وزارة التعليم العالي والبحث العلمي

وحدة الإشراف والتقويم العلمي

شعبة ضمان الجودة والاعتماد الأكاديمي

استمارة وصف البرنامج الأكاديمي للكليات والمعاهد

للعام الدراسي ٢٠٢٣-٢٠٢٢

الجامعة: جامعة بغداد

الكلية /المعهد: كلية الهندسة

القسم العلمي: هندسة الحاسبات

تاريخ ملء الملف: ٢٠٢٢/١٠/١٣

التوقيع:

اسم رئيس القسم: أ.م.د. مصطفى اسماعيل سلمان

التاريخ: ١٣/ ١٠/ ٢٠٢٢

التوقيع:

اسم المعاون العلمي: أ.د. ضياء وحيد كاظم

التاريخ: ١٣ - ١٠ - ٢٠٢٢

دقق الملف من قبل :

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي أ.م.د. بهجت الطائي

التاريخ: ٢٠٢٢/٩/٢٠

التوقيع:

مصادقة السيد العميد

٢٠٢٢/٩/٢٠

وصف البرنامج الأكاديمي

وصف البرنامج الأكاديمي هذا إنجاز مقتضيا لاهم خصائص البرنامج ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهنا 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 هندسة الحاسبات
3-اسم البرنامج الاكاديمي أو المهني	برنامج هندسة الحاسبات
4-اسم الشهادة النهائية	بكالوريوس في هندسة الحاسبات
5-النظام الدراسي: **سنوي /مقررات/أخرى**	النظام السنوي وبتواجد الطلاب في داخل الحرم الجامعي وبدوام كامل ضمن طريقة (برنامج اليوم) وجها لوجه او التعليم الالكتروني. العام الاكاديمي يتألف من 30 أسبوع كل طالب يتوجب عليه إتمام 159 ساعة معتمدة للنجاح كل المقررات تخضع (100-150) دقيقة محاضرات أسبوعيا و (120) دقيقة .
6-برنامج الاعتماد المعتمد	IAC-Iraqi Accreditation Council
7-المؤثرات الخارجية الأخرى	N/A
8-تاريخ إعداد الوصف	2022/10/13
9- أهداف البرنامج الأكاديمي: 1- تخريج مهندسي حاسبات للعمل في الصناعة والأوساط الأكاديمية والقطاعات الأخرى من تطبيقات هندسة حاسبات. 2- منح الخريجين امكانية التطوير المهني المستمر من خلال التعليم مدى الحياة. 3- تخريج مهندسين قياديين في المهنة وفي الابتكار. 4- تخريج مهندسين ذوي معرفة بتأثير مهنتهم في المجتمع واهمية الاخلاق في المهنة.	

10-مخرجات البرنامج المطلوبة وطرائق التعليم والتعلم والتقييم

بعد استعراض معايير ABET وأهداف البرنامج، فقد تقرر من قبل وزارة التعليم العالي والبحث العلمي أن معايير ABET (أ - ك) تشمل روح الرؤية التربوية لدينا. ولذلك، تم اعتمادها.

أ- الأهداف المعرفية

أ1- القدرة على تطبيق المعرفة في الرياضيات والعلوم والهندسة لوصف وحل المشاكل.
ا2- القدرة على تصميم وإجراء التجارب، وكذلك لتحليل و تفسير البيانات.
أ3- القدرة على تصميم نظام أو مكون أو عملية لتلبية الاحتياجات المطلوبة.

ب- الأهداف المهاراتية

القدرة على استخدام التقنيات والمهارات والأدوات الهندسية الحديثة اللازمة لممارسة مهنة الهندسة وتطور برنامج هندسة الحاسبات المعارف والمهارات التي من شأنها تمكين الطلاب من:

ب 1- تطوير الكفاءة الأولية في تخصصات هندسة الحاسوب.
ب 2- تحديد وصياغة وحل المشاكل الهندسية للحاسوب باستخدام الأدوات الهندسية الحديثة والتقنيات، والمهارات.
ب 3- أداء تصميم المتكامل لأنظمة الحاسوب والمكونات أو العمليات عن طريق الخبرات العملية .

طرائق التعليم والتعلم:
1- المحاضرات.
2- البرامج التعليمية.
3- الواجبات والمهام.
4- مختبر. التجارب
5- الاختبارات والامتحانات.
6- الأسئلة والمناقشات.
7- اتصال بين النظرية والتطبيق.
8- الرحلات الميدانية.
9- الأنشطة اللامنهجية.
10- الندوات.
11- الحلقات النقاشية والمحادثات الشفوية.
12- تقارير، عروض وملصقات

طرائق التقييم

1- دراسة أحوال الخريجين السابقين.
2- لجان ذات الصلة في الإدارة مثل QA،scientific .
3- سيتم تعقب اتجاهات الموظفين من خريجي كليتنا على سبيل المثال مكان العمل والمسمى الوظيفي كل عام.
4- ستعطى دراسة من أرباب العمل على الخريجين كل سنه على الأقل لتحديد ما إذا كانت اتجاهات عملهم ذات صله باختصاصهم.
5- سيتم إعادة تقييم في كل مرة لعدة سنوات من قبل أعضاء هيئة التدريس ومن ثم الوزارة وستعرض المحادثات مع الخريجين.

