z	محاضرات صفية	الاختبارات
25	3		تحويل Z العكسي	محاضرات صفية	الاختبارات
26	3		دالة نقل النبض ة	محاضرات صفية	الاختبارات
27	3		المصفوفات	محاضرات صفية	الاختبارات
28	3		النظريات الأساسية للمصفوفات	محاضرات صفية	الاختبارات

29	3		حل المعادلات الجبرية باستخدام المصفوفات	محاضرات صفية	الاختبارات
30	3		مسائل القيمة المخصصة	محاضرات صفية	الاختبارات

11. البنية التحتية	
1- الكتب المقررة المطلوبة	**الرياضيات الهندسية المتقدمة، للمؤلف وايلي، الطبعة الخامسة**
2- المراجع الرئيسية (المصادر)	• الرياضيات الهندسية المتقدمة، للمؤلف داس، الطبعةالأولى • الرياضيات الهندسية المتقدمة، للمؤلف كرايزغ، الطبعةالتاسعة
أ(الكتب والمراجع التي يوصى بها المجلات العلمية ،التقارير.....،)	**لا يوجد**
ب(المراجع الالكترونية ،مواقع الانترنيت) ‘.....	https://www.wolframalpha.com/

12. خطة تطوير المقرر الدراسي
من خلال المراجعة الدورية لبنية المقرر الدراسي وتحديث المراجع

FIRST YEAR

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.	
1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Mathematics I / ECE101
4. Program(s) to which it contributes	Mathematics II
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	4 hours per week, 120 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	To make the student acquainted with the essential mathematical tools that are necessary for his academic study of the various subjects in electronic and communications engineering

10. Learning Outcomes, Teaching, Learning and Assessment Method
Knowledge and Understanding

A1. Several Mathematics concepts will be studied briefly.
A2. In details, Differentiation and its application and methods will be introduced and explained.
A3. Merge the theoretical materials with the practical implementations.
A4. More than 1000 questions are included.

B. Subject-specific skills

B1. The course knowledge can be used to support wide variety of Engineering subjects .
B2. The student will have a big picture regarding the best mathematical tools to be used for solving the engineering problems.
B3. Apply these concepts in their studies to solve the engineering problems related to the main topics studied in mechanical engineering .
B4. Learn and recruit Logarithmic and Trigonometric Functions in the related mathematical models .
B5. Be able to apply Differentiation equations in engineering problems and applications.
B6. Work in groups and function on multi-disciplinary teams .

Teaching and Learning Methods

Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, homework, questions, and answers in lectures

C. Thinking Skills

C1. suggest many different cases and suggest suitable solutions for these issues
C2. group work on issues with real life application
C3. test the students with variety types of questions

Teaching and Learning Methods

Tests, sheets, mini-projects

Assessment methods

Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4		Calculus Prerequisites/ Coordinates Systems: distance between two points, graphs, and symmetry; Slope and Line Equation;	Lectures	Quiz/ Exam
2	4		Calculus Prerequisites/ Functions and Their Graphs: intervals, domain, range, integer-valued functions, function defined in pieces and compositions of functions; Circles, Parabolas, and Shift of Graphs;	Lectures	Quiz/ Exam
3	4		Calculus Prerequisites/ Review of Trigonometric Function: definition and identities; Absolute Value and Target Value.	Lectures	Quiz/ Exam
4	4		Limits and Continuity/ Limits and Their Properties; Right-Hand and Left-Hand Limits;	Lectures	Quiz/ Exam
5	4		Limits and Continuity/ Sandwich Theorem; Limits Involving Infinity, Changing Variables;	Lectures	Quiz/ Exam
6	4		Limits and Continuity/ Continuous Functions and Continuity Test.	Lectures	Quiz/ Exam
7	4		Derivatives/ Slope of Tangent, Rate of Change of Function, Definition of Derivative; Differentiation Rules;	Lectures	Quiz/ Exam
8	4		Derivatives/ Derivative of Trigonometric Functions; The Chain Rule; Implicit Differentiation	Lectures	Quiz/ Exam
9	4		Derivatives/ Derivatives of Higher Order; Linear Approximation; Newton's Method for Approx. solutions of Equations (Optional).	Lectures	Quiz/ Exam
10	4		Application of Derivatives/ Related Rate of Change; Maxima, Minima, and Mean Value Theorem	Lectures	Quiz/ Exam
11	4		Application of Derivatives/ Curve Sketching with y' and y": maximum points, minimum points, points of inflection, rise and fall and concavity (Optional).	Lectures	Quiz/ Exam
12	4		Application of Derivatives/ Graphing of Rational Functions: horizontal, vertical, and oblique asymptotes.	Lectures	Quiz/ Exam
13	4		Matrices/ Concepts to Matrices; Matrix Operations; The Telecommunication well-known Matrices	Lectures	Quiz/ Exam

14	4		Matrices/ Concepts to Determined; Determined properties	Lectures	Quiz/ Exam
15	4		Complex Variables/	Lectures	Quiz/ Exam
16	4		Integration/ Area Under the Curve and Definition of Integration Finite Sums and Sigma Notation;	Lectures	Quiz/ Exam
17	4		Integration/ Definite Integral and Rules of Definite Integral	Lectures	Quiz/ Exam
18	4		Integration/ Indefinite Integral; Differential Equations and Initial Value Problem;	Lectures	Quiz/ Exam
19	4		Integration/ Integration by Substitution;	Lectures	Quiz/ Exam
20	4		Integration/ Numerical Integration: Trapezoidal rule and Simpson's rule (optional);	Lectures	Quiz/ Exam
21	4		Integration/ Logarithms and Exponentials: the natural logarithm ($ln\ x$) and the exponential function (e^x); Rules of Logarithms and Exponential,	Lectures	Quiz/ Exam
22	4		Integration/ Derivatives, and Integral of Logarithms and Exponentials; Application: capacitor discharge current.	Lectures	Quiz/ Exam
23	4		Application of Definite Integral/ Area between Curves: curves that cross, boundaries with changing formulas; integration with respect to y and geometric evaluation of some integrals (optional); Volume of Solids (optional);	Lectures	Quiz/ Exam
24	4		The Calculus of Transcendental Function/ Inverse Functions and their Derivatives; Logarithmic Differentiation;	Lectures	Quiz/ Exam
25	4		The Calculus of Transcendental Function/ General Exponential and Logarithmic Functions: derivatives, integral, and logarithmic equations;	Lectures	Quiz/ Exam
26	4		The Calculus of Transcendental Function/ Rate at which Functions Grow: relative rate of change; Inverse Trigonometric Functions; Derivatives of Inverse Trigonometric Functions; Hyperbolic Functions: definition and identities,	Lectures	Quiz/ Exam
27	4		Techniques of Integration/ Algebraic Procedure (optional) and Trigonometric Identities	Lectures	Quiz/ Exam
28	4		Techniques of Integration/ Integration by Parts: repeated use, tabular integration, and solving for unknown integral;	Lectures	Quiz/ Exam
29	4		Techniques of Integration/ Trigonometric Integrals: integral of power of *sin x*, *cos x*, *tan x*, and *sec x*, eliminating the square;	Lectures	Quiz/ Exam
30	4		Techniques of Integration/ Trigonometric Substitutions: integrals involving root square of trigonometric functions; Rational Functions and Partial Fractions; Improper Integral (optional).	Lectures	Quiz/ Exam

12. Infrastructure	
Required reading: • CORE TEXTS • COURSE MATERIALS • OTHER	• "Calculus" by Ross L. Finney and George B. Thomas Jr, 11th edition, 1990. • "Thomas' Calculus" by Maurice D. Weir, Joel Hass, and Frank R. Giordano, 2nd edition, 2008.
Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	None
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Logic circuits / ECE102
4. Program(s) to which it contributes	
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	2 hours per week (Lectures- over the year), 2 hours per week (Lab- over the 2nd semester), 90 Hour per year (Totally)
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	we studied the operation of all the basic logic gates, and we used Boolean algebra to describe and analyze circuits that were made up of combinations of logic gates. These circuits can be classified as *combinational* logic circuits because, at any time, the logic level at the output depends on the combination of logic levels present at the inputs. A combinational circuit has no *memory* characteristic, so its output depends *only* on the current value of its inputs. we will study simple techniques for designing combinational logic circuits to satisfy a given set of requirements. A complete study of logic-circuit design is not one of our objectives, but the methods we introduce will provide a good introduction to logic design. A Sequential logic circuits is a form of binary circuit; its design employs one or more inputs and one or more outputs, whose states are related to some definite rules that depends on previous states. ... Examples of such circuits include clocks, flip-flops, bi-stables, counters, memories, and registers.

10. Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. To introduce the number system.
A2.To illustrate the codes.
A3.To introduce the logic gates.
A4.To introduce the Boolean algebra and logic simplification
A5.To illustrate the combinational logic analysis. A6.To introduce the combinational logic circuits A7.To introduce the basic sequential logic circuits.
A8.To introduce the counters.
A9.To introduce the shift registers

B. Subject-specific skills

B1.the course knowledge can be used to introduce number system and codes. provide main steps to teach students how to introduce Boolean algebra and logic simplification and the combinational logic analysis
B2.the course knowledge can be used to introduce combinational and sequential logic circuit .provide main steps to teach students how to build logic circuit.

Teaching and Learning Methods

Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, homework, questions and answers in lectures

C. Thinking Skills

C1. suggest many different cases and suggest suitable solutions for these issues
C2. group work on issues with real life application
C3. test the students with variety types of questions

Teaching and Learning Methods

Tests, sheets, mini-projects

Assessment methods

Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books
D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		***Number Systems*** Decimal Numbers; Binary Numbers; Decimal to Binary Conversion Hexadecimal Numbers; Octal Numbers. Conversion between binary and Octal Numbers Conversion between binary and Hexadecimal Numbers **Binary Arithmetic** Addition ; subtraction ;multiplication; division Signed binary number ; 1st and 2nd Complements ***Codes*** Binary Coded Decimal (BCD)	Lectures	Quiz/Exam
2	2			Lectures	Quiz/Exam
3	2			Lectures	Quiz/Exam
4	2			Lectures	Quiz/Exam
5	2		***Codes*** Digital Codes .Gray code,ex-3 code, ASCII code, error dedication code ***Logic Gates*** The OR Gate; The AND Gate; The Inverter; The Exclusive OR and Exclusive NOR Gates.	Lectures	Quiz/Exam
6	2			Lectures	Quiz/Exam
7	2		***Logic Gates*** Universal logic gates The NAND Gate; The NOR Gate.	Lectures	Quiz/Exam
8	2			Lectures	Quiz/Exam
9	2			Lectures	Quiz/Exam

10	2		***Boolean Algebra and Logic Simplification*** Boolean Operations and Expressions; Laws and Rules of Boolean Algebra ***Boolean Algebra and Logic Simplification*** DeMorgan's Theorems; Boolean Analysis of Logic Circuits ***Boolean Algebra and Logic Simplification*** Simplification Using Boolean Algebra; Boolean Expressions and Truth Tables; The Karnaugh Map.	Lectures	Quiz/Exam
11	2		***Boolean Algebra and Logic Simplification*** Simplification Using The Karnaugh Map.	Lectures	Quiz/Exam
12	2			Lectures	Quiz/Exam
13	2			Lectures	Quiz/Exam
			Combinational Logic Analysis Basic Combinational Logic Circuits; ***Combinational Logic Analysis*** Implementing Combinational Logic;		
14	2		Combinational Logic Analysis Universality of the NAND Gate	Lectures	Quiz/Exam
15	2			Lectures	Quiz/Exam
16	4		Combinational Logic Circuits Basic Adders; half adder full adder Parallel Binary Adders; Basic subtractor; half subtractor ; full subtractor Combinational Logic Circuits Binary code conversion circuit; Parity Generators/Checkers circuits. Combinational Logic Circuits Multiplexers; Demultiplexers Combinational Logic Circuits Decoders; Encoders	Lectures +Lab	Quiz/Exam
17	4			Lectures +Lab	Quiz/Exam
18	4			Lectures +Lab	Quiz/Exam
19	4			Lectures +Lab	Quiz/Exam
20	4		Basic Sequential Circuits Flip Flops; S-R, cross NOR SR Flip flop analyses ; gated SR flip flop ; latches Basic Sequential Circuits Triggered and clock ; level triggered ; edge triggered ; D-Flip Flops	Lectures +Lab	Quiz/Exam
21	4			Lectures +Lab	Quiz/Exam
22	4		Basic Sequential Circuits T and J-K Flip Flops Basic Sequential Circuits	Lectures +Lab	Quiz/Exam
23	4			Lectures +Lab	Quiz/Exam
24	4			Lectures +Lab	Quiz/Exam

25	4		Flip Flops Operating Characteristics; Flip Flop Applications Counters Asynchronous Counters Counters Up-Down Asynchronous Counters; Mod x Asynchronous counters	Lectures +Lab	Quiz/Exam
26	4		Counters Mod x Asynchronous counters Counters Synchronous Counters; Up-Down Synchronous Counters; Design of Synchronous Counters Shift Registers Register description; shift register Operation; Serial (Parallel) In/Serial (Parallel) Out Shift Registers	Lectures +Lab	Quiz/Exam
27	4			Lectures +Lab	Quiz/Exam
28	4			Lectures +Lab	Quiz/Exam
29	4		Shift Registers Bidirectional Shift Register; Shift Register Counters; Shift Register Applications.	Lectures +Lab	Quiz/Exam
30	4			Lectures +Lab	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• Fundamentals of logic design, CHARLES H.ROTH,JR. / LARRY L.KINNEY • Digital fundamentals, FLOYD
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	
Minimum number of students	8

Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Electronics I / ECE103
4. Program(s) to which it contributes	
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	4 hours per week, 120 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	To understand and apply concepts and applications of semiconductor principles and electronic devices analysis, in which student will be able to implement or analyze different electronics circuits with diodes such as clippers, clampers and rectifiers.

10. Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. Understand the principles semiconductor materials and the PN junction principles and structure and diode modeling methods.
A2. Understand the diode applications such as rectifiers, clippers and clamping.
A3. Understand the principles, operation and applications of Zener diode and some special diodes.
A5. Transistor types, characteristics and operations will be studied and discussed.

B. Subject-specific skills

B1. The course knowledge can be used to design and analyze different diode circuits using different modelling methods.
B2. The course knowledge can be used to analyze diode circuits for different application such rectifier, clippers and clamper circuits.
B3. Provide main steps to teach students how to analyze Zener diode circuits.
B4. Students will be able to design and analyze transistor circuits.

Teaching and Learning Methods

Lectures, graphics and analyzing.
Sheets and solutions of questions.
Discussion of several issues together.
Writing reports with discussion.
Design and implement different circuits discussed throughout the course.

Assessment methods

Exams, homework, questions and answers in lectures. Report discussion

C. Thinking Skills

C1. suggest many different cases and suggest suitable solutions for these issues
C2. group work on issues with real life application
C3. test the students with variety types of questions

Teaching and Learning Methods

Tests, sheets, reports and mini-projects

Assessment methods

Exams, Homework, Quizzes, workshop and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Search through resources and books D2.
Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method

1	4		Atomic structure and model, Formation of energy band in crystal Energy band, Fermi-Dirac function. Semiconductor Materials Intrinsic semiconductor, Extrinsic semiconductor, Fermi level in Intrinsic semiconductor, Fermi level in Extrinsic semiconductor, Majority and Minority Carriers Current flow in impurity semiconductor materials, PN junction operation and characteristics PN-junction, Depletion layer formation.	Lectures	Quiz/Exam
2	4			Lectures	Quiz/Exam
3	4			Lectures	Quiz/Exam
4	4			Lectures	Quiz/Exam
5	4			Lectures	Quiz/Exam
6	4		Diode equation, diode parameters. Temperature Dependence of the i-υ Characteristics PN-Junction capacitance.	Lectures	Quiz/Exam
7	4			Lectures	Quiz/Exam
8	4		Modeling the Diode Forward Characteristic 1- ideal model 2- The Exponential Model 3- Graphical Analysis Using the Exponential Model 4- Iterative Analysis Using the 5- Piecewise Linear Model 6- The Constant-Voltage-Drop Model	Lectures	Quiz/Exam
9	4			Lectures	Quiz/Exam
10	4			Lectures	3Quiz/Exam
11	4		The Small-Signal Diode Model	Lectures	Quiz/Exam
12	4		Multiple diodes configurations	Lectures	Quiz/Exam
13	4			Lectures	Quiz/Exam
14	4			Lectures	Quiz/Exam
15	4			Lectures	Quiz/Exam
16	4		Diode applications: Logic circuit using diodes, Rectifier (full-wave, half-wave and bridge) with filters, Clipper and clamping circuits,	Lectures	Quiz/Exam
17	4			Lectures	Quiz/Exam
18	4			Lectures	Quiz/Exam
19	4			Lectures	Quiz/Exam
20	4			Lectures	Quiz/Exam
21	4			Lectures	Quiz/Exam
22	4			Lectures	Quiz/Exam
23	4			Lectures	Quiz/Exam
24	4			Lectures	Quiz/Exam
25	4		Zener diode, Zener diode characteristics. Zener equivalent circuit, applications.	Lectures	Quiz/Exam
26	4			Lectures	Quiz/Exam
27	4			Lectures	Quiz/Exam
28	4		Tunnel diodes, varactor, LED and photodiodes.	Lectures	Quiz/Exam
29	4			Lectures	Quiz/Exam

30	4		Mini project presentation and discussion	Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• Millman-Halkias, "Integrated electronics", Second edition 1972. • Adrianus J. Dekker, "Electrical engineering materials", Second edition, 1961. • Adel S. Sedra and Kenneth C. Smith, "Microelectronic circuit", Fifth edition, 2004. • Donald A. Neamen, "Semiconductor physics and devices", Third edition, 2003. • Thomas L. Floyd, "Electronic devices conventional current version", Seventh edition, 2005.
Special requirements (include for example workshops, periodicals, IT software, websites)	Workshop for the students to present their miniprojects.
Community-based facilities (include for example, guest Lectures, internship, field studies)	None

13. Admissions	
Pre-requisites	
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Computer Programming I / ECE104

10. Learning Outcomes, Teaching, Learning and Assessment Method

4. Program(s) to which it contributes	Computer Programming II
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	4 hours per week, 120 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	To teach the students who to write a clear algorithm by describing its steps as well as illustrating its operation using a flow chart. Moreover, to teach the students the basics of Basic and visual Basic programming languages.