ج-الأهداف الوجدانية والقيمية

ج1- الحصول على تقدير لبعض المشاكل الأخلاقية التي تنشأ في ممارسة المهنة.
ج2- الحصول على فهم تأثير مهنة الخريج في المجتمع.

طرائق التعليم والتعلم

الاختبارات، ومسابقات.
الأنشطة.
المشاركة أثناء المحاضرات

طرائق التقييم

1- دراسة أحوال الخريجين السابقين.
2- لجان ذات الصلة في الإدارة مثل QA،scientific .
3- سيتم تعقب اتجاهات الموظفين من خريجي كليتنا على سبيل المثال مكان العمل والمسمى الوظيفي كل عام.
4- ستعطى دراسة من أرباب العمل على الخريجين كل سنه على الأقل لتحديد ما إذا كانت اتجاهات عملهم ذات صله باختصاصهم

5- سيتم إعادة تقييم في كل مرة لعدة سنوات من قبل أعضاء هيئة التدريس ومن ثم الوزارة وستعرض المحادثات مع الخريجين.

د-المهارات العامة والتأهيلية المنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي)
د1- تطوير مهارات الاتصال الكتابية والشفوية
د2- القدرة على العمل في مجاميع متعددة التخصصات.

طرائق التعليم والتعلم

الاختبارات، ومسابقات.
الأنشطة.
المشاركة أثناء المحاضرات

طرائق التقييم

1- دراسة أحوال الخريجين السابقين.
2- لجان ذات الصلة في الإدارة مثل QA،scientific .
3- سيتم تعقب اتجاهات الموظفين من خريجي كليتنا على سبيل المثال مكان العمل والمسمى الوظيفي كل عام.
4- ستعطى دراسة من أرباب العمل على الخريجين كل سنه على الأقل لتحديد ما إذا كانت اتجاهات عملهم ذات صله باختصاصهم
5- سيتم إعادة تقييم في كل مرة لعدة سنوات من قبل أعضاء هيئة التدريس ومن ثم الوزارة وستعرض المحادثات مع الخريجين.

11- بنية البرنامج
ويقدم القسم برامج الهندسة للحصول على درجة البكالوريوس في العلوم (بكالوريوس) في هندسة الحاسبات، اما برامج القسم الهندسية للحصول على .M.Sc الماجستير تتم بالتعاون مع قسم هندسة الإلكترونية والاتصالات.

جدول رقم (1): بكالوريوس درجة المناهج الهندسة / الحاسوب

المرحلة الدراسية	رمز المقرر او المساق	اسم المقرر او المساق	الساعات المعتمدة	
			النظري	العملي
الاولى	GS 101	حقوق الانسان	2	-
الاولى	GE 102	رياضيات	4	-
الاولى	COE 103	الكترونيك 1	3	2
الاولى	COE 104	دوائر كهربائية	3	2
الاولى	COE 105	اساسيات النظم الرقمية	3	2
الاولى	COE 106	منهجية برمجة الحاسوب	3	2
الاولى	COE107	اساسيات نظام الحاسوب	3	2
الاولى	GS 108	اللغة الإنكليزية	2	-
الثانية	GS 201	اللغة العربية	2	-
الثانية	COE 202	الرياضيات الهندسية	4	-
الثانية	COE 203	الكترونيك 2	3	2
الثانية	COE 204	المعالج الدقيق والحاسوب الدقيق 1	3	2

الثانية	COE 205	تصميم النظم الرقمية	3	2
الثانية	COE 206	هياكل البيانات والخوارزميات	2	2
الثانية	COE 207	اتصالات	3	2
الثانية	GS 208	اللغة الإنكليزية	2	-
الثالثة	COE 301	معمارية الحاسوب 1	3	-
الثالثة	COE 302	انظمة السيطرة الرقمية	3	2
الثالثة	COE 303	المعالج الدقيق والحاسوب الدقيق 2	3	2
الثالثة	COE 304	نظم التشغيل	3	-
الثالثة	COE 305	شبكات الحاسوب	3	2
الثالثة	COE 306	معالجة الاشارة الرقمية	2	-
الثالثة	COE 307	أنظمة قواعد البيانات	2	2
الثالثة	GS 308	اللغة الإنكليزية	2	-
الرابعة	COE 401	تكنلوجيا الانترنت	3	2
الرابعة	COE 402	معمارية الحاسوب 2	3	-
الرابعة	COE 403	الأنظمة المضمنة	3	2
الرابعة	COE 404	امن الحاسوب	3	-
الرابعة	COE 405	الروبوتات والذكاء الصناعي	3	-
الرابعة	COE 406	الرؤية الحاسوبية وتميز الانماط	3	-
الرابعة	COE 407	المشروع الهندسي	2	2
الرابعة	GS 408	اللغة الإنكليزية	2	-

12-التخطيط للتطور الشخصي

التحسين المستمر هو التركيز على الطلبة ويتم كل يوم كجزء طبيعي من مهنتنا. نحن نسعى دائما لتحسين العمليات التي تزيد من رفع درجة تحصيل أهداف القسم والكلية ويتم إجراء دراسة دورية لدراسة مواقع الضعف أو العجز من اجل تجاوزها أو التغلب عليها. ونطلب من كل مدرس العمل على تحسين مستمر لأداء الطلبة وكتابة المشاكل والعقبات التي تواجه الطلبة أو العملية التعليمية ضمن اختصاصه في موقع عمله في محاولة لضمان الجودة ونمارس التحسين المستمر لتقديم برنامجنا الأمثل وقد نفذت الإجراءات المحددة التالية بنجاح:

1- تغييرات شاملة في المناهج الدراسية في العام الدراسي 2019-2020
2- التحسين المستمر لأعضاء هيئة التدريس من خلال برامج التدريب.
3- تعزيز عدد من أعضاء هيئة التدريس للصفوف العلمية العليا.
4- شراء عدد من المعدات المختبرية وأدوات القياس.
5- شراء عدد من الكتب لمكتبة القسم.
6- شراء عدد من أجهزة حاسبات.
7- إنشاء شبكة مرافق الوصول المقدمة من قبل شبكة كلية الهندسة اللاسلكية LAN مع المحطات متوفرة الآن في القسم.
8- توظيف عدد من أعضاء هيئة التدريس والملاكات الهندسية.
9- زيادة في الأنشطة اللاصفية للطلاب مثل إقامة المؤتمرات والندوات العلمية.
10- إعادة إعمار وتأهيل الفصول الدراسية وغرف في الدائرة، وكذلك الخدمات والبنية التحتية.

13- معيار القبول (وضع الأنظمة المتعلقة بالالتحاق بالكلية أو المعهد)

القبول في برنامج البكالوريوس لقسم هندسة الحاسبات قبول مركزي وزاري ويجب تلبية المتطلبات الدنيا التالية:

1- المتقدم أو المتقدمة ينبغي أن يكون له شهادة الدراسة الثانوية العراقية، أو ما يعادلها. يجب على الطلاب الحصول على معدل عال يؤهل للقبول في كليات الهندسة.
2- يتم التحكم بالقبول مركزيا من قبل وزارة التعليم العالي والبحث العلمي.
3- توزيع الطلاب على الأقسام الهندسية 13 من كلية الهندسة في جامعة بغداد، بما في ذلك قسم هندسة الحاسبات، وفقا لخطة قدرة الإدارات ومتوسط تقييم المتقدمين وتطلعهم أو الاختيار. وكانت خطة قدرة قسم هندسة الحاسبات في السنوات الثلاث الأخيرة 40 – 50 طالب.
4- عدد الطلبة المقبولين يقتصر على عدد من المقاعد متاح وفق ما يقرره مجلس الكلية بناء على قدرة الموارد في الكلية كما شملت خطة لقبول الطلاب المتفوقين من مؤسسة المعاهد الفنية والاوائل على قسمي علوم الحاسبات وعلوم الرياضيات، والموظفين المتميزين من مؤسسات الدولة والوزارات.
5- يجب على مقدم الطلب تقديم الوثائق المطلوبة خلال فترة زمنية محددة.
6- مقدم الطلب الذي تخرج من نظام المدارس الثانوية خارج العراق أن يكون قد أتم الثانية عشرة من المدارس الابتدائية والثانوية المشتركة ودراسات من مدرسة معترف بها. ومطلوب أيضا تقديم شهادة معادلة من وزارة التربية العراقية.

القبول لقسم هندسة الحاسبات هو قدرة تنافسية عالية. كما هو موضح أعلاه، يتم منح المتقدمين القبول وفقا لإجراء تقييم شامل على أساس سجل تقييم، ولكن فقط إلى الحد الذي يسمح به أكبر عدد ممكن من القبولات الجديدة التي تخصص لكل عام دراسي.

14- اهم مصادر المعلومات عن البرنامج

أ- صفحة القسم على الموقع الإلكتروني للكلية.
ب- دليل قسم هندسة الحاسبات.
ج- دليل كلية الهندسة.
د- بعض اجتماعات لجان من الوزارة لقسم هندسة الحاسبات.

مخطط مهارات المنهج

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

				مخرجات التعلم المطلوبة من البرنامج															
Year / Level	رمز المقرر	اسم المقرر	أساسي أم اختياري	الاهداف المعرفية				الاهداف المهاراتية الخاصة بالبرنامج				الاهداف الوجدانية والقيمية				المهارات العامة والتاهيلية المنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور			
				A1	A2	A3		B1	B2	B3		C1	C2	C3	C4	D1	D2		
First	GS 101	Human rights	C									√				√			
	GE 102	Mathematics	C	√	√														
	COE 103	Electronic I	C	√	√	√		√	√	√							√		
	COE 104	Electrical circuits	C	√	√	√		√	√	√							√		
	COE 105	Fundamentals of Digital Systems	C	√	√	√		√	√	√							√		
	COE 106	Computer programing Methodology	C	√	√	√		√	√	√		√	√				√		
	COE107	Fundamentals of Computer System	C	√		√		√									√		
	GS 108	English	C													√	√		
Second	GS 201	Arabic	C													√	√		
	COE 202	Engineering Mathematics	C	√	√														
	COE 203	Electronic II	C	√	√	√		√	√	√		√	√				√		
	COE 204	Microprocessor and Microcomputer I	C	√	√	√		√	√	√		√	√				√		
	COE 205	Digital System Design	C	√	√	√		√	√	√		√	√				√		
	COE 206	Data Structure and Algorithms	C	√	√	√		√	√	√		√	√				√		
	COE 207	Communications	C	√	√	√		√	√	√		√	√				√		
	GS 208	English	C													√	√		
Third	COE 301	Computer Architecture I	C	√	√	√		√	√	√		√	√						
	COE 302	Digital Control Systems	C	√	√	√		√	√	√		√	√						
	COE 303	Microprocessor and Microcomputer II	C	√	√	√		√	√	√		√	√				√		
	COE 304	Operating Systems	C	√	√	√		√	√	√		√	√						
	COE 305	Computer Network	C	√	√	√		√	√	√		√	√				√		
	COE 306	Digital Signal Processing	O	√	√	√		√	√	√		√	√						