11. Course StructureA. Knowledge and Understanding

A1. Introduce the thinking process behind making an algorithm.
A2. Illustrate the flow chart as a tool for writing a computer program. A3. Introduce the principles of Structured Programming through BASIC language.

A4. Introduce the principles of Object Oriented programing through visual BASIC language.

B. Subject-specific skills

B1.the course knowledge can be used to teach the students how to analyze a scientific problem step by step toward finding a suitable solution to the problem. B2. Provide the main steps to write a simple program in Basic language. B3. Provide the main steps to write a simple program in Visual Basic language.

Teaching and Learning Methods

Lectures, Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, homework, questions and answers in lectures

C. Thinking Skills

C1. suggest many different cases and suggest suitable solutions for these issues
C2. group work on issues with real life application
C3. test the students with variety types of questions

Teaching and Learning Methods

Lectures, Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books
D2.Search through internet and papers

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Introduction to computer system	Lectures	Quiz/Exam
	2			Lab.	
2	2		Algorithms	Lectures	Quiz/Exam
	2			Lab.	
3	2			Lectures	Quiz/Exam
	2			Lab.	
4	2		Flow Charts	Lectures	Quiz/Exam
	2			Lab.	

5	2 2			Lectures Lab.	Quiz/Exam
6	2 2		Variables and Constants in BASIC	Lectures Lab.	Quiz/Exam
7	2 2		Input Statement in BASIC	Lecture Lab.	Quiz/Exam
8	2 2		Output Statement in BASIC	Lecture Lab.	Quiz/Exam
9	2 2		Assignment Statement in BASIC	Lecture Lab.	Quiz/Exam
10	2 2			Lecture Lab.	Quiz/Exam
11	2 2		Making Decisions in BASIC	Lecture Lab.	Quiz/Exam
12	2 2			Lecture Lab.	Quiz/Exam
13	2 2		Program Looping in BASIC	Lecture Lab.	Quiz/Exam
14	2 2			Lecture Lab.	Quiz/Exam
15	2 2		Arrays in BASIC	Lecture Lab.	Quiz/Exam
16	2 2			Lecture Lab.	Quiz/Exam
17	2 2		Visual Basic Environment	Lecture Lab.	Quiz/Exam
18	2 2		Variables, Constants in Visual BASIC	Lecture Lab.	Quiz/Exam
19	2 2		Assignment statement in Visual Basic	Lecture Lab.	Quiz/Exam
20	2 2		Making Decisions in Visual Basic	Lectures Lab.	Quiz/Exam
21	2 2		Branching and Looping in Visual Basic	Lecture Lab.	Quiz/Exam
22	2 2		Visual Basic Control Fundamentals	Lecture Lab.	Quiz/Exam
23	2 2		Executing commands (event Procedures and command buttons)	Lecture Lab.	Quiz/Exam
24	2 2		Entering input and displaying output using Text box and Label	Lecture Lab.	Quiz/Exam

25	2		Entering input and displaying output using Input box and message box	Lecture	Quiz/Exam
	2			Lab.	
26	2		Check box, Option button and Frame controls	Lecture	Quiz/Exam
	2			Lab.	
27	2		Array in Visual Basic	Lecture	Quiz/Exam
	2			Lab.	
28	2		List Box and Combo Box Controls	Lecture	Quiz/Exam
	2			Lab.	
29	2		Procedures in Visual Basic	Lecture	Quiz/Exam
	2			Lab.	
30	2			Lecture	Quiz/Exam
	2			Lab.	

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• "Theory and Problems of Programming with Basic " by Byron S. Gottfried • "Theory and Problems of Programming with Visual Basic " by Byron S. Gottfried
Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	None
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Electrical Circuits I / ECE105
4. Program(s) to which it contributes	Electrical Circuits II, Communication, Electronic
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	4 hours per week, 120 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	The main purpose of the course is to acquaint the students with the fundamental concepts of transient response in higher order electrical circuits; resonant frequencies; filtering; as well as analysis of two-port networks.

10. Learning Outcomes, Teaching, Learning and Assessment Method
A. Knowledge and Understanding
A1. Transient response of RLC circuits. A2. Electrical resonance. A3. Electrical Filters. A4. Two-port networks.

B. Subject-specific skills
B1.the course knowledge can be used to communications and electronics.
Teaching and Learning Methods
Lectures. Sheets and solutions of questions. Discussion of several issues together.
Assessment methods
Exams, homework, questions and answers in lectures
C. Thinking Skills
C1. suggest different problems and their suitable solutions. C2. group work on issues with applied scientific application C3. test the students with variety types of questions
Teaching and Learning Methods
Tests and homework
Assessment methods
Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.
D. General and Transferable Skills (other skills relevant to employability and personal development)
D1.Search through resources and books D2.Search through internet

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4		Basic Concepts	Lectures	Quiz/Exam
2	4			Lectures	Quiz/Exam
3	4			Lectures	Quiz/Exam

4	4		Series, Parallel, and Series-Parallel Resistive Circuits.	Lectures	Quiz/Exam
5	4			Lectures	Quiz/Exam
6	4		D.C. Network Analysis Techniques	Lectures	Quiz/Exam
7	4			Lectures	Quiz/Exam
8	4		Delta-Star Transformation	Lectures	Quiz/Exam
9	4			Lectures	Quiz/Exam
10	4		D.C. Network Theorem	Lectures	Quiz/Exam
11	4			Lectures	Quiz/Exam
12	4			Lectures	Quiz/Exam
13	4		Maximum power transfer	Lectures	Quiz/Exam
14	4		Bridge circuits Principles and Applications.	Lectures	Quiz/Exam
15	4			Lectures	Quiz/Exam
16	4		D.C. Transient Circuits	Lectures	Quiz/Exam
17	4			Lectures	Quiz/Exam
18	4		A.C. Circuits	Lectures	Quiz/Exam
19	4			Lectures	Quiz/Exam
20	4		A.C. Source Transformations	Lectures	Quiz/Exam
21	4			Lectures	Quiz/Exam
22	4		Power Calculations in A.C. Circuits	Lectures	Quiz/Exam
23	4			Lectures	Quiz/Exam
24	4		A.C. Network Analysis Techniques	Lectures	Quiz/Exam
25	4			Lectures	Quiz/Exam
26	4			Lectures	Quiz/Exam
27	4		A.C. Delta-Star Transformation	Lectures	Quiz/Exam
28	4			Lectures	Quiz/Exam
29	4		A.C. Network Theorems	Lectures	Quiz/Exam
30	4			Lectures	Quiz/Exam

12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• Introductory Circuit Analysis by Robert L. Boylestad 13ed, 2015 • Fundamentals of Electrical Engineering and Electronics by Theraja, B.L
Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	None
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Energy conversion / ECE106
4. Program(s) to which it contributes	
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	2 hours per week, 60 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	To understand and apply concepts and applications of energy conversion, in which student will be able to implement or analyze different electronics circuits.

10. Learning Outcomes, Teaching, Learning and Assessment Method
A. Knowledge and Understanding

A1.Units of Basic Electrical Quantities will be studied.
A2. Understand the principles Magnetic Circuits.
A3.Electromagnetism will be studied.
A4. Study Electromagnetic Induction.

B. Subject-specific skills

B1. The course knowledge can be used to know the basic principles of the work of magnetic circuits.
B2. Provide main steps to teach students how to analyze electromagnetism circuits.

Teaching and Learning Methods

Lectures, graphics, Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, homework, questions and answers in lectures

C. Thinking Skills

C1. suggest many different cases and suggest suitable solutions for these issues
C2. group work on issues with real life application
C3. test the students with variety types of questions

Teaching and Learning Methods

Tests, sheets

Assessment methods

Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		SI units; Charge; Force; Work; Power; Electrical potential and e.m.f.; Conductance; Electrical power and energy	Lectures	Quiz/Exam
2	2			Lectures	Quiz/Exam
3	2			Lectures	Quiz/Exam
4	2		Magnetic fields; Magnetic flux and flux density; Magnetomotive force and magnetic field strength: Permeability and B-H curves; Reluctance; Composite series magnetic circuits; Hysteresis and hysteresis loss.	Lectures	Quiz/Exam
5	2			Lectures	Quiz/Exam
6	2			Lectures	Quiz/Exam
7	2			Lectures	Quiz/Exam
8	2		Magnetic field due to an electric current; Electromagnets; Force on a current-carrying conductor; Principle of operation of a simple D.C. motor; Principles of operation of a movingcoil instrument; Force on a charge.	Lectures	Quiz/Exam
9	2			Lectures	Quiz/Exam
10	2			Lectures	Quiz/Exam
11	2			Lectures	Quiz/Exam
12	2		Laws of electromagnetic induction; Rotation of a loop in a magnetic field; Inductance; Inductors; Energy stored; Inductance of a coil; Mutual Inductance.	Lectures	Quiz/Exam
13	2			Lectures	Quiz/Exam
14	2			Lectures	Quiz/Exam
15	2			Lectures	Quiz/Exam
16	2		The A.C. generator; Waveforms; A.C. values.	Lectures	Quiz/Exam
17	2			Lectures	Quiz/Exam
18	2			Lectures	Quiz/Exam
19	2			Lectures	Quiz/Exam
20	2		Three-phase supply; Star connection; Delta connection; Power in threephase systems.	Lectures	Quiz/Exam
21	2			Lectures	Quiz/Exam
22	2			Lectures	Quiz/Exam
23	2			Lectures	Quiz/Exam
24	2		Transformer principle of operation; E.m.f. equation of a transformer; Transformer construction; Regulation of a transformer; Threephase transformers; Voltage transformers.	Lectures	Quiz/Exam
25	2			Lectures	Quiz/Exam
26	2			Lectures	Quiz/Exam
27	2		The action of a commutator; D.C. machine construction; E.m.f. generated in an armature winding;	Lectures	Quiz/Exam
28	2			Lectures	Quiz/Exam
29	2			Lectures	Quiz/Exam

30	2		Shunt, series, and compound windings; D.C. generators; Types of D.C. generator and their characteristics; D.C. motors; Types of D.C. motor and their characteristics.	Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	ELECTRICAL AND ELECTRONIC PRINCIPLES AND TECHNOLOGY, JOHN BIRD
Special requirements (include for example workshops, periodicals, IT software, websites)	None.
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering

2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Workshop of Electronics / ECE107
4. Program(s) to which it contributes	Circuit theory and Electronic I
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	This course aims to introduce the students to the practical aspects of different electrical and electronic circuits Student will prove electric circuit theorems practically. Moreover, the students will have the chance to deal with diode circuits for different applications as well as the transistor circuits.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Workshop of Electronics / ECE107
4. Program(s) to which it contributes	Circuit theory and Electronic I
5. Modes of Attendance offered	In class

6. Semester/Year	Year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	5/9/2020
9. Aims of the Course	This course aims to introduce the students to the practical aspects of different electrical and electronic circuits Student will prove electric circuit theorems practically. Moreover, the students will have the chance to deal with diode circuits for different applications as well as the transistor circuits.

10. Learning Outcomes, Teaching, Learning and Assessment Method
A. Knowledge and Understanding
A1. Learning the principles of electric circuits analysis Transistor and FET electronics devices characteristics will be tested. A2. Understanding different electric circuit theorems used to simplify circuit analysis. A3. Getting knowledge on diode characterizing and different applications such as rectifiers, clippers, clampers and use of Zener diodes. A4. Understanding bipolar junction transistor characteristics and circuit for different configurations.
B. Subject-specific skills
B1. The course will help the students to develop their design skills for electric and electronic circuit design and analysis. B2. The students will put the measurement skills they obtain in this course to use in the future for any electrical or electronic project design.
Teaching and Learning Methods
Graphics and analyzing. Hands-on experiments. Sheets and solutions of questions. Discussion of several issues together.
Assessment methods
Exams, homework, practical and oral examinations.

C. Thinking Skills
C1. Incorporating the knowledge of electrical and electronic circuits analysis when considering any and electronic circuits using diodes and BJT. C2. group work on issues with practical applications.
Teaching and Learning Methods
Tests and sheets.
D. General and Transferable Skills (other skills relevant to employability and personal development)
D1. Search through resources and books D2. Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Electronic Symbols	Lab	Quiz/Exam
2	3			Lab	Quiz/Exam
3	3		Electronic measuring Devices	Lab	Quiz/Exam
4	3			Lab	Quiz/Exam
5	3			Lab	Quiz/Exam
6	3			Lab	Quiz/Exam
7	3		Resistors Types and Coding	Lab	Quiz/Exam
8	3			Lab	Quiz/Exam
9	3		Capacitors Types and Coding	Lab	Quiz/Exam
10	3			Lab	Quiz/Exam
11	3		Inductors Types and Coding	Lab	Quiz/Exam
12	3			Lab	Quiz/Exam

13	3		Semiconductors Devices	Lab	Quiz/Exam
14	3			Lab	Quiz/Exam
15	3		Wires Types and their Uses	Lab	Quiz/Exam
16	3		Soldering	Lab	Quiz/Exam
17	3			Lab	Quiz/Exam
18	3			Lab	Quiz/Exam
19	3		Design and Implementation of a Complete DC Charger	Lab	Quiz/Exam
20	3			Lab	Quiz/Exam
21	3		Design and Implementation of Combinational Logic Circuits	Lab	Quiz/Exam
22	3			Lab	Quiz/Exam
23	3		Batteries Types, their Charging and Uses	Lab	Quiz/Exam
24	3		Relays, Contactors and Circuit Breakers	Lab	Quiz/Exam
25	3			Lab	Quiz/Exam
26	3		Design of Electrical Installation, Wiring and Lighting Distribution	Lab	Quiz/Exam
27	3			Lab	Quiz/Exam
28	3			Lab	Quiz/Exam
29	3		Wiring and Connection of some Electrical Devices for Home	Lab	Quiz/Exam
30	3			Lab	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	● Adel S. Sedra and Kenneth C. Smith, "Microelectronic circuit", Fifth edition, 2004. ● Donald A. Neamen, "Semiconductor physics and devices", Third edition, 2003. ● Thomas L. Floyd, "Electronic devices conventional current version", Seventh edition, 2005.
Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	

Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Electrical Measurement Laboratory / ECE108
4. Program(s) to which it contributes	Circuit theory and Electronic I
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	This course aims to introduce the students to the practical aspects of different electrical and electronic circuits Student will prove electric circuit theorems practically. Moreover, the students will have the chance to deal with diode circuits for different applications as well as the transistor circuits.

10. Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. Learning the principles of electric circuits analysis Transistor and FET electronics devices characteristics will be tested.
A2. Understanding different electric circuit theorems used to simplify circuit analysis.
A3. Getting knowledge on diode characterizing and different applications such as rectifiers, clippers, clampers and use of Zener diodes.
A4. Understanding bipolar junction transistor characteristics and circuit for different configurations.

B. Subject-specific skills

B1. The course will help the students to develop their design skills for electric and electronic circuit design and analysis.
B2. The students will put the measurement skills they obtain in this course to use in the future for any electrical or electronic project design.

Teaching and Learning Methods

Graphics and analyzing. Hands-on experiments. Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, homework, practical and oral examinations.

C. Thinking Skills

C1. Incorporating the knowledge of electrical and electronic circuits analysis when considering any and electronic circuits using diodes and BJT.
C2. group work on issues with practical applications.

Teaching and Learning Methods

Tests and sheets.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Search through resources and books D2.
Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Ohm's Law	Lab	Quiz/Exam
2	3			Lab	Quiz/Exam
3	3		Kirchhoff's Laws	Lab	Quiz/Exam
4	3			Lab	Quiz/Exam
5	3		Superposition Theorem	Lab	Quiz/Exam
6	3			Lab	Quiz/Exam
7	3		Thevenin's Theorem and Norton's Theorem	Lab	Quiz/Exam
8	3			Lab	Quiz/Exam
9	3		Maximum Power Transfer Theorem	Lab	Quiz/Exam
10	3		Star Delta conversions	Lab	Quiz/Exam
11	3			Lab	Quiz/Exam
12	3		The Cathode Ray Oscilloscope	Lab	Quiz/Exam
1	3			Lab	Quiz/Exam
14	3			Lab	Quiz/Exam
15	3		Transient Response in RL , RC and RLC Circuit	Lab	Quiz/Exam
16	3			Lab	Quiz/Exam
17	3			Lab	Quiz/Exam
18	3		A.C. Phase Relationship	Lab	Quiz/Exam
19	3			Lab	Quiz/Exam
20	3		Diode Characteristics	Lab	Quiz/Exam
21	3			Lab	Quiz/Exam
22	3		Clipping and Clamping circuits	Lab	Quiz/Exam
23	3			Lab	Quiz/Exam
24	3		Zener diode	Lab	Quiz/Exam
25	3			Lab	Quiz/Exam
26	3			Lab	Quiz/Exam
27	3		DC. Power supply	Lab	Quiz/Exam
28	3			Lab	Quiz/Exam
29	3		Transistor characteristics	Lab	Quiz/Exam
30	3			Lab	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	● Adel S. Sedra and Kenneth C. Smith, "Microelectronic circuit", Fifth edition, 2004. ● Donald A. Neamen, "Semiconductor physics and devices", Third edition, 2003. ● Thomas L. Floyd, "Electronic devices conventional current version", Seventh edition, 2005.
Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	
Minimum number of students	8
Maximum number of students	35

SECOND YEAR

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Mathematics II / ECE201
4. Program(s) to which it contributes	Engineering Analysis, Communication, DSP, Probability, Electromagnetics
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	4 hours per week, 120 hours per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	To make the student acquainted with the essential mathematical tools that are necessary for his academic study of the various subjects in electronic and communications engineering

10. Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. Infinite and Power Series.
A2. Parametric equations and analytical geometry in space.
A3. Polar, cylindrical and spherical coordinates.
A4. First order and second order differential equations.
A5. Double and triple integral.
A6. Calculus of vector fields.

B. Subject-specific skills

B1. Recognizing the convergent and the divergent series.
B2. Coordinate conversion from Cartesian to polar, cylindrical and spherical according to the symmetry in the problem.
B3. Recognizing the type of the differential equations and choosing the proper way of solution.

Teaching and Learning Methods

Lectures, graphics and analyzing, comments on students solutions of questions.

Assessment methods

Exams, quizzes

C. Thinking Skills

C1. suggest many different cases and suggest suitable solutions for these issues
C2. group work on issues with real life application
C3. test the students with variety types of questions

Teaching and Learning Methods

Step-by-step solution of examples and exercises with graphical illustrations.

Assessment methods

Exams, quizzes

D. General and Tran skills relevant to employability and personal development)

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Infinite series	Lectures	Quiz/Exam
2	2		Limit of infinite series (convergence and divergence)	Lectures	Quiz/Exam
3	2		Power series: Taylor's series and Maclaurin series	Lectures	Quiz/Exam
4	2		Evaluating integrals using power series	Lectures	Quiz/Exam
5	2		Equations of conic sections	Lectures	Quiz/Exam
6	2		Polar coordinates	Lectures	Quiz/Exam
7	2		Graphing in polar coordinates	Lectures	Quiz/Exam
8	2		Integration in polar coordinated	Lectures	Quiz/Exam
9	2		Vectors	Lectures	Quiz/Exam
10	2		Cross product and dot product	Lectures	Quiz/Exam
11	2		Line and plane equations in space	Lectures	Quiz/Exam
12	2		Cylindrical and spherical coordinates	Lectures	Quiz/Exam
13	2		Functions of two or more variables	Lectures	Quiz/Exam
14	2		Partial derivative and directional derivative	Lectures	Quiz/Exam
15	2		Maximum, minimum and saddle points	Lectures	Quiz/Exam
16	2		Lagrange Multipliers	Lectures	Quiz/Exam
17	2		Types of differential equations	Lectures	Quiz/Exam
18	2		Solution of first order differential equations	Lectures	Quiz/Exam
19	2		Solution of second order differential equations	Lectures	Quiz/Exam
20	2		Applications: Modeling of electrical circuits	Lectures	Quiz/Exam
21	2		Vector valued functions	Lectures	Quiz/Exam
22	2		Modeling of projectile functions	Lectures	Quiz/Exam
23	2		Curvature and the frame of unit vectors TNB	Lectures	Quiz/Exam
24	2		Double integral	Lectures	Quiz/Exam
25	2		Double integral in polar coordinates	Lectures	Quiz/Exam
26	2		Mass, center of mass and moment of inertia	Lectures	Quiz/Exam
27	2		Triple integral and cylindrical and spherical coordinates	Lectures	Quiz/Exam

28	2		Fields analysis and line integral and surface integral	Lectures	Quiz/Exam
29	2		Flux and Green theorem	Lectures	Quiz/Exam
30	2		Divergence theorem and Stoke's Theorem	Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	● "Calculus" by Ross L. Finney and George B. Thomas Jr, 11th edition, 1990. ● "Thomas' Calculus" by Maurice D. Weir, Joel Hass, and Frank R. Giordano, 2nd edition, 2008.
Special requirements (include for example workshops, periodicals, IT software, websites)	Simulation programs (Google Classroom, Matlab)
Community -based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Mathematics I
Minimum number of students	8
Maximum number of students	35

10. Learning Outcomes, Teaching, Learning and Assessment Method

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering

2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Computer Programming II / ECE202
4. Program(s) to which it contributes	Computer Programming I
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	4 hours per week, 120 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	To teach the students the basics of C++ through procedural and Object Oriented Programming.

COURSE SPECIFICATION

A. Knowledge and Understanding
A1. Structured Programming. A2. Object Oriented Programming.
B. Subject-specific skills
B1.the course knowledge can be used to teach students the principles of C++ programming language.
Teaching and Learning Methods

Lectures, Sheets and solutions of questions. Discussion of several issues together.
Assessment methods
Exams, homework, questions and answers in lectures
C. Thinking Skills
C1. suggest many different cases and suggest suitable solutions for these issues C2. group work on issues with real life application C3. test the students with variety types of questions
Teaching and Learning Methods
Lectures, Sheets and solutions of questions. Discussion of several issues together.
Assessment methods
Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.
D. General and Transferable Skills (other skills relevant to employability and personal development)
D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Introduction to computer system	Lecture	Quiz/Exam
	2			Lab.	
2	2		The history of programming Languages	Lecture	Quiz/Exam
	2			Lab.	
3	2		Introduction to C++	Lecture	Quiz/Exam
	2			Lab.	
4	2		Operators and Expressions	Lecture	Quiz/Exam
	2			Lab.	
5	2			Lecture	Quiz/Exam
	2			Lab.	
6	2		Operators and Expressions	Lectures	Quiz/Exam

	2			Lab.	
7	2		Making decisions in C++ programming	Lecture	Quiz/Exam
	2			Lab.	
8	2			Lecture	Quiz/Exam
	2			Lab.	
9	2		Program Looping	Lecture	Quiz/Exam
	2			Lab.	
10	2			Lecture	Quiz/Exam
	2			Lab.	
11	2		Arrays	Lecture	Quiz/Exam
	2			Lab.	
12	2		Strings	Lecture	Quiz/Exam
	2			Lab.	
13	2		Pointers	Lecture	Quiz/Exam
	2			Lab.	
14	2		Functions	Lecture	Quiz/Exam
	2			Lab.	
15	2			Lecture	Quiz/Exam
	2			Lab.	
16	2		Structures and Unions	Lecture	Quiz/Exam
	2			Lab.	
17	2			Lecture	Quiz/Exam
	2			Lab.	
18	2		Introduction to Object Oriented Programming	Lecture	Quiz/Exam
	2			Lab.	
19	2		Introduction to Class and Objects	Lecture	Quiz/Exam
	2			Lab.	
20	2		Constructors and Destructors	Lecture Lab.	Quiz/Exam
	2				
21	2		Arrays of Objects	Lecture	Quiz/Exam
	2			Lab.	
22	2		Pointers to Objects	Lecture	Quiz/Exam
	2			Lab.	
23	2		Using Functions with Objects	Lecture	Quiz/Exam
	2			Lab.	
24	2		Friends of A class	Lecture	Quiz/Exam
	2			Lab.	
25	2		Operator Overloading	Lecture	Quiz/Exam
	2			Lab.	
26	2		Inheritance	Lecture	Quiz/Exam
	2			Lab.	

27	2			Lecture	Quiz/Exam
	2			Lab.	
28	2		Introduction to C++ File system	Lecture	Quiz/Exam
	2			Lab.	
29	2		Reading and Writing text files	Lecture	Quiz/Exam
	2			Lab.	
30	2		Reading and Writing blocks of data	Lecture	Quiz/Exam
	2			Lab.	

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• "Starting out with C++" by H. Schildt • "Thinking in C++"
Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Computer Programming I
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Electromagnetic Fields / ECE203
4. Program(s) to which it contributes	Antenna, Propagation and microwaves
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	This course aims to help the students understanding the basics of electromagnetic fields.

10. Learning Outcomes, Teaching, Learning and Assessment Method
A. Knowledge and Understanding
A1. Basic principles of electromagnetic fields will be covered. A2. The students will be introduced to the theories of electromagnetic fields A3. Theoretical analysis will be covered.
B. Subject-specific skills

B1.the course knowledge can be applied to antenna design and EM wave propagation.
B2.The students will use the skills they obtained in this course in microwave engineering.

Teaching and Learning Methods

Lectures, graphics and analyzing. Sheets and solutions of questions.

Assessment methods

Exams, homework, questions and answers in lectures

C. Thinking Skills

C1. Considering the Maxwell equations in EM wave theory.

Teaching and Learning Methods

Tests, sheets.

Assessment methods

Exams, Homework and Quizzes

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Vector Analysis: Scalar and Vector Algebra; Cartesian Coordinating System; Vector Components and Unit Vectors;	Lectures	Quiz/Exam
2	3			Lectures	Quiz/Exam

3	3		Vector Field; Dot Product; Cross Product; Cylindrical Coordinates; Spherical Coordinates System.	Lectures	Quiz/Exam
4	3		Coulomb's Law and Electric Field Intensity The Experimental Law of Coulomb; Dielectric Field Intensity; Field of n-Point Charges; Field due to Continuous Volume Charge Distribution; Field of Line Charge; Field of a Sheet Charge; Area Lines and Sketches of Fields.	Lectures	Quiz/Exam
5	3			Lectures	Quiz/Exam
6	3			Lectures	Quiz/Exam
7	3			Lectures	Quiz/Exam
8	3			Lectures	Quiz/Exam
9	3		Electric Flux Density, Gauss' Law: Electric Flux Density, Gauss' Law; Applications of Gauss' Law; Some Symmetrical Charge Distributions; Differential Volume Element; Divergence; Maxwell's First Equation (Electrostatic); The Vector Operator and The Divergence Theorem.	Lectures	Quiz/Exam
10	3			Lectures	Quiz/Exam
11	3			Lectures	Quiz/Exam
12	3			Lectures	Quiz/Exam
13	3			Lectures	Quiz/Exam
14	3		Energy And Potential: Energy Expanded in Moving a Point Charge in an Electric Field; The Line Integrals; Potential Difference and Potential of a Point Charge; The Potential Field of a System of Charges; Conservative Property; Potential Gradient; The Dipole Energy Density in The Electrostatic Field.	Lectures	Quiz/Exam
15	3			Lectures	Quiz/Exam
16	3			Lectures	Quiz/Exam
17	3			Lectures	Quiz/Exam
18	3		Conductors, Dielectric, and Capacitance: Current and Current Density; Continuity of Current in Metallic Conductors; Conductor's Properties and Boundary Conditions; The Method of Images; Semiconductors; The Nature of The Dielectric Materials; Capacitance; Capacitance of Some Useful Configurations; Capacitance of Two Wires Line.	Lectures	Quiz/Exam
19	3			Lectures	Quiz/Exam
20	3			Lectures	Quiz/Exam
21	3			Lectures	Quiz/Exam
22	3			Lectures	Quiz/Exam
23	3		Poisson's and Laplace's Equations: Poisson's and Laplace's Equations; Uniqueness Theorem; Solution of Laplace's Equations.	Lectures	Quiz/Exam
24	3			Lectures	Quiz/Exam

25	3			Lectures	Quiz/Exam
26	3			Lectures	Quiz/Exam
27			The Steady Magnetic Field: Biot-Savart Law; Ampere's Circuital Law; The Curl; Stokes' Theorem; Magnetic Flux Density; The Scalar and Vector Magnetic Potential; Derivation of Steady Magnetic Field Laws.	Lectures	Quiz/Exam
28				Lectures	Quiz/Exam
29				Lectures	Quiz/Exam
30				Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	● ELECTROMAGNETIC ENGINEERING WILLIAM HYTE
Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	None
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Electronics II / ECE204
4. Program(s) to which it contributes	Electronics I
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	4 hours per week, 120 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	To understand principles of electronic circuit analysis and synthesis, in which student will be able to implement or analyze different electronics circuits.

10. Learning Outcomes, Teaching, Learning and Assessment Method
A. Knowledge and Understanding
A1. Transistor and FET electronics devices characteristics will be studied. A2. AC and DC transistor and FET amplifiers analysis and design will be studied A3. Using transistor and FET devices as a switch will be studied. A4. Negative Feedback electronic circuits will be studied.

B. Subject-specific skills
B1.the course knowledge can be used to know the basic principles of the work of electronic circuits. B2.provide main steps to teach students how to build useful electronic circuits as amplifiers and switches devices.
Teaching and Learning Methods
Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.
Assessment methods
Exams, homework, questions and answers in lectures
C. Thinking Skills
C1. suggest many different cases and suggest suitable solutions for these issues C2. group work on issues with real life application C3. test the students with variety types of questions
Teaching and Learning Methods
Tests, sheets, mini-projects
Assessment methods
Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.
D. General and Transferable Skills (other skills relevant to employability and personal development)
D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4		Transistor characteristics, CB and CE configuration	Lectures	Quiz/Exam
2	4		Transistor Fixed bias circuit, transistor with emitter resistance	Lectures	Quiz/Exam

3	4		Transistor independent of beta biasing circuit, transistor with feedback resistance circuit.	Lectures	Quiz/Exam
4	4		Transistor as a switch.	Lectures	Quiz/Exam
5	4		Transistor stability factors and thermal resistance.	Lectures	Quiz/Exam
6	4		A.C. transistor hybrid model.	Lectures	Quiz/Exam
7	4		A.C. transistor r_e model.	Lectures	Quiz/Exam
8	4		AC analysis for CE configuration of fixed bias and amplifier with emitter resistance.	Lectures	Quiz/Exam
9	4		AC analysis for CE configuration amplifier with feedback resistance.	Lectures	Quiz/Exam
10	4		AC analysis for CB configuration.	Lectures	Quiz/Exam
11	4		AC analysis for CC configuration.	Lectures	Quiz/Exam
12	4		AC analysis for transistor using complete hybrid equivalent circuit.	Lectures	Quiz/Exam
13	4		AC analysis for cascade transistors amplifiers using approximate hybrid equivalent circuits.	Lectures	Quiz/Exam
14	4		AC analysis for cascade transistors amplifiers using complete hybrid equivalent circuits.	Lectures	Quiz/Exam
15	4		Design of transistor amplifier circuits.	Lectures	Quiz/Exam
16	4		FET characteristics for JFET.	Lectures	Quiz/Exam
17	4		FET characteristics for Enhancement and depletion MOSFET.	Lectures	Quiz/Exam
18	4		FET DC biasing circuit, fixed bias.	Lectures	Quiz/Exam
19	4		FET DC biasing circuit, self-bias.	Lectures	Quiz/Exam
20	4		FET AC equivalent circuit.	Lectures	Quiz/Exam
21	4		Analysis of FET CS amplifier.	Lectures	Quiz/Exam
22	4		Analysis of FET CD amplifier.	Lectures	Quiz/Exam
23	4		Analysis of FET CG amplifier.	Lectures	Quiz/Exam
24	4		Cascade FET amplifiers.	Lectures	Quiz/Exam
25	4		Design of FET amplifiers.	Lectures	Quiz/Exam
26	4		Feedback amplifiers.	Lectures	Quiz/Exam
27	4		Feedback amplifier concept.	Lectures	Quiz/Exam
28	4		Feedback amplifier gain, input resistance and output resistance.	Lectures	Quiz/Exam
29	4		Feedback voltage series and current series amplifier circuits.	Lectures	Quiz/Exam
30	4		Feedback voltage shunt and current shunt amplifier circuits.	Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• Integrated Electronics by Millman and Halkias. • Electronic Circuits by Boylested. "Power Electronics Devices, Circuits, and Applications" by Muhammad H. Rashid, 3rd Edition, 2001.
Special requirements (include for example workshops, periodicals, IT software, websites)	Practical work in laboratory and simulation programs (multisim)
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Electronics1 and Circuit1.
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.	
1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department

3. Course title/code	Communication Theory I / ECE205
4. Program(s) to which it contributes	Communication theory, Digital communication.
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	The objective of this course is to study and how to analysis and convert signals from time domain to frequency domain using Fourier techniques. Hence the study of primary principles for Transmission line.

10. Learning Outcomes, Teaching,Learning and Assessment Method
A. Knowledge and Understanding
A1.Classification of signals. A2.Classification of system. A3.Fourier Series and Fourier Transform. A4.Transmission lines.
B. Subject-specific skills
B1.the scorer of the course teaches, the students must be familiar with signal analysis (Fourier techniques). B2.provide main steps to teach students the first principles of Transmission Lines and how to use the smith chart.