	COE 307	Data Base Systems	O	√	√	√		√	√	√							√		
	GS 308	English	C													√	√		
Fourth	**COE 401**	Internet Technology	C	√	√	√		√	√	√		√	√				√		
	COE 402	Computer Architecture II	C	√	√	√		√	√	√		√	√						
	COE 403	Embedded System	C	√	√	√		√	√	√		√	√				√		
	COE 404	Computer Security	C	√	√	√		√	√	√		√	√						
	COE 405	Robotics and Artificial Intelligence	O	√	√	√		√	√	√		√	√						
	COE 406	Computer Vision and pattern Recognition	O	√	√	√		√	√	√		√	√						
	COE 407	Engineering Project	C	√	√	√		√	√	√		√	√			√	√		
	GS 408	English	C													√	√		

First Stage

TEMPLATE FOR COURSE SPECIFICATION
نموذج وصف المقرر

MATHEMATICS I

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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 programme specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Mathematics I / GE102
4. Modes of Attendance offered	Semester System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The Semester year is composed of 15-week regular subjects.
5. Semester/Year	1st and 2nd Academic Semesters 2023 – 2022

6. Number of hours tuition (total)	120 hrs. / 3 theory + 1 discussion hrs/week
7. Date of production/revision of this specification	October / 2022

8. Aims of the Course
A1. The general goal of education as a whole is to prepare the student for public and private life to benefit his community and himself. Upgrading the student's level in mathematics in particular and in the educational process in general.
A2. Developing the student's ability to conclude, generalize, and use their own logic.
A3. Student understands of some mathematical concepts, such as: relationship - function - trigonometric functions - differentiation - integration - prob.
A4. Understanding mathematical proof and its rationale. Understanding some mathematical systems such as: clique-matrices. Recognize mathematics and learn about its most important applications in life.

9. Learning Outcomes, Teaching ,Learning and Assessment Method
A. Cognitive goals.
A1. Solution of linear algebraic equations A2. Matrix operations and inverse of a matrix A3. Complex variables A4. Differential calculus A5. Integral calculus

B. The skills goals special to the course

A student who successfully fulfills the course requirements will have demonstrated:

B1. Learn to use concepts of engineering mathematics.

B2. Apply these concepts in their studies to solve the engineering problems related to the main topics studied in mechanical engineering.

B3. Learn methods for sketch functions.

B4. Learn and recruit Logarithmic and Trigonometric functions in the related mathematics models.

B5. Be able to apply differential equations in engineering problems and applications.

B6. Work in groups and function on multi-disciplinary teams.

B7. Understand professional, social and ethical responsibilities.

B8. Communicate effectively.

Teaching and Learning Methods

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. Connection between Theory and Application.
7. Field Trips.
8. Extracurricular Activities.
9. In- and Out-Class oral conservations.

Assessment methods
1. Lab 2. Quizzes and exams 3. homework 4. assignments
C. Affective and value goals
C1. Ability to analyze. C2. Ability to solve problems. C3. Ability to calculate the results.
Teaching and Learning Methods
1. Lectures 2. Homework 3. Lab. Experiments. 4. Discussions
Assessment methods
1. Quizzes and exams 2. homework 3. Lab 4. assignments

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.

D2. Problem Solving based on understanding.

D3. Ability to learn and remember key facts.

D4. Self-discipline and self-motivation.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Items A1,A2.A4	Complex Number	C1,C2,C3	Weekly Quizzes
2	4	Items A1,A2.A4	Determinates Matrix, properties, operations	C1,C2,C3	
3	4	Items A1,A2.A4	Review of functions Limits, continuity, derivatives	C1,C2,C3	

4	4	Items A1,A2.A4	Transcendental functions Inverse functions, Trigonometric functions	C1,C2,C3	
5 and 6	8	Items A1,A2.A3.A4	Inverse Trigonometric functions	C1,C2,C3	
7	4	Items A1,A2.A3.A4	Indeterminate forms and L'Hopital's R	C1,C2,C3	
8	4	Items A1,A2.A3.A4	Differentiation, differentiation rules	C1,C2,C3	
9	2	Items A1,A2.A3.A4	Derivatives of trigonometric functions	C1,C2,C3	
10	2	Items A1,A2.A3.A4	Derivatives of the inverse trigonometric functions	C1,C2,C3	
11	4	Items A1,A2.A3.A4	Natural logarithms	C1,C2,C3	
12	4	Items A1,A2.A3.A4	The exponential function	C1,C2,C3	

13 and 14	8	Items A1,A2.A3.A4	Hyperbolic functions and their inverse	C1,C2,C3	
15, 16, and 17	12	Items A1,A2.A3.A4	Integration-the definite integral	C1,C2,C3	
18 and 19	8	Items A1,A2.A3.A4	Indefinite integrals	C1,C2,C3	
20 and 21	8	Items A1,A2.A3.A4	Substitution and Area between curves	C1,C2,C3	
22, 23, and 24	12	Items A1,A2.A3.A4	Techniques of integration, basic integration formulas, integration by parts, integration of rational functions by partial fractions, trigonometric substitutions, integral Tables	C1,C2,C3	
25 and 26	8	Items A1,A2.A3.A4	Applications of definite integrals-Volumes by Slicing and Rotation about Axis	C1,C2,C3	

27, 28, 29, and 30	16	Items A1,A2.A3.A4	Differential Equations First order differential equations, variable separable, homogeneous, linear, exact first order, special first order equations (Bernoulli's differential equations, non-exact differential equation).	C1,C2,C3	

11. Infrastructure	
1. Books Required reading:	• "Thomas Calculus" G. Thomas, M. Weir, et al., 11th edition, 2004. • "Calculus II"; by Paul Dawkins, 2007. • "Engineering Mathematics", by John Bird, 5th edition, Elsevier Ltd., 2007. • "Engineering Mathematics", by K.A. Stroud, First edition, MACMILLAN and CO LTD, 1970. • "Theory and Problems of Advanced Calculus", by Robert Wrede and Murray R. Spiegel, Second Edition, McGRAW-HILL, 2002.

2. Main references (sources)	
A- Recommended books and references (scientific journals, reports…).	• Howard, A. et. Al. (2008). Calculus. McGraw-Hill Papers. • Faddeev, L. D., and P. N. Pyatov. "The differential calculus on quantum linear groups." Fifty Years of Mathematical Physics: Selected Works of Ludwig Faddeev. 2016. 510-522. • Kalton, Nigel, and Lutz Weis. "The $ H^{\infty} $-Functional Calculus and Square Function Estimates." arXiv preprint arXiv:1411.0472 (2014). • Abadi, Martín, Bruno Blanchet, and Cédric Fournet. "The Applied Pi Calculus: Mobile Values, New Names, and Secure Communication." Journal of the ACM (JACM) 65.1 (2017).
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
Maintaining Continuous development of academic curricula in line with the scientific development.

TEMPLATE FOR COURSE SPECIFICATION

ELECTRONICS I

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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 programme specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Electronics I/ COE 103
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st and 2nd Academic Semesters 2023 – 2022

6. Number of hours tuition (total)	150 hrs totally. 3 hrs. Per week /Theory and 2 hrs. per week/ Lab.
7. Date of production/revision of this specification	October/2022

8. Aims of the Course
A1. How to use the learned skills to understand, derive, and solve the equations in various objects (e.g. Electrical circuits II, Engineering Analysis, Electronics II, Communications, etc.)
A2. Representation of an introduction to the following course (Electronics II).

9. Learning Outcomes, Teaching ,Learning and Assessment Method
A. Cognitive goals.
A1. Design simple circuits that depend on diode characteristics. A2. Solve problems related to diode circuit. A3. Solve the problem related to transistor circuit. A4. Design simple circuits that depend on transistor characteristics.

B. The skills goals special to the course.

B1. Acquire good knowledge in the atomic structure and crystalline structures.

B2. The differences between the insulators, conductors, and semiconductors.

B3. Recognizing the properties and differences between n and p material and the formation of them.

B4. The principle of operation of the diode, the IV characteristics and the equivalent models of the diode.

B5. A good knowledge of different diode applications.

B6. The principle of BJT transistor construction, operation principle and transistor analysis for different configurations.

B7. The dc biasing and operating point of the different configurations of BJT transistors.

B8. A basic understanding of the BJT transistor as a switch.

Teaching and Learning Methods

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Lab. Experiments.
5. Tests and Exams.
6. In-Class Questions and Discussions.
7. Connection between Theory and Application.
8. Field Trips.
9. Extracurricular Activities.
10. Seminars.
11. In- and Out-Class oral conservations.

Assessment methods

1. Lab
2. Quizzes and exams
3. homework
4. assignments

C. Affective and value goals

C1. Ability to analyze.
C2. Ability to solve problems.
C3. Ability to calculate the results.

Teaching and Learning Methods

5. Lectures
6. Homework
7. Lab. Experiments.
8. Discussions

Assessment methods

1. Quizzes and exams
2. homework
3. Lab
4. assignments

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.

D2. Problem Solving based on understanding.

D3. Ability to learn and remember key facts.

D4. Self-discipline and self-motivation.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2 the. 1 tut.	Item A1	Atom structures	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
2	2 the. 1 tut.	item A2	Energy bands, insulators, conductors	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
3	2 the. 1 tut.	item A3	Semi-conductor	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
4	2 the. 1 tut.	item A3	Type of semi-conductor	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
5	2 the. 1 tut.	item A4	PN-junction	From 1 to12 of T-Methods	From 1 to 4 of A-Methods

6	2 the. 1 tut.	item A4	Forward and reserved biased	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
7	2 the. 1 tut.	item A4	Diode characteristics	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
8	2 the. 1 tut.	item A4	Diode equation	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
9	2 the. 1 tut	item A4	Diode equivalent circuit	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
10	2 the. 1 tut.	item A5	Diode applications: switching	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
11	2 the. 1 tut.	item A5	Rectifier circuits	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
12	2 the. 1 tut.	item A5	Clipping circuit	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
13	2 the. 1 tut.	item A5	Clipping circuit	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
14	2 the. 1 tut.	item A5	Clamping circuit	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
15	2 the. 1 tut.	item A5	Clamping circuit	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
16	2 the. 1 tut.	item A5	Regulators	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
17	2 the. 1 tut.	item A5	Zener diode	From 1 to12 of T-Methods	From 1 to 4 of A-Methods