Teaching and Learning Methods
Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.
Assessment methods
Exams, homework, questions and answers in lectures
C. Thinking Skills
C1. suggest many different cases and suggest suitable solutions for these issue C2.group work on issues with real life application C3.test the students with variety types of questions
Teaching and Learning Methods
Tests, sheets, mini-projects
Assessment methods
Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.
D. General and Transferable Skills (other skills relevant to employability and personal development)
D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Classification of signals: Power Signal: periodic, almost periodic, and random;	Lectures	Quiz/Exam
2	3		Energy Signals: deterministic, random; Definition of Average Power and Energy in Time Domain.	Lectures	Quiz/Exam
3	3		Classification of system :Linear; Nonlinear; Time Variant; Time Invariant.	Lectures	Quiz/Exam

4	3		Causal; Non-Causal; With Memory; Without Memory; Discrete; Continuous	Lectures	Quiz/Exam
5	3		Real Form Fourier Series (Trigonometric Form); Half-Period Expansion (Even and Odd); Properties of Fourier Series	Lectures	Quiz/Exam
6	3		Alternative Form of Fourier Series; Average Power in Terms of Fourier Series; Complex Form Fourier Series	Lectures	Quiz/Exam
7	3		Relation Between Real and Complex Form Fourier Series; Amplitude, Phase, and Power Spectral Density Spectrum (Characteristics)	Lectures	Quiz/Exam
8	3		Parseval's Theorem; Applications in Linear Systems.	Lectures	Quiz/Exam
9	3		Definition of Fourier Transform and its Inverse	Lectures	Quiz/Exam
10	3		Properties of Fourier Transform: uniqueness, linearity, scaling, time delay, differentiation, time reversal.	Lectures	Quiz/Exam
11	3		conjugate, modulation, convolution, multiplication, multiplication by t^n, duality;	Lectures	Quiz/Exam
12	3		Amplitude, Phase, and Energy Spectral Density; Rayleigh	Lectures	Quiz/Exam
13	3		Sine and Cosine Fourier Transform; Applications in Linear Systems.	Lectures	Quiz/Exam
14	3		Autocorrelation	Lectures	Quiz/Exam
15	3		Cross Correlation	Lectures	Quiz/Exam
16	3		Convolution; Applications.	Lectures	Quiz/Exam
17	3		Differential Equation for Distributed Parameter; Uniform Transmission Line and its Solutions;	Lectures	Quiz/Exam
18	3		Characteristic Impedance; Propagation Constant; Variation of	Lectures	Quiz/Exam
			Characteristic Impedance and Propagation Constants (α and β) With Frequency;		
19	3		Special Transmission Lines: Lossless Transmission Line, Distortionless Transmission Line, Matched Transmission Line,	Lectures	Quiz/Exam
20	3		Infinite Long Transmission Line; Inductive Loading; Phase and Group Velocity.	Lectures	Quiz/Exam

21	3		Determination of Integration Constants of Transmission Line in Terms of Receiving End; Impedance along The Line and Input Impedance;	Lectures	Quiz/Exam
22	3		Input Impedance of Lossless Transmission Line	Lectures	Quiz/Exam
23	3		Input Impedance of Open Circuit ($Z_L=\infty$) and Short Circuit ($Z_L=0$) Lossless Transmission Line	Lectures	Quiz/Exam
			Physical and Electrical Length of		
24	3		Transmission Line	Lectures	Quiz/Exam
25	3		Reflection Coefficients (Voltage and Current)	Lectures	Quiz/Exam
26	3		Standing Wave Ratio; Sending and Receiving End Voltage, Current, and Power	Lectures	Quiz/Exam
27	3		Measurement of Transmission Line Characteristics; Equivalent Four Terminal Lump Parameters Network.	Lectures	Quiz/Exam
28	3		Introduction to Main Circles in Smith Chart	Lectures	Quiz/Exam
29	3		Compensation Using Open Circuit and Short Circuit Stub (Series and Parallel Stub)	Lectures	Quiz/Exam
30	3		Quarter Wavelength Transformer; Cascade λ/4 Transformers.	Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1. Communication Systems Stremer. 2. Modern Digital & Analog Communication Systems, B.P.Lathi. 3. Digital& Analog Communication Systems, KSAM Shanmugam. 4. Advanced Engineering Mathematics, CLARENCE R. WYLIE.

Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Mathematics I
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Electrical Circuits II / ECE206
4. Program(s) to which it contributes	Electrical Circuits, Communication, Electronics
5. Modes of Attendance offered	In class
6. Semester/Year	year

7. Number of hours tuition (total)	2 hours per week, 60 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	The main purpose of the course is to acquaint the students with the fundamental concepts of transient response in higher order electrical circuits; resonant frequencies; filtering; as well as analysis of two-port networks.

10. Learning Outcomes, Teaching, Learning and Assessment Method
A. Knowledge and Understanding
A1. Transient response of RLC circuits. A2. Electrical resonance. A3. Electrical Filters. A4. Two-port networks.
B. Subject-specific skills
B1.the course knowledge can be used to communications and electronics.
Teaching and Learning Methods
Lectures. Sheets and solutions of questions. Discussion of several issues together.
Assessment methods
Exams, homework, questions and answers in lectures

C. Thinking Skills
C1. suggest different problems and their suitable solutions. C2. group work on issues with applied scientific application C3. test the students with variety types of questions
Teaching and Learning Methods
Tests and homework
Assessment methods
Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.
D. General and Transferable Skills (other skills relevant to employability and personal development)
D1.Search through resources and books D2.Search through internet

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Introduction to transient in electrical networks	Lectures	Quiz/Exam
2	2		Transient in 2nd order RLC networks	Lectures	Quiz/Exam
3	2		Natural response in series RLC networks	Lectures	Quiz/Exam
4	2		Step response in series RLC networks	Lectures	Quiz/Exam
5	2		Natural response in parallel RLC networks	Lectures	Quiz/Exam
6	2		Step response in parallel RLC networks	Lectures	Quiz/Exam
7	2		Further examples on transient response	Lectures	Quiz/Exam
8	2		Electrical resonance	Lectures	Quiz/Exam
9	2		Series resonance	Lectures	Quiz/Exam
10	2		Series resonance	Lectures	Quiz/Exam
11	2		Parallel resonance	Lectures	Quiz/Exam

12	2		Practical resonance circuits and examples	Lectures	Quiz/Exam
13	2		Electric Filters. Basic filter networks	Lectures	Quiz/Exam
14	2		LPF and HPF	Lectures	Quiz/Exam
15	2		BPF and BSF	Lectures	Quiz/Exam
16	2		Symmetrical T-networks	Lectures	Quiz/Exam
17	2		Symmetrical π-networks	Lectures	Quiz/Exam
18	2		Constant-k filters	Lectures	Quiz/Exam
19	2		Constant-k filters	Lectures	Quiz/Exam
20	2		m-derived filters	Lectures	Quiz/Exam
21	2		Half sections	Lectures	Quiz/Exam
22	2		Composite filters	Lectures	Quiz/Exam
23	2		Active filters	Lectures	Quiz/Exam
24	2		Practical filter realization	Lectures	Quiz/Exam
25	2		Two-port networks	Lectures	Quiz/Exam
26	2		z-parameters	Lectures	Quiz/Exam
27	2		y-parameters	Lectures	Quiz/Exam
28	2		hybrid parameters	Lectures	Quiz/Exam
29	2		Transmission parameters	Lectures	Quiz/Exam
30	2		Further examples	Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	● "Fundamentals of Electric Circuit" by Charles K. Alexander, 4th edition, 2009. ● "Network Analysis and Synthesis" by U.A. Bakshi, 1st edition, 2009. ● "Electric Circuits" by James W. Nilsson, 9th edition, 2011.
Special requirements (include for example workshops, periodicals, IT software, websites)	None

Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Electric Circuits I
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Computer Architecture / ECE207
4. Program(s) to which it contributes	
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	4 hours per week, 120 Hour per year

8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	After completion of this course the student will be equipped with the all assembly language programming tools needed for solve problem and write a program in a computer to obtain the result, knowing how to interfacing of the Intel microprocessor.

10. Learning Outcomes, Teaching, Learning and Assessment Method
A. Knowledge and Understanding
A1.known a general architecture of computer & General architecture of A microcomputer A2. known a microprocessor Unit (MPU),Arithmetic / logic unit (ALU), Register unit., Control unit and How does the microcomputer work A3. work with Programming-integer instructions and computations A4. work with Programming – control flow instructions A5.work with The 8086 microprocessors and their memory and input/output interfaces. A6.Known the interrupt.
B. Subject-specific skills
B1.the course knowledge can be used to Intel 8086 microprocessor. B2.provide main steps to teach students how to write assembly language programming and how to interfacing of the Intel microprocessor.
Teaching and Learning Methods
Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.
Assessment methods
Exams, homework, questions and answers in lectures
C. Thinking Skills

C1. suggest many different cases and suggest suitable solutions for these issues
C2. group work on issues with real life application
C3. test the students with variety types of questions

Teaching and Learning Methods

Tests, sheets, mini-projects

Assessment methods

Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books
D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4		general architecture of computer & General architecture of A microcomputer Data types, Types of Microprocessors, Number Systems, Computer languages; Machine language, Assembly language, high-level language	Lectures + Lab	Quiz/Exam
2	4			Lectures + Lab	Quiz/Exam
3	4			Lectures + Lab	Quiz/Exam
4	4			Lectures + Lab	Quiz/Exam
5	4		programmable registers, Accumulator, general –purpose registers, Flags, Program Counter, Stack Pointer	Lectures + Lab	Quiz/Exam
6	4			Lectures + Lab	Quiz/Exam
7	4		Architecture of 8086 microprocessor, Bus Interface Unit [BIU],Execution Unit [EU],Register Organization, General Purpose Registers, Segment Registers	Lectures + Lab	Quiz/Exam
8	4			Lectures + Lab	Quiz/Exam
9	4			Lectures + Lab	Quiz/Exam
10	4			Lectures + Lab	Quiz/Exam
11	4		Pointers and Index Registers, Flag Register, Bus Operation, Memory	Lectures + Lab	Quiz/Exam
12	4			Lectures + Lab	Quiz/Exam

13	4		Segmentation, Generation of 20-bit Address, 8086 instruction set and Assembly language program, Addressing modes	Lectures + Lab	Quiz/Exam
14	4		Programming-integer instructions and computations: Data transfer instructions, Arithmetic instructions, Logic instructions , Shift instructions , Rotate instructions	Lectures + Lab	Quiz/Exam
15	4			Lectures + Lab	Quiz/Exam
16	4			Lectures + Lab	Quiz/Exam
17	4			Lectures + Lab	Quiz/Exam
18	4		Programming – control flow instructions Flag-control instructions, compare instruction, control flow and jump instructions, subroutines instruction, loops instructions	Lectures + Lab	Quiz/Exam
19	4			Lectures + Lab	Quiz/Exam
20	4			Lectures + Lab	Quiz/Exam
21	4			Lectures + Lab	Quiz/Exam
22	4			Lectures + Lab	Quiz/Exam
23	4			Lectures + Lab	Quiz/Exam
24	4		The 8086 microprocessors and their memory and input/output interfaces.	Lectures + Lab	Quiz/Exam
25	4			Lectures + Lab	Quiz/Exam
26	4			Lectures + Lab	Quiz/Exam
27	4			Lectures + Lab	Quiz/Exam
28	4		interrupt	Lectures + Lab	Quiz/Exam
29	4			Lectures + Lab	Quiz/Exam
30	4			Lectures + Lab	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Walter A.Triebel , Avtar Singh, the 8088 and 8086 microprocessors programming, interfacing, software, hardware, and applications, Fourth Edition,2005 Barry B. Brey,the Intel microprocessors, Eight Edition, 2009 B.p. Singh, Renu Singh, Advanced microprocessors and MICROCONTROLLERS, Third Edition,2009 A.P. Godse, D.A. Godse, microprocessors & its applications, 2004

Special requirements (include for example workshops, periodicals, IT software, websites)	Emulator 8086 program
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Logic Circuit
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Electronics Lab II / ECE208
4. Program(s) to which it contributes	Electronics II
5. Modes of Attendance offered	In Laboratory
6. Semester/Year	year
7. Number of hours tuition (total)	2 hours per week, 60 Hour per year
8. Date of production/revision of this specification	5/9/2022

9. Aims of the Course	To understand principles of electronic circuit analysis and synthesis, in which student will be able to implement or analyze different electronics circuits.

10. Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. Transistor and FET electronics devices characteristics will be tested.
A2. AC and DC transistor and FET amplifiers will be applied in practical circuit.
A3. Using transistor and FET devices as a switch will be tested.
A4. Negative Feedback electronic circuits will be connected and tested.

B. Subject-specific skills

B1.the course knowledge can be used to know the basic principles of the work of electronic circuits.
B2.provide main steps to teach students how to build useful electronic circuits as amplifiers and switches devices.

Teaching and Learning Methods

Applying the concept of electronic circuits in practical circuits.

Assessment methods

Exams, reports.

C. Thinking Skills

C1. suggest many different cases and suggest suitable solutions for these issues
C2. group work on issues with real life application
C3. test the students with variety types of questions

Teaching and Learning Methods

Tests, sheets, mini-projects

Assessment methods

Exams, Quizzes and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Diode Clipping and Clamping circuits.	Lab	Quiz/Exam
2	2			Lab	Quiz/Exam
3	2		DC power supply.	Lab	Quiz/Exam
4	2			Lab	Quiz/Exam
5	2		Bipolar Transistor Characteristics And Parameters.	Lab	Quiz/Exam
6	2			Lab	Quiz/Exam
7	2		Transistor As A Switch.	Lab	Quiz/Exam
8	2			Lab	Quiz/Exam
9	2			Lab	Quiz/Exam
10	2		Common Emitter Transistor Amplifiers Design.	Lab	Quiz/Exam
11	2			Lab	Quiz/Exam
12	2			Lab	Quiz/Exam
13	2		Common Collector Amplifier Design.	Lab	Quiz/Exam
14	2			Lab	Quiz/Exam
15	2			Lab	Quiz/Exam
16	2		Common Base Amplifier and Cascade Amplifier	Lab	Quiz/Exam
17	2			Lab	Quiz/Exam
18	2			Lab	Quiz/Exam
19	2		Field Effect Transistor Characteristics.	Lab	Quiz/Exam
20	2			Lab	Quiz/Exam
21	2			Lab	Quiz/Exam
22	2		FET Amplifier Design.	Lab	Quiz/Exam
23	2			Lab	Quiz/Exam
24	2			Lab	Quiz/Exam
25	2		The Operational Amplifier.	Lab	Quiz/Exam
26	2			Lab	Quiz/Exam

27	2			Lab	Quiz/Exam
28	2		Feedback Amplifier.	Lab	Quiz/Exam
29	2			Lab	Quiz/Exam
30	2			Lab	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• Integrated Electronics by Millman and Halkias. • Electronic Circuits by Boylested. “Power Electronics Devices, Circuits, and Applications” by Muhammad H. Rashid, 3rd Edition, 2001.
Special requirements (include for example workshops, periodicals, IT software, websites)	Practical work in laboratory.
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Electronics1 and Circuit1.
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronics and Communication Dept.
3. Course title/code	Communication Laboratory / ECE209
4. Program(s) to which it contributes	-
5. Modes of Attendance offered	In Laboratory
6. Semester/Year	year
7. Number of hours tuition (total)	2 hours per week, 60 Hour per year
8. Date of production/revision of this specification	5/9/2022
	The objective of this course is -To practice the basic theories of types of the filters, Fourier series and

9. Aims of the Course	transmission lines. -To give a specific design problem to the students, which after completion they will verify using the hardware implementation.

10. Learning Outcomes
A1To develop practical knowledge about theories of filters, Fourier series and transmission lines. A2.To provide hands-on experience to the students, so that they are able to apply theoretical concept in practice.

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		RC circuits as LPF-HPF circuits	Lab	Quiz/Exam
2	2			Lab	Quiz/Exam
3	2		RC circuits as integrating and differentiating circuits	Lab	Quiz/Exam
4	2			Lab	Quiz/Exam
5	2			Lab	Quiz/Exam
6	2		Resonance circuits	Lab	Quiz/Exam
7	2			Lab	Quiz/Exam
8	2			Lab	Quiz/Exam
9	2		Frequency selective circuits (passive RC filters)	Lab	Quiz/Exam
10	2			Lab	Quiz/Exam
11	2			Lab	Quiz/Exam
12	2		LC filters (constant-k filters)	Lab	Quiz/Exam
13	2			Lab	Quiz/Exam
14	2			Lab	Quiz/Exam
15	2		LC filters (m-derived filters)	Lab	Quiz/Exam
16	2			Lab	Quiz/Exam
17	2			Lab	Quiz/Exam
18	2		Butterworth and Chebyshev passive filters	Lab	Quiz/Exam
19	2			Lab	Quiz/Exam

20	2			Lab	Quiz/Exam
21	2		Active filters	Lab	Quiz/Exam
22	2			Lab	Quiz/Exam
23	2			Lab	Quiz/Exam
24	2		Fourier Series	Lab	Quiz/Exam
25	2			Lab	Quiz/Exam
26	2			Lab	Quiz/Exam
27	2		Transmission lines	Lab	Quiz/Exam
28	2			Lab	Quiz/Exam
29	2			Lab	Quiz/Exam
30	2			Lab	Quiz/Exam

THIRD YEAR

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Digital Systems Design / ECE301
4. Program(s) to which it contributes	Logic Circuits
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	The purpose of the course is to acquaint the students the principles of logic circuit analysis, design and implementation. This Includes both combinational and sequential circuit.

10. Learning Outcomes, Teaching, Learning and Assessment Method

Knowledge and Understanding

A1. Identify logic circuit types
A2. Analysis and simplification of different logic circuits.
A3. Design and Implementation of digital systems.
A4. Identify different Logic families.

B. Subject-specific skills

B1.the course knowledge can be used to know the principles of the work of digital circuits.
B2.provide main steps to teach students how to build useful digital electronic circuits such as multiplier and digital control circuits.

Teaching and Learning Methods

Lectures, homework, in class discussion, and self-learning through mini-projects.

Assessment methods

Exams, quizzes, homework, and mini-project evaluation.

C. Thinking Skills

C1. Students suggest problems then they solving them through mini-projects. C2. In class discussions and reasoning .

Teaching and Learning Methods

Lectures, homework, in class discussion, and self-learning through mini-projects.

Assessment methods

Exams, quizzes, homework, and mini-project evaluation.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through references such as internet, and books D2.Knowledge exchange between students themselves.

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11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Digital system in general and Digital system basic components	Lectures	Quiz/Exam
2	3			Lectures	Quiz/Exam
3	3		Combinational circuits	Lectures	Quiz/Exam
4	3			Lectures	Quiz/Exam
5	3			Lectures	Quiz/Exam
6	3			Lectures	Quiz/Exam
7	3		Sequential synchronous circuits	Lectures	Quiz/Exam
8	3			Lectures	Quiz/Exam
9	3			Lectures	Quiz/Exam
10	3			Lectures	Quiz/Exam
11	3			Lectures	Quiz/Exam
12	3			Lectures	Quiz/Exam
13	3			Lectures	Quiz/Exam
14	3			Lectures	Quiz/Exam
15	3			Lectures	Quiz/Exam
16	3		Algorithmic state machines	Lectures	Quiz/Exam
17	3			Lectures	Quiz/Exam
18	3			Lectures	Quiz/Exam
19	3			Lectures	Quiz/Exam
20	3		Sequential asynchronous circuits	Lectures	Quiz/Exam
21	3			Lectures	Quiz/Exam
22	3			Lectures	Quiz/Exam
23	3			Lectures	Quiz/Exam
24	3			Lectures	Quiz/Exam
25	3			Lectures	Quiz/Exam
26	3			Lectures	Quiz/Exam
28	3			Lectures	Quiz/Exam
28	3		Logic families	Lectures	Quiz/Exam
29	3		Mini-projects	Seminars	Benchmark
30	3			Seminars	Benchmark

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	DIGITAL DESIGN by M.Morris Mano Internet
Special requirements (include for example workshops, periodicals, IT software, websites)	National Instruments simulation program (Multisim)
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Logic Circuits
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering

2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Engineering Analysis / ECE302
4. Program(s) to which it contributes	Mathematics, Communication, DSP
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	This purpose of this course is to provide students with more advanced engineering mathematical topics and relevant mathematical tools required in the analysis and solution of problems in applied engineering and scientific professions.

10. Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. Laplace Transform and its applications.
A2. Solution of differential equations .
A3. The Z-transform and its applications.
A4. Linear algebra.

B. Subject-specific skills

B1.the course knowledge can be used to communications, control engineering, and DSP.

Teaching and Learning Methods

Lectures. Sheets and solutions of questions. Discussion of several issues together.
Assessment methods
Exams, homework, questions and answers in lectures
C. Thinking Skills
C1. suggest different problems and their suitable solutions. C2. group work on issues with applied scientific application C3. test the students with variety types of questions
Teaching and Learning Methods
Tests and homework
Assessment methods
Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.
D. General and Transferable Skills (other skills relevant to employability and personal development)
D1.Search through resources and books D2.Search through internet

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		2nd-order linear differential equations	Lectures	Quiz/Exam
2	3		Variation of parameters method	Lectures	Quiz/Exam
3	3		Simultaneous differential equations	Lectures	Quiz/Exam
4	3		Related applications of differential equations	Lectures	Quiz/Exam
5	3		Euler-Cauchy differential equations	Lectures	Quiz/Exam
6	3		Further Examples	Lectures	Quiz/Exam
7	3		Series solution of differential equations	Lectures	Quiz/Exam
8	3		Differential equations with ordinary point	Lectures	Quiz/Exam
9	3		Frobenius method	Lectures	Quiz/Exam

10	3		Partial differential equations	Lectures	Quiz/Exam
11	3		Formation of partial differential equations	Lectures	Quiz/Exam
12	3		Formation of partial differential equations	Lectures	Quiz/Exam
13	3		Solution of partial differential equations	Lectures	Quiz/Exam
14	3		Laplace transform	Lectures	Quiz/Exam
15	3		Properties of the Laplace transform	Lectures	Quiz/Exam
16	3		Initial value problems	Lectures	Quiz/Exam
17	3		Properties of the Laplace transform	Lectures	Quiz/Exam
18	3		Properties of the Laplace transform	Lectures	Quiz/Exam
19	3		Inverse Laplace transform – partial fraction expansion	Lectures	Quiz/Exam
20	3		Laplace transform of periodic functions	Lectures	Quiz/Exam
21	3		Laplace transform – convolution	Lectures	Quiz/Exam
22	3		Applications of Laplace transform	Lectures	Quiz/Exam
23	3		The Z-transform	Lectures	Quiz/Exam
24	3		Properties of the Z-transform	Lectures	Quiz/Exam
25	3		Inverse Z-transform	Lectures	Quiz/Exam
26	3		Pulse transfer function	Lectures	Quiz/Exam
27	3		Matrices	Lectures	Quiz/Exam
28	3		Basic theorems of matrices	Lectures	Quiz/Exam
29	3		Solution of algebraic equations	Lectures	Quiz/Exam
30	3		Characteristic value problems	Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• "Advanced Engineering Mathematics" by C.R. Wylie, 5th edition, 1982. • "Advanced Engineering Mathematics" by Erwin Kreyszig, 9th edition, 2006. • "Advanced Engineering Mathematics" by H.K. Daas, 1st edition, 2013.
Special requirements (include for example workshops, periodicals, IT software, websites)	none

Community-based facilities (include for example, guest Lectures , internship , field studies)	none

13. Admissions	
Pre-requisites	Mathematics I, Mathematics II
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Centre	Electronic and Communication Engineering Department
3. Course title/code	Probability and Statistics / ECE303
4. Program(s) to which it contributes	Digital communications
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	2 hours per week, 60 Hour per year
8. Date of production/revision of this specification	5/9/2022

9. Aims of the Course
The objective of the course is to provide comprehensive theoretical concepts and practical tools of the probability theory and mathematical statistics that are effectively used in science and engineering.

10· Learning Outcomes, Teaching, Learning and Assessment Method.
A- Knowledge and Understanding A1. Basic probability axioms, continuous and discrete random variables. A2. How to derive the probability density function, marginal and conditional. A3. Discrete and continuous distributions. A4. Moment generating function. A5. Central limit theorem. A6. Estimation.
B. Subject-specific skills B1. Study, correctly apply and interpret statistical methods. B2. Course knowledge can be used in population surveys. B3. knowledge can be used in surveys, quality control and market research.
Teaching and Learning Methods
Lectures, discussion, case studies, completion of tutorial and practice questions.
Assessment methods
Written exam, in lecture review questions on topics completed.

C. Thinking Skills C1. Modeling C2. Problem solving C3. General analysis assimilation .
Teaching and Learning Methods
Class discussion and in lecture review questions
Assessment methods
Exams, homework, questions and answers in lectures
D1. Search through resources and books

11. Course Structure

				Teaching	Assessment
Week	Hours	ILOs	Unit/Module or Topic Title	Method	Method
1	2		Events; operation with events	Lectures	Quiz/Exam
2	2		Counting of sampling points	Lectures	Quiz/Exam
3	2		Probability laws	Lectures	Quiz/Exam
4	2		Bayes' Theorem	Lectures	Quiz/Exam
5	2		Random variables; discrete and continuous	Lectures	Quiz/Exam
6	2		Joint probability distribution	Lectures	Quiz/Exam
7	2		Expectation and variance	Lectures	Quiz/Exam
8	2		Laws of Expectation and variance	Lectures	Quiz/Exam
9	2		Chebyshev's Theorem	Lectures	Quiz/Exam
10	2		Uniform distribution	Lectures	Quiz/Exam
11	2		Binomial distribution	Lectures	Quiz/Exam
12	2		Hypergeometric distribution	Lectures	Quiz/Exam
13	2		Poisson distribution	Lectures	Quiz/Exam
14	2		Negative binomial	Lectures	Quiz/Exam
15	2		Geometric distribution	Lectures	Quiz/Exam
16	2		Normal distribution	Lectures	Quiz/Exam
17	2		Binomial approximation to the Normal	Lectures	Quiz/Exam
			Gamma, Exponential and Chi-		

18	2	Lectures	Quiz/Exam	square distribution,	
19	2	Weibull distribution	Lectures	Quiz/Exam	
20	2	Functions of random variables		Lectures	Quiz/Exam
21	2	Random sampling	Lectures	Quiz/Exam	
22	2	Sampling Theorem	Lectures	Quiz/Exam	
23	2	Sampling distribution of means		Lectures	Quiz/Exam
24	2	Sampling distribution of (n-1) Lectures	Quiz/Exam	s^2/σ^2	
25	2	T-distribution and F-distribution		Lectures	Quiz/Exam
26	2	Estimation of the mean	Lectures	Quiz/Exam	
27	2	Estimating the variance	Lectures	Quiz/Exam	
28	2	Statistical Hypothesis: type I and Lectures	Quiz/Exam	type II errors	
29	2	Concepts of random process	Lectures	Quiz/Exam	
30	2	Classification of random process		Lectures	Quiz/Exam

12. Infrastructure

Required reading:

· CORE TEXTS — Probability and statistics for engineers and scientists by Walpole, Myers, and Ye

· COURSE MATERIALS

· OTHER

Special requirements (include for example workshops, periodicals, IT software, websites)

Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	Mathematics I, Mathematics II
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Antennas and Propagation / ECE304
4. Program(s) to which it contributes	Microwaves, Digital Communications
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	3 hours per week, 60 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	This course aims to help the students understanding the basics of electromagnetic wave propagation through different types of media. In addition, the course includes a details description of the Antenna theory and applications. By the end of this course, the student should be able to analyze the propagation of a plane wave through any medium. The student should also be able to design simple antennas, and choose the appropriate antenna for any application.

10. Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. Propagation of electromagnetic waves will be studied thoroughly. A2. The students will be introduced to the reflection and refraction of electromagnetic waves.
A3. Theoretical analysis of radiation structures will be introduced.
A4. The basic types of antennas and their salient features will be studied.

B. Subject-specific skills

B1.the course knowledge can be applied to the basic design of digital and analog communication systems.
B2.The students will use the skills they obtained in this course to choose the appropriate antenna for any specific application.

Teaching and Learning Methods

Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, homework, questions and answers in lectures

C. Thinking Skills

C1. Incorporating the physical knowledge of EM propagation when considering any solution that incorporates wireless technology. C2. group work on issues with real life application

Teaching and Learning Methods

Tests, sheets, mini-projects

Assessment methods

Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		- Introduction to Antennas and Propagation. - A review of Static Fields. Time-varying Electromagnetic Fields and Maxwell's Equations.	Lectures	Quiz/Exam
2	3			Lectures	Quiz/Exam
3	3			Lectures	Quiz/Exam
4	3			Lectures	Quiz/Exam
5	3		- The Uniform Plane Wave	Lectures	Quiz/Exam
6	3			Lectures	Quiz/Exam
7	3			Lectures	Quiz/Exam
8	3			Lectures	Quiz/Exam
9	3			Lectures	Quiz/Exam
10	3		- Plane Waves at Boundaries and Dispersive Media	Lectures	Quiz/Exam
11	3			Lectures	Quiz/Exam
12	3			Lectures	Quiz/Exam
13	3			Lectures	Quiz/Exam
14	3			Lectures	Quiz/Exam
15	3			Lectures	Quiz/Exam
16	3		- Fundamental Parameters of Antennas	Lectures	Quiz/Exam
17	3			Lectures	Quiz/Exam
18	3			Lectures	Quiz/Exam
19	3		- Radiation Integrals and Auxiliary Potential Functions	Lectures	Quiz/Exam
20	3			Lectures	Quiz/Exam
21	3		- Linear Wire Antennas	Lectures	Quiz/Exam
22	3			Lectures	Quiz/Exam
23	3		- Loop Antennas	Lectures	Quiz/Exam
24	3			Lectures	Quiz/Exam
25	3		- Array Antennas	Lectures	Quiz/Exam
26	3			Lectures	Quiz/Exam
27	3		- Propagation in Ionosphere	Lectures	Quiz/Exam
28	3			Lectures	Quiz/Exam
29	3		- Line of Sight Transmission	Lectures	Quiz/Exam
30	3			Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• Hayt, William Hart, and John A. Buck. *Engineering Electromagnetics*. Vol. 6. New York: McGraw-Hill, 2001.
	• Constantine, A. Balanis. *Antenna Theory: Analysis and Design*, third edition, John Wiley and sons, 2005. • Stutzman, Warren L., and Gary A. Thiele. *Antenna Theory and Design*. John Wiley and Sons, 2013. • Kraus, John D. *Antennas*, 1988.
Special requirements (include for example workshops, periodicals, IT software, websites)	Simulation programs (CST)
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Mathematics I and II, Electromagnetic Fields
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department

3. Course title/code	Communication Theory II / ECE305
4. Program(s) to which it contributes	Digital communication, Computer Networks.
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	4 hours per week, 120 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	The objective of this course is to study introduction of communication system, system and signal analysis, analogy signal transmission, noise in analogy communication system, sampling and pulse code modulation.

10. Learning Outcomes, Teaching,Learning and Assessment Method
Knowledge and Understanding
A1.Classification of signals and system. A2. Types of analogy modulation. A3Noise in analogy communication. A4. Sampling and Pulse modulation.
B. Subject-specific skills
B1.the course knowledge can be used to design an analogy communication system. B2.provide main steps to teach students how to minimize noise in analogy communication system.
Teaching and Learning Methods
Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.
Assessment methods
Exams, homework, questions and answers in lectures
C. Thinking Skills
C1. suggest many different cases and suggest suitable solutions for these issues C2.group work on issues with real life application C3.test the students with variety types of questions
Teaching and Learning Methods
Tests, sheets, mini-projects
Assessment methods
Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.
D. General and Transferable Skills (other skills relevant to employability and personal development)
D1.Search through resources and books D2.Search through internet and papers

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11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4		System Response: impulse response, step response, and Time domain analysis	Lectures	Quiz/Exam
2	4		Real and Ideal filter: transfer function and frequency domain analysis	Lectures	Quiz/Exam
3	4		Normal AM	Lectures	Quiz/Exam
4	4			Lectures	Quiz/Exam
5	4		Double Side Band (DSB)	Lectures	Quiz/Exam
6	4			Lectures	Quiz/Exam
7	4		Single Side Band (SSB)	Lectures	Quiz/Exam
8	4			Lectures	Quiz/Exam
9	4		Vestigial Side Band (VSB)	Lectures	Quiz/Exam
10	4			Lectures	Quiz/Exam
11	4		Frequency Modulation: FM Generation (Direct and Indirect Method)	Lectures	Quiz/Exam
12	4			Lectures	Quiz/Exam
13	4		FM Detection	Lectures	Quiz/Exam
14	4		Frequency Division Multiplexing (FDM).	Lectures	Quiz/Exam
15	4		Noise Figure	Lectures	Quiz/Exam
16	4		Noise in AM System	Lectures	Quiz/Exam
17	4			Lectures	Quiz/Exam
18	4		Noise in FM System	Lectures	Quiz/Exam
19	4			Lectures	Quiz/Exam
20	4		The Sampling Theorem	Lectures	Quiz/Exam
21	4			Lectures	Quiz/Exam
22	4		Pulse Code Modulation (PCM)	Lectures	Quiz/Exam
23	4			Lectures	Quiz/Exam
24	4		Differential Pulse Code Modulation (DPCM)	Lectures	Quiz/Exam
25	4			Lectures	Quiz/Exam
26	4		Delta Modulation (DM)	Lectures	Quiz/Exam
27	4			Lectures	Quiz/Exam
28	4		Time Division Multiplexing (TDM).	Lectures	Quiz/Exam
29	4		Amplitude Shift Keying (ASK),	Lectures	Quiz/Exam

30	4		Frequency Shift Keying (FSK); Phase Shift Keying (PSK),	Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Digital& Analog Communication Systems, K-SAM Shanmugam. Modern Digital & Analog Communication Systems, B.P.Lathi. Digital Communications, Bernard Sklar. Communication Systems, A.Bruce Carlson
Special requirements (include for example workshops, periodicals, IT software, websites)	Simulation programs (Matlab.)
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Communication I, Mathematics I, Mathematics II.
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department

3. Course title/code	Electronics III / ECE306
4. Program(s) to which it contributes	Electronics I and Electronics II
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	4 hours per week, 120 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	To understand principles of electronic circuit analysis and synthesis, in which student will be able to implement or analyze different electronics circuits.

10. Learning Outcomes, Teaching, Learning and Assessment Method
A. Knowledge and Understanding
A1. Power amplifiers, difference amplifier and operational amplifier will be studied. A2. Oscillator circuits and amplifiers frequency response will be studied A3. Different multivibrator types will be studied. A4. Digital electronic families and circuits, ADC and DAC circuits will be studied.
B. Subject-specific skills

B1.the course knowledge can be used to know the work of different electronic systems.
B2.provide main steps to teach students how to build useful electronic systems such as operational amplifiers and oscillators circuits.