18	2 the. 1 tut.	item A5	Logic circuits	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
19	2 the. 1 tut.	item A5	Special type diodes	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
20	2 the. 1 tut.	item A6	Bipolar transistor	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
21	2 the. 1 tut.	item A6	Configuration, operation	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
22	2 the. 1 tut.	item A6	C.B configuration	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
23	2 the. 1 tut.	item A6	C.E configuration	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
24	2 the. 1 tut.	Item A6	C.C configuration	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
25	2 the. 1 tut.	item A7	D.C biasing	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
26	2 the. 1 tut.	item A7	Biasing Circuits	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
27	2 the. 1 tut.	item A7	Biasing Circuits (continued)	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
28	2 the. 1 tut.	item A7	Load line analysis	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
29	2 the. 1 tut.	item A7	BJT Design	From 1 to12 of T-Methods	From 1 to 4 of A-Methods
30	2 the. 1 tut.	item A7	Transistor switching networks		

11. Infrastructure	
1. Books Required reading:	• "Electronic Devices and Circuit Theory", Robert Boylestad, Louis Nashelsky, 10th Edition , 2009. • “Semiconductor Physics and Devices” , Donald A. Neamen, 3rd edition, 2003” • "Microelectronic Circuits", Sedra, Smith, Fourth edition or Fifth edition, Oxford University Press, 1998-2003.
2. Main references (sources)	
A- Recommended books and references (scientific journals, reports…).	none
B-Electronic references, Internet sites…	none

12. The development of the curriculum plan
Maintaining Continuous development of academic curricula in line with the scientific development.

TEMPLATE FOR COURSE SPECIFICATION

ELECTRICAL CIRCUITS I

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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 programme specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Electrical Circuits I / COE 104

4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The Annual System is composed of 30-week regular subjects. The laboratory is an annual system, the first course, DC circuits due to health conditions and the Covid-19 pandemic. We will accredit an electronic laboratory during the month, with students attending one week of the laboratory, to familiarize students with the laboratory and equipment and teach them to use and connect components and measuring devices in the correct and accurate manner. The second course is the alternating current laboratory with the same system for the first course. The theoretical course is reinforced in the laboratory. The Annual System is composed of 30-week regular subjects.
5. Semester/Year	1st and 2nd Academic Semesters 2022 – 2023
6. Number of hours tuition (total)	150 hrs. / 5 hrs., per week 90 hrs. /3 hrs. per week Theory. 60 hrs. / 2 hrs. per week Lab.
7. Date of production/revision of this Specification	October/ 2022

8. Aims of the Course
A1. Explain and analyze the voltage/current relationships and operational characteristics of resistors, inductors, capacitors, and voltage and current sources.

A2. Explain and analyze different electrical circuit morphologies. In particular; series and parallel circuit structures, equivalent circuit configurations arrived at by the combination of series and parallel circuit elements such as resistors, inductors, capacitors, current and voltage sources, equivalent circuit configurations arrived at using network theorems such as; Thevenin and Norton equivalent circuits, superposition, and source transformations.
A3. Explain and analyze power and energy dissipation and distribution for DC & AC circuits composed of the elements listed in the first objective.
A4. Design simple electrical circuits, with DC & AC sources, that satisfy specific functional requirements.
A5. Explain and analyze the voltage/current relationships and operational characteristics of resistors, inductors, capacitors, and voltage and current sources.
A6. Explain and analyze different electrical circuit morphologies. In particular; series and parallel circuit structures, equivalent circuit configurations arrived at by the combination of series and parallel circuit elements such as resistors, inductors, capacitors, current and voltage sources, equivalent circuit configurations arrived at using
A7. Explain and analyze power and energy dissipation and distribution for AC circuits composed of the elements listed in the first objective.
A8. Design simple electrical circuits, with AC sources, that satisfy specific functional requirements.

9. Learning Outcomes, Teaching ,Learning and Assessment Method

A. Cognitive goals.

A1. Electricity and Magnetism

A2. Solution of linear algebraic equations

A3. Matrix operations and inverse of a matrix

A4. Complex variables

A5. Differential calculus

A6. Integral calculus

B. The skills goals special to the course.

A student who successfully fulfills the course requirements will have demonstrated:

B1. An ability to define and explain the meaning/function of charge, current, voltage, power, energy, R, L, C, the op-amp, and the fundamental principles of Ohm's law, KVL and KCL including an understanding of electrical safety and the effect of current on humans.

B2. An ability to write the equilibrium equations for a given network and solve them analytically, for the steady state (DC and AC/phasor) solution.

B3. An ability to state and apply the principles of superposition, linearity, source transformations, and Thevenin/Norton equivalent circuits to simplify the analysis of circuits and/or the computation of responses.

B4. An in depth understanding of the behavior of inductances and capacitances, and differentiating

A5. An ability to qualitatively and quantitatively predict and compute the steady state AC responses of basic circuits using the phasor method.

B6. An ability to compute effective and average values of periodic signals and compute the instantaneous and average powers delivered to a circuit element.

B7. An ability to compute the complex power associated with a circuit element and design a circuit to improve the power factor in an AC circuit.

B8. An ability to determine the conditions for maximum power transfer to any circuit element.

B9. Principles of 3-phase circuits.