Teaching and Learning Methods

Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, homework, questions and answers in lectures

C. Thinking Skills

C1. suggest many different cases and suggest suitable solutions for these issues
C2. group work on issues with real life application
C3. test the students with variety types of questions

Teaching and Learning Methods

Tests, sheets, mini-projects

Assessment methods

Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4		Class-A power amplifier	Lectures	Quiz/Exam
2	4		Class-B power amplifier	Lectures	Quiz/Exam
3	4		Class-AB power amplifier	Lectures	Quiz/Exam
4	4		Class-C power amplifier	Lectures	Quiz/Exam

5	4		Difference amplifier basic circuit	Lectures	Quiz/Exam
6	4		Difference amplifier with constant current source	Lectures	Quiz/Exam
7	4		Difference amplifier using FET	Lectures	Quiz/Exam
8	4		Difference amplifier using Darlington	Lectures	Quiz/Exam
9	4		Difference amplifier using current repeater	Lectures	Quiz/Exam
10	4		DC level shifter	Lectures	Quiz/Exam
11	4		Operational amplifier circuit	Lectures	Quiz/Exam
12	4		Operational amplifier applications, inverter and non- inverter	Lectures	Quiz/Exam
13	4		Operational amplifier adder and subtracter.	Lectures	Quiz/Exam
14	4		Operational amplifier clipping and rectifier circuits	Lectures	Quiz/Exam
15	4		Operational amplifier control circuit	Lectures	Quiz/Exam
16	4		Low frequency response	Lectures	Quiz/Exam
17	4		High frequency response transistor model	Lectures	Quiz/Exam
18	4		High frequency response for CE transistor	Lectures	Quiz/Exam
19	4		High frequency response for CB transistor	Lectures	Quiz/Exam
20	4		High frequency response for CC transistor	Lectures	Quiz/Exam
21	4		High frequency response for CS FET	Lectures	Quiz/Exam
22	4		High frequency response for CD FET	Lectures	Quiz/Exam
23	4		Phase shift oscillator, transistor, FET and Op-amp circuits	Lectures	Quiz/Exam
24	4		Wien bridge oscillator and general form oscillator	Lectures	Quiz/Exam
25	4		Tuned circuit oscillator and crystal oscillator	Lectures	Quiz/Exam
26	4		Bistable multivibrator	Lectures	Quiz/Exam
27	4		Monostable multivibrator	Lectures	Quiz/Exam
28	4		Astable multivibrator	Lectures	Quiz/Exam
29	4		Digital logic families	Lectures	Quiz/Exam
30	4		Encoder, decoder, multiplexer and demultiplexer, ROM, A/D and D/A converters.	Lectures	Quiz/Exam

12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• **Microelectronics Digital and analog circuits and systems by Jacob Millman.** • **Electronic Circuits Discrete and integrated by Schilling.**
Special requirements (include for example workshops, periodicals, IT software, websites)	Practical work in laboratory and simulation programs (multisim)
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Electronics1 and 2.
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad-College of Engineering
2. University Department/Center	Electronics and Communication Dept.

3. Course title/code	Power Electronics / ECE307
4. Program(s) to which it contributes	Electronics I, Electronics II
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	2 hours per week, 60 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	To understand and apply advanced concepts and applications of power electronics analysis and synthesis, in which student will be able to implement or analyze different power electronics circuits.

10. Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. Several Power electronics devices will be studied briefly.
A2. AC–DC converter circuit will be studied and discussed.
A3. The students will be familiar with DC-DC chopper and DC-AC inverters.
A4. Some power electronics applications.

B. Subject-specific skills

B1.the course knowledge can be used to power electronic circuits.
B2.provide main steps to teach students how to build useful devices such as power supplies, inverters, choppers and other devices.

Teaching and Learning Methods

Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.
Assessment methods
Exams, homework, questions and answers in lectures
C. Thinking Skills
C1. suggest many different cases and suggest suitable solutions for these issues C2. group work on issues with real life application C3. test the students with variety types of questions
Teaching and Learning Methods
Tests, sheets, mini-projects
Assessment methods
Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.
D. General and Transferable Skills (other skills relevant to employability and personal development)
D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Introduction: Definition, History, Applications and Trends of Power electronics. Power Electronics Devices and their Characteristics: (Diode, Transistor, Thyristor, DIAC, TRIAC, MOSFET, IGBT, GTO, MCT). Gating Requirements; Methods of Switching ON and OFF.	Lectures	Quiz/Exam
2	2			Lectures	Quiz/Exam
3	2			Lectures	Quiz/Exam
4	2			Lectures	Quiz/Exam
5	2		Types of Firing Circuits. Thyristor Cooling.	Lectures	Quiz/Exam
6	2			Lectures	Quiz/Exam
7	2			Lectures	Quiz/Exam

8	2		Converters: Single Phase; Two Phase; Three Phase; Free Wheeling Diode.	Lectures	Quiz/Exam
9	2			Lectures	Quiz/Exam
10	2			Lectures	Quiz/Exam
11	2		Overlap Angle: General Equation of uncontrolled and fully Controlled Converter	Lectures	Quiz/Exam
12	2			Lectures	Quiz/Exam
13	2			Lectures	Quiz/Exam
14	2		Inverters: Force Communicated; Line Communication Overlap Circuits; Single Phase Bridge; Three Phase Bridge.	Lectures	Quiz/Exam
15	2			Lectures	Quiz/Exam
16	2			Lectures	Quiz/Exam
17	2			Lectures	Quiz/Exam
18	2		Pulse Width Modulation.	Lectures	Quiz/Exam
19	2			Lectures	Quiz/Exam
20	2		D.C – D.C Chopper.	Lectures	Quiz/Exam
21	2			Lectures	Quiz/Exam
22	2		Cycloconverter.	Lectures	Quiz/Exam
23	2			Lectures	Quiz/Exam
24	2		Harmonics in Converter: Methods of Reducing Harmonics.	Lectures	Quiz/Exam
25	2			Lectures	Quiz/Exam
26	2			Lectures	Quiz/Exam
27	2			Lectures	Quiz/Exam
28	2		Applications of Thyristors.	Lectures	Quiz/Exam
29	2			Lectures	Quiz/Exam
30	2			Lectures	Quiz/Exam

12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• "Power Electronics" by Cyril Lander, 3rd edition, 1993. • "Power Electronics Handbook, Devices, Circuits, and Applications" by Muhammad H. Rashid, 3rd Edition, 2011. • "Power Electronics Devices, Circuits, and Applications" by Muhammad H. Rashid, 3rd Edition, 2001.
Special requirements (include for example workshops, periodicals, IT software, websites)	Simulation programs (multisim)

Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Electronics1, 2, Energy Conversion and Electric Circuit1 and 2.
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Control Theory / ECE308
4. Program(s) to which it contributes	Mathematics, Electrical, Communication, control systems,
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	5/9/2022
	Learning different control theories and

9. Aims of the Course	their applications in different control systems

10. Learning Outcomes, Teaching, Learning and Assessment Method
A. Knowledge and Understanding
A1. Identify control engineering. A2. Mathematical representation of component and system of linear automatic control. A3. Block diagram and Block diagram Reduction.-Laplace Transform- Time domain analysis response- Frequency domain analysis response. A4. Stability analysis-Routh Hurwitz stability- Root locus- Bode Diagram- Polar Plots- Nyquist stability- compensators. A5. Nonlinear control system- Discrete time control system- Z –transfrom- Time response of sampled data control system..
B. Subject-specific skills
B1. The course knowledge can be used in control engineering, electrical engineering, communication, mechanical engineering.
Teaching and Learning Methods
Lectures, homework, Sheets and solutions of questions , and self-learning through mini projects.
Assessment methods
Exams, quizzes, homework, questions and answers in lectures ,and mini project evaluation.
C. Thinking Skills
C1. Suggest different problems and their suitable solutions. C2. group work on issues with applied scientific application C3. Test the students with variety types of questions C4. Students suggest problems then solving them through mini projects.
Teaching and Learning Methods
Exams, quizzes, homework, and mini project evaluation.

Assessment methods
Exams, quizzes, homework, and mini project evaluation.
D. General and Transferable Skills (other skills relevant to employability and personal development)
D1.Search through references such as internet, and books D2.Knowledge exchange between students themselves.

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Introduction to control Engineering	Lectures	Quiz/Exam
2	3		Mathematical representation of component and system of linear automatic control	Lectures	Quiz/Exam
3	3		Block diagram and Block diagram	Lectures	Quiz/Exam
4	3		Block diagram and Block diagram	Lectures	Quiz/Exam
5	3		Laplace Transform	Lectures	Quiz/Exam
6	3		Inverse Laplace Transform	Lectures	Quiz/Exam
7	3		Time domain analysis response	Lectures	Quiz/Exam
8	3		Time domain analysis response	Lectures	Quiz/Exam
9	3		Frequency domain analysis response-	Lectures	Quiz/Exam
10	3		Frequency domain analysis response-	Lectures	Quiz/Exam
11	3		Stability analysis	Lectures	Quiz/Exam
12	3		Routh Hurwitz stability	Lectures	Quiz/Exam
13	3		Root locus	Lectures	Quiz/Exam
14	3		Root locus	Lectures	Quiz/Exam
15	3		Bode Diagram	Lectures	Quiz/Exam
16	3		Bode Diagram	Lectures	Quiz/Exam
17	3		Polar plots	Lectures	Quiz/Exam
18	3			Lectures	Quiz/Exam
19	3		Nyquist stability	Lectures	Quiz/Exam
20	3			Lectures	Quiz/Exam
21	3		Lag compensator	Lectures	Quiz/Exam
22	3		lead compensator	Lectures	Quiz/Exam
23	3		lag-lead compensator	Lectures	Quiz/Exam
24	3		Nonlinear control system	Lectures	Quiz/Exam
25	3		Discrete time control system	Lectures	Quiz/Exam

26	3		Z –Transform	Lectures	Quiz/Exam
27	3		Time response of sampled data control system.	Lectures	Quiz/Exam
28	3		Stability in the sampled data control system	Lectures	Quiz/Exam
29	3		Analog & Digital simulation	Lectures	Quiz/Exam
30	3		Mini Project	Seminar	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• "Modern Control engineering" by katsuhiko Ogata, 5th edition. • Internet
Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Electrical and Mechanical principle, Mathematics II
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Electronics and Communications Laboratory / ECE309
4. Program(s) to which it contributes	Electronic III
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	This lab is intended to supplement, in a practical way, the material that learnt in Electronics and communication. They are due at the beginning of each lab. Make a copy of the pre-lab so that it could be reefed to it during the experiment Lab Reports. Each student will write a Lab Report for each experiment.

10. Learning Outcomes, Teaching, Learning and Assessment Method

Knowledge and Understanding

A1. Understand and design different experiments in communication system including active RC filters nonlinear circuits, sampling, and analog and digital modulation.
A2. Analyze the obtained data.
A3. Writing reports about the experiments. A4.
Discussing the results.

B. Subject-specific skills

B1. Supplement, in a practical way, the material that learnt in Electronics and communication.

Teaching and Learning Methods

1- lab experiments 2-
Writing reports.
3- Homework and Assignments.

Assessment methods

1- Tests and Exams.
2- In-Lab Questions and Discussions.

C. Thinking Skills

C1. Modeling
C2. Problem solving
C3. General analysis assimilation

Teaching and Learning Methods

Class discussion and in lecture review questions

Assessment methods

Exams, quizzes, homework, and mini-project evaluation.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Search through resources and books

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11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Low pass active RC filters	Lab	Quiz/report
2	3		high pass active RC filters	Lab	Quiz/report
3	3		Band pass active RC filters	Lab	Quiz/report
4	3		Limiters	Lab	Quiz/report
5	3		Comparators	Lab	Quiz/report
6	3		Schmitt triggers	Lab	Quiz/report
7	3		Written Mid-term exam	Lab	Quiz/report
8	3		Practical Mid-term exam	Lab	Quiz/report
9	3		AM modulation	Lab	Quiz/report
10	3		AM demodulation	Lab	Quiz/report
11	3		Sampling technique 1	Lab	Quiz/report
12	3		Sampling technique (reconstruction)	Lab	Quiz/report
13	3		Oscillator 1	Lab	Quiz/report
14	3		Oscillator 2	Lab	Quiz/report
15	3		Written term exam	Lab	Quiz/report
16	3		Practical term exam	Lab	Quiz/report
17	3		FM generation	Lab	Quiz/report
18	3		FM demodulation part1	Lab	Quiz/report
19	3		FM demodulation part2	Lab	Quiz/report
20	3		Astable Multivibator	Lab	Quiz/report
21	3		Bistable Multivibrator	Lab	Quiz/report
22	3		Monostable Multivibrator	Lab	Quiz/report
23	3		Written mid-term exam	Lab	Quiz/report
24	3		Practical mid-term exam	Lab	Quiz/report

25	3		Amplitude shift keying	Lab	Quiz/report
26	3		Amplitude shift keying demodulation	Lab	Quiz/report
27	3		Phase shift keying	Lab	Quiz/report
28	3		Phase shift keying demodulation	Lab	Quiz/report
29	3		Frequency shift keying	Lab	Quiz/report
30	3		Frequency shift keying demodulation	Lab	Quiz/report

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Modern digital and analog communication systems by Lathi electronic devices and circuits by bogart
Special requirements (include for example workshops, periodicals, IT software, websites)	Electronic devices and components (Oscilloscopes, function generators, DCsupplies)
Community-based facilities (include for example, guest Lectures , internship , field studies)	None
13. Admissions	
Pre-requisites	Analog Electronics, Electronics lab 1, 2
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Computer Aided Design / ECE310
4. Program(s) to which it contributes	Mathematics, Electrical, Communication, control systems,
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	2 hours per week, 60 Hour per year
8. Date of production/revision of this specification	5/9/2022
9. Aims of the Course	Learning Matlab programming and using it for solving different problems in control and communication systems

10. Learning Outcomes, Teaching, Learning and Assessment Method
A. Knowledge and Understanding

A1. Learning MatLab programming.
A2. Using MatLab to solve Time domain analysis response and Frequency domain analysis response.
A3. AM Modulation and Demodulation using MatLab.
A4. Identify Frequency Response Analysis by using MatLab.

B. Subject-specific skills

B1. The course knowledge can be used in control engineering, electrical engineering, communication, mechanical engineering.

Teaching and Learning Methods

Lectures, homework, Sheets and solutions of questions, and self-learning through mini projects .

Assessment methods

Exams, quizzes, homework, questions and answers in lectures ,and mini project evaluation.

C. Thinking Skills

C1. Suggest different problems and their suitable solutions. C2. Group work on issues with applied scientific application C3. Test the students with variety types of questions.

Teaching and Learning Methods

Exams, quizzes, homework, and mini project evaluation.

Assessment methods

Exams, quizzes, homework, and mini project evaluation.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through references such as internet, and books D2.Knowledge exchange between students themselves.

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Overview of the MatLab Environment	Lectures	Quiz/Exam
2	2			Lectures	Quiz/Exam
3	2		Variables and Arrays	Lectures	Quiz/Exam
4	2			Lectures	Quiz/Exam
5	2		Loops, Decision, and Flow Control	Lectures	Quiz/Exam
6	2			Lectures	Quiz/Exam
7	2		Graphics and Data Visualization	Lectures	Quiz/Exam
8	2			Lectures	Quiz/Exam
9	2		More on Matrices	Lectures	Quiz/Exam
10	2			Lectures	Quiz/Exam
11	2		Function M-File	Lectures	Quiz/Exam
12	2			Lectures	Quiz/Exam
13	2		Numerical Analysis [Newton's and trapezoidal rule]	Lectures	Quiz/Exam
14	2			Lectures	Quiz/Exam
15	2		Sampling Theorem	Lectures	Quiz/Exam
16	2			Lectures	Quiz/Exam
17	2		Introduction to SimuLink	Lectures	Quiz/Exam
18	2			Lectures	Quiz/Exam
19	2		AM Modulation and Demodulation	Lectures	Quiz/Exam
20	2			Lectures	Quiz/Exam
21	2		Time Domain Analysis of Control Systems	Lectures	Quiz/Exam
22	2			Lectures	Quiz/Exam
23	2			Lectures	Quiz/Exam
24	2		Position and Speed Control Systems	Lectures	Quiz/Exam
25	2			Lectures	Quiz/Exam
26	2			Lectures	Quiz/Exam
27	2		Root Locus Design Graphical User Interface (GUI)	Lectures	Quiz/Exam
28	2			Lectures	Quiz/Exam
29	2		Frequency Response Analysis	Lectures	Quiz/Exam
30	2			Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• " MATLAB, An Introduction With Applications " by AMOS GILAT , 5th edition. • Internet
Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Electrical and Mechanical principle, Mathematics II, Communication II, programming.
Minimum number of students	8
Maximum number of students	35

FOURTH YEAR

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Microwaves / ECE402
4. Program(s) to which it contributes	-
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	2 hours per week, 60 Hour per year
8. Date of production/revision of this specification	1/Nov/2020
9. Aims of the Course	This course aims to help the students understanding the basics of Microwave theory and techniques. It also intends to introduce the applications of Microwave Engineering in the modern communication and radar systems. By the end of this course, the students should be able to understand basic Microwave electromagnetic structures, analyze Microwave networks, and design simple passive and active Microwave components.

10. Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. Basic principles of Microwave Engineering will be covered.
A2. The students will be introduced to the basic principles of measurements in the microwave and RF frequency ranges.
A3. Theoretical analysis of microwave circuits will be covered.
A4. Some of the most basic microwave passive and active circuit components will be introduced.

B. Subject-specific skills

B1.the course knowledge can be applied to the basic design of digital and analog communication systems.
B2.The students will use the skills they obtained in this course to complete the design of any system that works in the RF and microwave frequency range.