Teaching and Learning Methods

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Lab. Experiments.
5. Tests and Exams.
6. In-Class Questions and Discussions.
7. Connection between Theory and Application.
8. Field Trips.
9. Extracurricular Activities.
10. Seminars.
11. In- and Out-Class oral conservations.
12. Reports, Presentations, and Posters.

Assessment methods

1. Lab
2. Quizzes and exams
3. homework
4. assignments

C. Affective and value goals

C1. Ability to analyze.
C2. Ability to solve problems.
C3. Ability to calculate the results.

Teaching and Learning Methods

1. Lectures
2. Homework
3. Lab. Experiments.
4. Discussions

Assessment methods

1. Quizzes and exams
2. homework
3. Lab
4. assignments

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.

D2. Problem Solving based on understanding.

D3. Ability to learn and remember key facts.

D4. Self-discipline and self-motivation.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2 the. 1 tut. 2 exp.	items 1,2,3 of section 6	Introduction and color coding , temperature effect	From 1 to12 of section 11	From 1 to 4 of section 12
2	2 the. 1 tut. 2 exp.	items 1,2,3 of section 6	Introduction and color coding , temperature effect	From 1 to12 of section 11	From 1 to 4 of section 12
3	2 the. 1 tut. 2 exp.	items 1,2,3 of section 6	Sources and source transformation	From 1 to12 of section 11	From 1 to 4 of section 12
4	2 the. 1 tut. 2 exp.	items 1,2,3 of section 6	Ohm's law, equivalent resistance	From 1 to12 of section 11	From 1 to 4 of section 12
5	2 the. 1 tut. 2 exp.	items 1,2,3 of section 6	Ohm's law, equivalent resistance	From 1 to12 of section 11	From 1 to 4 of section 12

6	2 the. 1 tut. 2 exp.	items 1,2,3 of section 6	DC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
7	2 the. 1 tut. 2 exp.	items 1,2,3,4of section 6	DC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
8	2 the. 1 tut. 2 exp.	items 1,2,3,4of section 6	DC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
9	2 the. 1 tut. 2 exp.	items 1,2,3,4,5 of section 6	DC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
10	2 the. 1 tut. 2 exp.	items 1,2,3,4,5 of section 6	DC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
11	2 the. 1 tut. 2 exp.	items 1,2,3,4,5,6 of section 6	DC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
12	2 the. 1 tut. 2 exp.	items 1,2,3,4,5,6of section 6	DC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of article 12
13	2 the. 1 tut. 2 exp.	items 1,2,3,4,5,6, of section 6	DC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
14	2 the. 1 tut. 2 exp.	items 1,2,3,4,5,6of section 6	Star Delta transformation	From 1 to12 of section 11	From 1 to 4 of section 12
15	2 the. 1 tut. 2 exp.	items 1,2,3,4,5,6of section 6	Power calculation	From 1 to12 of section 11	From 1 to 4 of section 12
16	2 the. 1 tut. 2 exp.	Items7,8,9of section 15	Introduction to AC signals	From 1 to12 of section 11	From 1 to 4 of section 12
17	2 the. 1 tut. 2 exp.	Items7,8,9of section 15	Average value and RMS value	From 1 to12 of section 11	From 1 to 4 of section 12

18	2 the. 1 tut. 2 exp.	Items7,8,9of section 15	Capacitor , Inductor ,	From 1 to12 of section 11	From 1 to 4 of section 12
19	2 the. 1 tut. 2 exp.	Items9,10,11 ,12of section 15	AC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
20	2 the. 1 tut. 2 exp.	Items9,10,11 ,12of section 15	AC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
21	2 the. 1 tut. 2 exp.	Items9,10,11 ,12of section 15	AC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
22	2 the. 1 tut. 2 exp.	Items9,10,11 ,12of section 15	AC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
23	2 the. 1 tut. 2 exp.	Items9,10,11 ,12of section 15	AC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
24	2 the. 1 tut. 2 exp.	Items9,10,11 ,12of section 15	AC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
25	2 the. 1 tut. 2 exp.	Items9,10,11 ,12of section 15	AC circuit analysis methods	From 1 to12 of section 11	From 1 to 4 of section 12
26	2 the. 1 tut. 2 exp.	items 13,14, of section 15	Power Calculation	From 1 to12 of section 11	From 1 to 4 of section 12
27	2 the. 1 tut. 2 exp.	items 13,14, of section 15	Power Calculation	From 1 to12 of section 11	From 1 to 4 of section 12
28	2 the. 1 tut. 2 exp.	items 13,14, of section 15	Power triangle	From 1 to12 of section 11	From 1 to 4 of section 12
29	2 the. 1 tut. 2 exp.	items 13,14, of section 15	Power factor correction, Resonance	From 1 to12 of section 11	From 1 to 4 of section 12
30	2 the. 1 tut. 2 exp.	item 15 of section 15	Three phase circuits	From 1 to12 of section 11	From 1 to 4 of section 12

11. Infrastructure	
1. Books Required reading:	• Electrical Circuits, 2nd edition, Nilson, 1986. • Fundamentals of Electric Circuits", C.K. Alexander and M.N.O. Sadiku, McGraw Hill, 4th edition, 2009.2. • "Basic Engineering Circuit Analysis", J. D. Irwin, Fourth edition, Macmillan, most recent edition. • Electrical Devices and Circuit theory, 9th edition , Boylestad, 2006.
2. Main references (sources)	