Teaching and Learning Methods

Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, homework, questions and answers in lectures

C. Thinking Skills

C1. Considering the propagation characteristics of microwave signals when designing any stage of a communication system. C2. group work on issues with real life application

Teaching and Learning Methods

Tests, sheets, mini-projects

Assessment methods

Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		- Introduction to Microwave Engineering	Lectures	Quiz/Exam
2	2			Lectures	Quiz/Exam
5	2		- Microwave and RF Transmission Lines - The Smith Chart	Lectures	Quiz/Exam
6	2			Lectures	Quiz/Exam
7	2			Lectures	Quiz/Exam
8	2			Lectures	Quiz/Exam
9	2			Lectures	Quiz/Exam
10	2		- Impedance Matching	Lectures	Quiz/Exam
11	2			Lectures	Quiz/Exam
12	2			Lectures	Quiz/Exam
13	2			Lectures	Quiz/Exam
16	2		- Review of Microwave Waveguides	Lectures	Quiz/Exam
17	2			Lectures	Quiz/Exam
19	2		- Microwave Network Analysis	Lectures	Quiz/Exam
20	2			Lectures	Quiz/Exam
21	2		- Microwave Resonators	Lectures	Quiz/Exam
22	2			Lectures	Quiz/Exam
23	2		- Microwave Passive Components	Lectures	Quiz/Exam
24	2			Lectures	Quiz/Exam
25	2		- Microwave Active Components	Lectures	Quiz/Exam
26	2			Lectures	Quiz/Exam
27	2			Lectures	Quiz/Exam
28	2		- Microwave Amplifier and Oscillator Design	Lectures	Quiz/Exam
29	2			Lectures	Quiz/Exam
30	2			Lectures	Quiz/Exam

12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• Pozar, David M. *Microwave engineering*. John Wiley & Sons, 2009. • Pozar, David M. *Microwave and RF Design of Wireless Systems*. Wiley Publishing, 2000. • Collin, Robert E. *Foundations for Microwave Engineering*. John Wiley & Sons, 2007. • White, Joseph F. *High Frequency Techniques: An Introduction to RF and Microwave Design and Computer Simulation*. John Wiley & Sons, 2004.
Special requirements (include for example workshops, periodicals, IT software, websites)	Simulation programs (CST)
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Antennas and Propagation, Electronics III
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This course gives the digital Signal processing to the four-year students.	
1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Digital Signal Processing / ECE403

4. Program(s) to which it contributes	Signals and Systems, Communication I, Communication II, Mathematics I, Mathematics II and Engineering Analysis.
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	1/Nov/2020
9. Aims of the Course	By the end of this course, the student should be familiar with discrete signals and systems and analyzing those systems in either discrete-time or discrete frequency by using various techniques.

10. Learning Outcomes, Teaching, Learning and Assessment Method

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	**3**		Discrete-time signals	Lectures	Quiz/Exam
2	**3**		Discrete-time systems	Lectures	Quiz/Exam
3	**3**			Lectures	Quiz/Exam
4	**3**		Sampling theorem	Lectures	Quiz/Exam
5	**3**			Lectures	Quiz/Exam
6	**3**		Discreet time convolution	Lectures	Quiz/Exam
7	**3**			Lectures	Quiz/Exam

8	**3**		Discrete time correlation	Lectures	Quiz/Exam
9	**3**		Discrete Fourier series	Lectures	Quiz/Exam
10	**3**		Discrete Fourier transform	Lectures	Quiz/Exam
11	**3**			Lectures	Quiz/Exam
12	**3**		Circular convolution	Lectures	Quiz/Exam
13	**3**		Fast Fourier transform	Lectures	Quiz/Exam
14	**3**		Z- transform	Lectures	Quiz/Exam
15	**3**			Lectures	Quiz/Exam
16	**3**		Introduction to digital filtering	Lectures	Quiz/Exam
17	**3**		FIR filtering	Lectures	Quiz/Exam
18	**3**		FIR filtering design using window method	Lectures	Quiz/Exam
19	**3**			Lectures	Quiz/Exam
20	**3**		FIR filtering by sampling	Lectures	Quiz/Exam
21	**3**		Introduction to common analogue filters	Lectures	Quiz/Exam
22	**3**		IIR filters by impulse invariance	Lectures	Quiz/Exam
23	**3**			Lectures	Quiz/Exam
24	**3**		IIR filters by impulse bilinear transformation	Lectures	Quiz/Exam
25	**3**			Lectures	Quiz/Exam
26	**3**		Digital filter realization	Lectures	Quiz/Exam
27	**3**			Lectures	Quiz/Exam
28	**3**			Lectures	Quiz/Exam
29	**3**		DSP applications	Lectures	Quiz/Exam
30	**3**			Lectures	Quiz/Exam

12. Infrastructure		
Required reading: · CORE TEXTS	Digital Signal Proc	John G. Proakis

. COURSE MATERIALS . OTHER	DSP first	James H. McClellan
Special requirements (include for example workshops, periodicals, IT software, websites)	Simulation programs (Matlab.)	
Community-based facilities (include for example, guest Lectures , internship , field studies)	None	

13. Admissions	
Pre-requisites	None
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This course gives the digital communications systems to the four-year students.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Digital Communication / ECE404
4. Program(s) to which it contributes	Communication I, Communication II.
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	4 hours per week, 120 Hour per year
8. Date of production/revision of this specification	1/Nov/2020
9. Aims of the Course	The objective of this course is to study the digital modulation types, synchronization, spread spectrum, satellite communications and mobile communications.

10. Learning Outcomes, Teaching, Learning and Assessment Method

Knowledge and Understanding

A1. Types of digital modulation.
A2. Performance of digital communication system.
A3. The synchronization techniques.
A4. Spread spectrum system.
A5. Satellite communication.
A6. Mobile communication.

B. Subject-specific skills

B1.the course knowledge can be used to design a digital communication system.
B2.provide main steps to teach students how to design satellite system and mobile communication system.

Teaching and Learning Methods

Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, homework, questions and answers in lectures

C. Thinking Skills

C1. suggest many different cases and suggest suitable solutions for these issues
C2. group work on issues with real life application
C3. test the students with variety types of questions

Teaching and Learning Methods

Tests, sheets, mini-projects

Assessment methods

Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4		Introduction to Digital Communication System	Lectures	Quiz/Exam
2	4		Digital Modulation ASK-FSK- PSK-DPSK	Lectures	Quiz/Exam
3	4		Probability of error and optimum threshold level	Lectures	Quiz/Exam
4	4		Performance of digital modulation in presents of noise	Lectures	Quiz/Exam
5	4			Lectures	Quiz/Exam
6	4		Comparison of digital modulation	Lectures	Quiz/Exam
7	4		QPSK-M-ary PSK- QAM - OQPSKπ/4QPSK	Lectures	Quiz/Exam
8	4			Lectures	Quiz/Exam
9	4		MSK- GMSK -MFSK	Lectures	Quiz/Exam
10	4			Lectures	Quiz/Exam
11	4			Lectures	Quiz/Exam
12	4		Synchronization-PLL	Lectures	Quiz/Exam
13	4		Carrier recovery ccts. (square low device-cost as loop- Decision feedback PLL)	Lectures	Quiz/Exam
14	4			Lectures	Quiz/Exam
15	4		Clock recovery methods (Spectral line method- Minimum Mean Square error- Early-Late Gate method)	Lectures	Quiz/Exam
16	4			Lectures	Quiz/Exam
17	4		Introduction To Spread Spectrum, advantages and disadvantages	Lectures	Quiz/Exam
18	4		PN Code, generation & properties.	Lectures	Quiz/Exam
19	4		Spread spectrum types (Direct sequence S.S - Frequency Hopping S.S.)	Lectures	Quiz/Exam
20	4		Introduction to satellite comm.	Lectures	Quiz/Exam
21	4		Satellite construction	Lectures	Quiz/Exam
22	4		Satellite link deign	Lectures	Quiz/Exam
23	4		Multiplexing (FDM-TDM)	Lectures	Quiz/Exam
24	4		Multiple Access (FDMA – TDMA – CDMA)	Lectures	Quiz/Exam
25	4		Introduction to Mobile Communication - Cellular Structure	Lectures	Quiz/Exam
26	4		GSM Structure	Lectures	Quiz/Exam
27	4		Modulation in GSM	Lectures	Quiz/Exam
28	4		Air Interface of GSM	Lectures	Quiz/Exam
29	4		Introduction to GPRS	Lectures	Quiz/Exam

30	4		Introduction to 3G Mobile system	Lectures	Quiz/Exam

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Computer Networks / ECE405
4. Program(s) to which it contributes	
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	2 hours per week, 60 Hour per year
8. Date of production/revision of this specification	1/Nov/2020
9. Aims of the Course	To make the student acquainted with the essential concepts that are necessary for the after-graduation career of the various subjects in computer networks engineering

10. Learning Outcomes, Teaching, Learning and Assessment Method

Knowledge and Understanding

A1. Several computer networks concepts will be studied briefly.
A2. In details, OSI layers and its protocols and definitions will be introduced and explained.
A3. IPv4 and IPv6 theoretical concepts and mathematical definitions with the practical implementations.
A4. Layer2 design and limitations.

B. Subject-specific skills

B1. The course knowledge can be used to support wide variety of computer networks design problems.
B2. The student will have a big picture regarding the simulation tools to be used for solving the design problems.
B3. Apply these concepts in their practical career to design the IP addressing for small companies to enterprises
B4. Understand the collision concept in the computer networks. Then determine the best protocols to reduce the collision.
B5. Be able to apply different topology to fit the required performance

Teaching and Learning Methods

Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, homework, questions, and answers in lectures

C. Thinking Skills

C1. suggest many different cases and suggest suitable solutions for these issues
C2. group work on issues with real life application
C3. test the students with variety types of questions

Teaching and Learning Methods

Tests, sheets, mini-projects

Assessment methods

Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books
D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Introduction/ Administrative Restrictions. Define Computer Network. Technical Applications of Networks	Lectures	Quiz
2	2		Introduction/ Typical Communication Directions. How is it Work? Network Topology. Classification of Networks.	Lectures	Quiz
3	2		Introduction/ Uses of Computer Networks. Network Hardware.	Lectures	Quiz
4	2		Introduction/ Network Hardware. Network Software.	Lectures	Quiz
5	2		Reference Models/ OSI Reference Model. TCP/IP Model.	Lectures	Quiz
6	2		Reference Models/ OSI Reference Model. TCP/IP Model.	Lectures	Quiz
7	2		Addressing/ How are communication services implemented? What is the Meaning of a Packet?	Lectures	Quiz
8	2		Addressing/ Hardware (Data Link Layer) Addressing. Network Layer.	Lectures	Quiz
9	2		Addressing/ IPv4 Addressing and the Subnetting.	Lectures	Quiz
10	2		Addressing/ IPv4 Addressing and the Subnetting.	Lectures	Quiz
11	2		Addressing/ NAT. IPv6.	Lectures	Quiz
12	2		Addressing/ NAT. IPv6.	Lectures	Quiz

13	2		Internetworking Devices/ Internetworking Devices Repeater	Lectures	Quiz
14	2		Internetworking Devices/ Hub Bridge	Lectures	Quiz
15	2		Internetworking Devices/ Switch	Lectures	Quiz
16	2		Internetworking Devices/	Lectures	Quiz
			Switch		
17	2		Internetworking Devices/ Router Gateway	Lectures	Quiz
18	2		Internetworking Devices/ Router Wireless LAN (AP)	Lectures	Quiz
19	2		Internetworking Devices/ Collision Domain & Broadcast Domain	Lectures	Quiz
20	2		Internetworking Devices/ Collision Domain & Broadcast Domain Ensuring connectivity with ARP.	Lectures	Quiz
21	2		Internetworking Devices/ How the Packets are Traveling?	Lectures	Quiz
22	2		Internetworking Devices/ Virtual LAN Converged Network with VLAN	Lectures	Quiz
23	2		Data Link Layer/ Data Link Layer Design Issues Error Detection and Correction	Lectures	Quiz
24	2		Data Link Layer/ Elementary Data Link Protocols Sliding Window Protocols	Lectures	Quiz
25	2		The Medium Access Control Sublayer/ The Channel Allocation Problem	Lectures	Quiz
26	2		The Medium Access Control Sublayer/ Multiple Access Protocols	Lectures	Quiz
27	2		The Physical Layer/ The Theoretical Basis For Data Communication Guided Transmission Media Wireless Transmission	Lectures	Quiz
28	2		The Physical Layer/ Communication Satellites Digital Modulation And Multiplexing	Lectures	Quiz
29	2		The Physical Layer/ The Public Switched Telephone Network	Lectures	Quiz
30	2		The Physical Layer/ The Mobile Telephone System	Lectures	Quiz

12. Infrastructure	
Required reading: CORE TEXTS	"Computer Networks" by ANDREW S. TANENBAUM, 5th edition, 2011. .
Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest lectures, internship, field studies)	None

13. Admissions	
Pre-requisites	None
Minimum number of students	8
Maximum number of students	35

12. Infrastructure	
	Digital & Analog Communication Systems, K-SAM Shanmugam.

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Digital & Analog Communication Systems, Leon W. Couch. Digital Communications, Bernard Sklar. Satellite Communication, Timothy Pratt & Charles W. Bostian Communication Systems, Marcelo S. Alncar & Valdemar C. da Rocha, Jr. and others.
Special requirements (include for example workshops, periodicals, IT software, websites)	Simulation programs (Matlab.)
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Communication I, Communication II.
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Communication Electronics / ECE406
4. Program(s) to which it contributes	Mathematics, Communication, Electronics,
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	1/Nov/2020
9. Aims of the Course	The purpose of this course is to provide students with more advanced about different types of multiplier circuits, Amplitude modulation techniques, Amplitude Demodulation, Angle Modulation circuits, and Digital Communication circuits.

10. Learning Outcomes, Teaching, Learning and Assessment Method
A. Knowledge and Understanding

A1. Identify different types of multipliers and their applications.
A2. Identify different types of modulation techniques.
A3. Design and implementation of a digital communication system.

B. Subject-specific skills

B1. The course knowledge can be used in communication and electronics, engineering.

Teaching and Learning Methods

Lectures, homework, Sheets and solutions of questions.

Assessment methods

Exams, quizzes, homework, questions and answers in lectures.

C. Thinking Skills

C1. Suggest different problems and their suitable solutions.
C2. group work on issues with applied scientific application.
C3. Test the students with variety types of questions

Teaching and Learning Methods

Exams, quizzes, and homework.

Assessment methods

Exams, quizzes, homework.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through references such as internet, and books D2.Knowledge exchange between students themselves.

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Analogue Multiplier	Lectures	Quiz/Exam
2	3			Lectures	Quiz/Exam
3	3			Lectures	Quiz/Exam
4	3			Lectures	Quiz/Exam
5	3			Lectures	Quiz/Exam
6	3			Lectures	Quiz/Exam
7	3		Amplitude Modulation Techniques	Lectures	Quiz/Exam
8	3			Lectures	Quiz/Exam
9	3			Lectures	Quiz/Exam
10	3			Lectures	Quiz/Exam
11	3			Lectures	Quiz/Exam
12	3			Lectures	Quiz/Exam
13	3			Lectures	Quiz/Exam
14	3		Amplitude Demodulation	Lectures	Quiz/Exam
15	3			Lectures	Quiz/Exam
16	3			Lectures	Quiz/Exam
17	3			Lectures	Quiz/Exam
18	3			Lectures	Quiz/Exam
19	3		Angle Modulation Circuits	Lectures	Quiz/Exam
20	3				
21	3				
22	3				
23	3				
24	3				
25	3				
26	3		Digital Communication Circuits	Lectures	Quiz/Exam
27	3				
28	3				
29	3				
30	3				

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• “Basic Electronic Communication” by R.Blake. • Internet

Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Electrical , communication, and electronic principles, Mathematics II
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department

3. Course title/code	Optical Fiber Communications Systems / ECE407
4. Program(s) to which it contributes	
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	1/Nov/2020
9. Aims of the Course	To understand and apply concepts and applications of optical fiber communications systems, in which student will be able to desing or analyze different optical communication systems with different budget analysis.

10. Learning Outcomes, Teaching, Learning and Assessment Method

Knowledge and Understanding

Understand the principles of optical fiber including its structure and signal degradation propagates through it.

A2. Power and rise time budget will be studied and discussed.
A3. Understand the principles of coherent optical fiber systems.
A4. Understand structure and operation of WDM and DWDM.
A5. Understand laser system structure and operation.

B. Subject-specific skills

- The course knowledge can be used to design and analyze optical fiber communication systems.
- Provide main steps to teach students how to analyze coherent optical fiber communications systems.
- Students will be able to design and analyze electronic circuits used in optical fiber communication systems.

Teaching and Learning Methods

Lectures, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, homework, questions and answers in lectures

C. Thinking Skills

C1. suggest many different cases and suggest suitable solutions for these issues
C2. group work on issues with real life application
C3. test the students with variety types of questions

Teaching and Learning Methods

Tests, sheets, mini-projects

Assessment methods

Exams, Homework, Quizzes, workshop and Evaluation according to the student's answer of suggested problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Parameters of Light Waves; Index of Refraction; Snell's Law; Polarization of Light and Electromagnetic Spectrum.	Lectures	Quiz/Exam
2	2		*Optical Communication System*: Block Diagram of an Optical Communication System; Advantages of Optical Communication System.	Lectures	Quiz/Exam
3	2			Lectures	Quiz/Exam
4	2		*Optical Fiber* : Optical Fiber Structure and its Parameters; Propagation of Light in Optical Fiber; Some Parameters of an Optical Fiber; Types of Optical Fiber; Advantage Types of Optical Fiber.	Lectures	Quiz/Exam
5	2			Lectures	Quiz/Exam
6	2		*Signal Degradation in Optical Fiber* Attenuation; Attenuation Sources: absorption, bending, and mode coupling; calculations and methods of reduction.	Lectures	Quiz/Exam
7	2			Lectures	Quiz/Exam
8	2		*Dispersion in Optical Fiber* Types of Dispersion: intermodal dispersion (material and waveguide), calculations and methods of reduction; Total Fiber Dispersion.	Lectures	Quiz/Exam
9	2			Lectures	Quiz/Exam
10	2		*Optical Transmitters (Light Sources)* Light Emitter and its Performance Characteristics; Light Emitting Diode (LED): principles of operation, characteristics, coupling efficiency, optical and electrical beamwidth. *Laser Diodes* Principles of Operation; Characteristics; Laser Modes; External Quantum Efficiency; Dynamic Response; Frequency Chirp; Noise Sources.	Lectures	Quiz/Exam
11	2			Lectures	Quiz/Exam
12	2			Lectures	Quiz/Exam
13	2		*Optical Receivers (Photodetectors)* Photodetector Operation; Characteristics; Photodetector Types: PN, PIN, APD, and phototransistor; Parameters and Comparisons;	Lectures	Quiz/Exam

14	2		Response Time and Bandwidth; Noise Contribution and SNR Calculations in PIN Receivers; Noise Contributions and SNR Calculations in APD Receivers; Q-Value and Receiver Sensitivity; Sensitivity Improvement In APD; The Quantum Limit of Photodetection; Extinction Ratio; Power Penalty; Intensity Noise (RIN); Timing Jitter and Timing Jitter Penalty.	Lectures	Quiz/Exam
15	2			Lectures	Quiz/Exam
16	2		Optical Power and Rise Time Budgets.	Lectures	Quiz/Exam
17	2			Lectures	Quiz/Exam
18	2		*Laser Principles and Theory* Invention of The Laser; Review of Laser History; Laser Operation; Components of a Laser System; Brewster Angle; Population Inversion; Einstein Coefficients; Three and Four Level Laser Systems; Absorption and Amplification; Laser Threshold Condition; Resonator; Line Broadening Mechanism; Properties of Laser Light; Types of Lasers.	Lectures	Quiz/Exam
19	2			Lectures	Quiz/Exam
20	2			Lectures	Quiz/Exam
21	2			Lectures	Quiz/Exam
22	2		*Analog Systems and Coherent Light*	Lectures	Quiz/Exam
23	2			Lectures	Quiz/Exam
24	2		*Wavelength Division Multiplexing (WDM) and Dense DWDM Systems*	Lectures	Quiz/Exam
25	2			Lectures	Quiz/Exam
26	2		Optical Fiber Communication Systems Laboratory	Lectures	Quiz/Exam
27	2			Lectures	Quiz/Exam
28	2			Lectures	Quiz/Exam
29	2		Optical Fiber Communications Systems Workshop	Lectures	Quiz/Exam
30	2			Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Senior John M., Optical Fiber Communications Principles and Practice, second edition, Prentice Hall, 2009. Gerd Keiser, Optical Fiber Communication, third edition, Mc Grow Hill, 2008. Gower John, Optical Communication System, second edition, Prentice Hall, 2002.
Special requirements (include for example workshops, periodicals, IT software, websites)	Workshop for the students to present their projects.
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Information Theory and Coding / ECE408
4. Program(s) to which it contributes	Data transmission, compression, error control coding
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	2 hours per week, 60 Hour per year
8. Date of production/revision of this specification	1/Nov/2020
9. Aims of the Course	The objective of this course is to discuss fundamental concepts and limits in information theory. It starts with basic concepts of information theory such as information content, entropy and continues to discuss Shannon's theorem to illustrate the role of coding for efficient and reliable communication to give methods to construct good codes.

10. Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. Compute information content and entropy of different sources.
A2. Compute channel Capacity of various channels.
A3. Design source codes.
A4. Design error correcting and detecting codes.

B. Subject-specific skills

B1. Knowledge of basic information theory probabilistic reasoning B2. Source coding
B3. Channel coding.

Teaching and Learning Methods

1- Lectures.
2- Tutorials.
3- Homework and Assignments.

Assessment methods

1- Tests and Exams.
2- In-Class Questions and Discussions.

C. Thinking Skills

C1. Modeling
C2. Problem solving
C3. General analysis assimilation

Teaching and Learning Methods

Class discussion and in lecture review questions

Assessment methods

Exams, homework, questions and answers in lectures

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Mathematical model of information source and Information axioms	Lectures	Quiz/Exam
2	2		Discrete and continuous source	Lectures	Quiz/Exam
3	2		Source entropy and entropy rate	Lectures	Quiz/Exam
4	2		Mutual information	Lectures	Quiz/Exam
5	2		Joint and conditional entropies	Lectures	Quiz/Exam
6	2		Channel capacity of symmetric discrete channels	Lectures	Quiz/Exam
7	2		Channel capacity of non-symmetric discrete channels	Lectures	Quiz/Exam
8	2		Channel capacity and redundancy	Lectures	Quiz/Exam
9	2		Shannon theorem	Lectures	Quiz/Exam
10	2		Source coding; fixed and variable length codes	Lectures	Quiz/Exam
11	2		Shannon-Fano code	Lectures	Quiz/Exam
12	2		Huffman code	Lectures	Quiz/Exam
13	2		M-array Huffman codes	Lectures	Quiz/Exam
14	2		Channel coding aims and application	Lectures	Quiz/Exam
15	2		Error detecting codes error correcting codes	Lectures	Quiz/Exam
16	2		Term exam	Lectures	Quiz/Exam
17	2		Linear block codes	Lectures	Quiz/Exam
18	2		Hamming codes	Lectures	Quiz/Exam
19	2		Polynomial algebra	Lectures	Quiz/Exam
20	2		Generator and parity check polynomials	Lectures	Quiz/Exam
21	2		Cyclic codes	Lectures	Quiz/Exam
22	2		Systematic cyclic codes	Lectures	Quiz/Exam
23	2		Cyclic encoder	Lectures	Quiz/Exam
24	2		Syndrome decoder	Lectures	Quiz/Exam
25	2		Convolutional codes	Lectures	Quiz/Exam
26	2		States and Trellis diagrams	Lectures	Quiz/Exam

27	2		Transfer function	Lectures	Quiz/Exam
28	2		Code tree of convolutional encoder	Lectures	Quiz/Exam
29	2		Viterbi decoding	Lectures	Quiz/Exam
30	2		Sequential decoding	Lectures	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Modern digital and analog communication systems by Lathi Digital communication by Sklar
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	Mathematics, Probability and statistics.
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Embedded Systems / ECE109
4. Program(s) to which it contributes	Computer architecture, Digital systems design
5. Modes of Attendance offered	In class
6. Semester/Year	Year
7. Number of hours tuition (total)	2 hours per week, 60 Hour per year
8. Date of production/revision of this specification	10/Nov/2020
9. Aims of the Course	The purpose of the course is to acquaint the students the fundamentals of the microprocessor-based systems. The course aims to teach the different architectures of microprocessor-based systems. Then introduce PIC microcontroller in detail as an example of microprocessor based system.

10. Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. Identify different processor- memory organizations.
A2. Identify different processor technologies.
A3. Identify embedded system properties and applications.
A4. Design and implementation of digital system using microcontrollers.

B. Subject-specific skills

B1.the course knowledge can be used to work with microcontrollers.
B2.provide main steps to teach students how to build useful digital systems.

Teaching and Learning Methods

Lectures, homework, in class discussion, and self-learning through miniprojects.

Assessment methods

Exams, quizzes, homework, and mini-project evaluation.

C. Thinking Skills

C1. Students suggest problems then solving them through mini-projects. C2. In class discussions and reasoning.

Teaching and Learning Methods

Lectures, homework, in class discussion, and self-learning through miniprojects.

Assessment methods

Exams, quizzes, homework, and mini-project evaluation.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through references such as internet, and books D2.Knowledge exchange between students themselves.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Principle of microprocessor-based systems and embedded system	Lectures	Quiz/Exam
2	2			Lectures	Quiz/Exam
3	2		Architectures and configurations of memory – processor	Lectures	Quiz/Exam
4	2			Lectures	Quiz/Exam
5	2		Pic microcontroller architecture and memory organization	Lectures	Quiz/Exam
6	2			Lectures	Quiz/Exam
7	2			Lectures	Quiz/Exam
8	2			Lectures	Quiz/Exam
9	2			Lectures	Quiz/Exam
10	2			Lectures	Quiz/Exam
11	2			Lectures	Quiz/Exam
12	2		Instruction set	Lectures	Quiz/Exam
13	2			Lectures	Quiz/Exam
14	2			Lectures	Quiz/Exam
15	2			Lectures	Quiz/Exam
16	2			Lectures	Quiz/Exam
17	2			Lectures	Quiz/Exam
18	2			Lectures	Quiz/Exam
19	2		Clock, rest, I/O, timer, and power supply circuits	Lectures	Quiz/Exam
20	2			Lectures	Quiz/Exam
21	2			Lectures	Quiz/Exam
22	2			Lectures	Quiz/Exam
23	2			Lectures	Quiz/Exam
24	2			Lectures	Quiz/Exam
25	2			Lectures	Quiz/Exam
26	2		Interrupt	Lectures	Quiz/Exam
27	2		Mini project	seminars	Discussion
28	2			seminars	Discussion
29	2			seminars	Discussion
30	2			seminars	Discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	● Designing Embedded systems with PIC microcontrollers, principles and applications, by Tim Wilmshurst. ● Internet
Special requirements (include for example workshops, periodicals, IT software, websites)	●Labcenter electronics simulation program (Protues Design Suite) ●Microchip technical documents, http://www.microchip.com.
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Computer Architecture
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Electronics and Communication Laboratory / ECE410
4. Program(s) to which it contributes	Electronics, Communication
5. Modes of Attendance offered	In class
6. Semester/Year	year
7. Number of hours tuition (total)	3 hours per week, 90 Hour per year
8. Date of production/revision of this specification	1/Nov/2020
9. Aims of the Course	This purpose of this course is to practice the theoretical aspects of electronic circuits and digital modulation schemes into practical laboratory experiments

10. Learning Outcomes, Teaching, Learning and Assessment Method
A. Knowledge and Understanding

A1. Understanding typed of A/D and D/A circuits.
A2. Understanding various digital modulation schemes.
A3. Leaning phase detection.
A4. Understanding voltage-controlled oscillation.
A5. Understanding phase-locked loop.

B. Subject-specific skills

B1.The course knowledge can be used to electronics and communication engineering.

Teaching and Learning Methods

Hands on experiments, lab. manual and experiment reports

Assessment methods

Exams, reports, questions and answers in the lab.

C. Thinking Skills

C1. Suggest different problems and their suitable solutions.
C2. Group work on issues with applied scientific application.
C3. Test the students' knowledge with different types of questions.

Teaching and Learning Methods

Tests and reports

Assessment methods

Exams, reports, Quizzes and Evaluation according to how the student perform the experiments.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books D2.Search through internet

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Digital to analog converter	Lab	
2	3			Lab	Quiz
3	3		Analog to digital converter	Lab	
4	3			Lab	Quiz
5	3		Delta modulation and demodulation	Lab	
6	3			Lab	Quiz
7	3		Amplitude shift keying modulation	Lab	
8	3		Amplitude shift keying demodulation	Lab	Quiz
9	3		Phase shift keying modulation and demodulation	Lab	
10	3			Lab	Quiz
11	3		Frequency shift keying modulation and demodulation	Lab	
12	3			Lab	Quiz
13	3		M-ary FSK modulation and demodulation	Lab	
14	3			Lab	Quiz
15	3		Review	Lab	
16	3		First semester exam	Lab	
17	3		Phase detector	Lab	
18	3			Lab	Quiz
19	3		Voltage-controlled oscillator	Lab	
20	3			Lab	Quiz
21	3		Phase-locked loop	Lab	
22	3			Lab	Quiz
23	3		Digital frequency synthesizer	Lab	
24	3			Lab	Quiz
25	3		Time division multiplexing	Lab	
26	3			Lab	Quiz
27	3		Series regulated power supply	Lab	
28	3			Lab	Quiz
29	3		Review	Lab	
30	3		Review	Lab	

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Microwaves Laboratory / ECE411
4. Program(s) to which it contributes	Microwaves, Digital Communications
5. Modes of Attendance offered	In class
6. Semester/Year	Semester
7. Number of hours tuition (total)	3 hours per week, 45 Hour per year
8. Date of production/revision of this specification	1/Nov/2020
9. Aims of the Course	This course aims to introduce the students to the practical aspects of different antenna and microwave waveguide-based systems. Using CST Microwave Studio, the students will be taught the main features of the simulation package, in addition to numerous handson examples of antennas, microstrip and waveguide structures. Moreover, the students will have the chance to deal with actual waveguide systems by working on a number of practical experiments that feature the basics of microwave transmission in different components.

10. Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. Practical approach on the design of microwave and RF components A2. Understanding the electromagnetic wave propagation by simulating different travelling wave structures.
A3. Learning the basic measurement skills for microwave waveguides and antennas.

B. Subject-specific skills

B1.The course will help the students to develop their design skills for electromagnetic structures.
B2.The students will put the measurement skills they obtain in this course to use in the future for any wireless communication design project.

Teaching and Learning Methods

Simulations, graphics and analyzing. Hands-on experiments. Sheets and solutions of questions. Discussion of several issues together.

Assessment methods

Exams, homework, practical and oral examinations.

C. Thinking Skills

C1. Incorporating the physical knowledge of EM propagation when considering any solution that incorporates wireless technology. C2. group work on issues with practical application

Teaching and Learning Methods

Tests, sheets, mini-projects

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1.Search through resources and books D2.Search through internet and papers

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		- Introduction to CST Microwave Studio	Lab	Quiz/Exam
2	3		- Simulation of a Half Wave Dipole	Lab	Quiz/Exam
3	3			Lab	Quiz/Exam
4	3		- Simulation of a Microwave Transmission Line	Lab	Quiz/Exam
5	3			Lab	Quiz/Exam
6	3		- Simulation of a Patch Antenna	Lab	Quiz/Exam
7	3			Lab	
8	3		- Simulation of a Rectangular Waveguide Structure.	Lab	Quiz/Exam
9	3			Lab	Quiz/Exam
10	3		- Simulation of a Yagi-Uda Antenna	Lab	Quiz/Exam
11	3			Lab	Quiz/Exam
12	3		- A Study of Doppler Effect	Lab	Quiz/Exam
13	3		- The Directional Coupler and its Applications	Lab	Quiz/Exam
14	3		- Measurement of the Permittivity	Lab	Quiz/Exam
15	3		- Antenna Pattern Measurements	Lab	Quiz/Exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	● Pozar, David M. *Microwave engineering*. John Wiley & Sons, 2009. ● Constantine, A. Balanis. *Antenna Theory: Analysis and Design*, third edition, John Wiley and sons, 2005. ● Leybold Didactic GMBH Microwave Lab. Manual
Special requirements (include for example workshops, periodicals, IT software, websites)	Simulation programs (CST)
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Antennas and Propagations, Electromagnetic Fields, Communications I
Minimum number of students	8
Maximum number of students	35

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• Electronics Laboratory manual. • "Principles of communications electronics" by Frenzel.
Special requirements (include for example workshops, periodicals, IT software, websites)	None

Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Electronics III, communication theory II
Minimum number of students	8
Maximum number of students	35

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.

1. Teaching Institution	University of Baghdad- College of Engineering
2. University Department/Center	Electronic and Communication Engineering Department
3. Course title/code	Computer Networks Lab / ECE412
4. Program(s) to which it contributes	Computer Networks
5. Modes of Attendance offered	In class
6. Semester/Year	Semester
7. Number of hours tuition (total)	2 hours per week, 30 hours per semester
8. Date of production/revision of this specification	1/Nov/2020

9. Aims of the Course	To make the student acquainted with the essential concepts that are necessary for the after-graduation career of the various subjects in computer networks engineering

10. Learning Outcomes, Teaching, Learning and Assessment Method
Knowledge and Understanding
A1. Several computer networks concepts will be studied briefly. A2. In details, network wiring, computer configurations and internetworking devices will be introduced and explained. A3. Dealing with IPv4 and IPv6 addressing and practical implementations. A4. Internetworking devices configurations.
B. Subject-specific skills
B1. The course knowledge can be used to support wide variety of computer networks design configuration . B2. The student will have a big picture regarding the simulation tools to be used for solving the design problems. B3. Apply these concepts in their practical career to design the IP addressing for small companies to enterprises B4. Understand the collision concept in the computer networks. Then determine the best protocols to reduce the collision. B5. Be able to apply different topology to fit the required performance
Teaching and Learning Methods
Lectures, simulations, graphics and analyzing. Sheets and solutions of questions. Discussion of several issues together.
Assessment methods

Exams, homework, questions, and answers in lab
C. Thinking Skills
C1. suggest many different cases and suggest suitable solutions for these issues C2. group work on issues with real life application C3. test the students with variety types of problems
Teaching and Learning Methods
Tests, sheets, mini-projects
Assessment methods
Exams, Homework, Quizzes and Evaluation according to the student's answer of suggested problems.
D. General and Transferable Skills (other skills relevant to employability and personal development)
D1. Search through solving the design problems. D2. Team work for simulating the real life networks.

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		EXP. No.1/ Networking Cabling.	Lab	Quiz
2	2		EXP. No.1/ TCP/IP Settings.	Lab	Quiz
3	2		EXP. No.2/ ARP and RAPR protocols	Lab	Quiz
4	2		EXP. No.3/ Router Components	Lab	Quiz
5	2		EXP. No.3/ Router Command Line Input and Configurations.	Lab	Quiz
6	2		EXP. No.4/ Router's Show Commands.	Lab	Quiz
7	2		EXP. No.5/ Router Basic Configurations.	Lab	Quiz
8	2		EXP. No.5/ Router Basic Configurations.	Lab	Quiz

9	2		EXP. No.5/ Router Interface Configurations	Lab	Quiz
10	2		EXP. No.6/ Router Routing Protocols. (RIP)	Lab	Quiz
11	2		EXP. No.6/ Router Routing Protocols. (OSPF)	Lab	Quiz
12	2		EXP. No.7/ Switch Command Line Input and Configurations.	Lab	Quiz
13	2		EXP. No.8/ Internetworking Devices Connections and Implement an Enterprise Topology	Lab	Quiz
14	2		EXP. No.9/ Implementing VLAN	Lab	Quiz
15	2		EXP. No.9/ Implementing VLAN	Lab	Quiz

12. Infrastructure	
Required reading: ● CORE TEXTS	Laboratory Sheets CISCO Documents .
Special requirements (include for example workshops, periodicals, IT software, websites)	None
Community-based facilities (include for example, guest lectures, internship, field studies)	None

13. Admissions

Pre-requisites	None
Minimum number of students	8
Maximum number of students	35