A- Recommended books and references (scientific journals, reports…).	• Electrical Circuit theory and Technology, 4th edition, Bird, 2010. • Engineering Circuit Analysis, 7th edition, Hayt and Kemmerly,2007. • Introductory Circuit Analysis, 5th edition, Bolyestad, • A Textbook of Electical Technology, Thiraja, 2009. • Introduction to Electric Circuits (9th Edition) by Dorf and Svoboda, John Wiley & Sons (2013). • ASEECircuitAnalysis_in_MATLAB_and_Simulink • Matlab - Electronics and Circuit Analysis using Matlab • The_Analysis_and_Design_of_Linear, 8th edition (2016) • Mathematical_Foundations_for_Linear (2016)
B-Electronic references, Internet sites…	Laboratory experiments in the Measurements Lab of the department. Available websites related to the subject. Extracurricular activities.

12. The development of the curriculum plan
Maintaining Continuous development of academic curricula in line with the scientific development.

TEMPLATE FOR COURSE SPECIFICATION

FUNDAMENTALS OF DIGITAL SYSTEMS

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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 programme specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Fundamentals of Digital System / COE 105
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st and 2nd Academic Semesters 2023 – 2022

6. Number of hours tuition (total)	90 hrs. /3 hrs. Per week Theory. 60 hrs. / 2 hrs. per week Lab.
7. Date of production/revision of this Specification	October/ 2022

8. Aims of the Course
A1. Define the problem (Inputs and Outputs), write its functions.
A2. Implement functions using digital circuit (Combinational or Sequential).
A3. Minimize functions using any type of minimizing algorithms (Boolean algebra, Karnaugh-Map or Tabulation Method).
A4. Have knowledge in analyzing and designing procedures of Combinational and Sequential circuits.

9. Learning Outcomes, Teaching ,Learning and Assessment Method
A. Cognitive goals.
A1. Number system A2. Digital Codes A3. Logic Gates A4. Boolean algebra A5. The Karnaugh Map A6. Arithmetic circuits A7. Sequential Circuits

B. The skills goals special to the course

A student who successfully fulfills the course requirements will have demonstrated:

B1. Learning about the different number systems.
B2. Learning the arithmetic operations related to different number systems.
B3. Learning the different logic gates of computer system and their work.
B4. Ability to design, simplify and implement different logical and arithmetic circuits that considered the basic of digital system.
B5. Ability to design, simplify and implement different sequential circuits, counters and shift registers.
B6. Learning the basics of computer hardware including memory, registers, arithmetic and logic unit, and bus system.

Teaching and Learning Methods

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. Connection between Theory and Application.
7. Field Trips.
8. Extracurricular Activities.
9. In- and Out-Class oral conservations.

Assessment methods

1. Lab
2. Quizzes and exams
3. homework
4. assignments

C. Affective and value goals

C1. Imagination
C2. Analyzing
C3. Ability to work within the team.
C4. Problem solving, by applying the learning outcomes and subject -specific skills to solve practical design problems.

Teaching and Learning Methods

1. Lectures
2. Homework
3. Lab. Experiments.
4. Discussions

Assessment methods

1. Quizzes and exams
2. homework
3. Lab
4. assignments

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)
D1. Ability to carry out Independent study to take notes, to carry out background reading. D2. Problem Solving based on understanding. D3. Ability to learn and remember key facts. D4. Self-discipline and self-motivation.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	2 theory 1 tutorial	A1	Number system	From 1 to9 of Teaching and Learning	From 1 to3 of Assessment Method
3-4	2 theory 1 tutorial 2 labs.	A2, A6	Arithmetic Operation	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
5	2 theory 1 tutorial 2 labs.	A1, A2	Digital Codes	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method

6	2 theory 1 tutorial 2 labs.	A3, A6	Logic Gates	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
7-9	2 theory 1 tutorial 2 labs.	A4, A6	Boolean algebra	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
10-11	2 theory 1 tutorial 2 labs.	A4	The Karnaugh Map	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
12-13	2 theory 1 tutorial 2 labs.	A4	Implementation of Logic Circuit	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
14-15	2 theory 1 tutorial 2 labs.	A2, A6	Basic Adders	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
16-17	2 theory 1 tutorial 2 labs.	A2, A6	Arithmetic circuits	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
18	2 theory 1 tutorial 2 labs.	A2, A6	Comparators	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
19	2 theory 1 tutorial 2 labs.	A2, A6	BCD Adder	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method

20	2 theory 1 tutorial 2 labs.	A6	Decoders and encoders, case studies: Seven Segment decoder, Memory Decoder, Priority Encoder	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
21	2 theory 1 tutorial 2 labs.	A6	Multiplexers and De-multiplexers, case studies: Chanel Multiplexing and Demulutiplexing	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
22	2 theory 1 tutorial 2 labs.	A5	Sequential Circuits	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
23-24	2 theory 1 tutorial 2 labs.	A5, A6	Asynchronous Counter	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
25-27	2 theory 1 tutorial 2 labs.	A5, A6	Synchronous Counter	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
28-30	2 theory 1 tutorial 2 labs.	A5, A6	Shift registers, linear feedback shift register	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method

11. Infrastructure	
1. Books Required reading:	• Fundamentals of logic design, 5th edition, Roth, 2004, Thomson learning, Inc. • Digital electronics, 5th edition, Bignell, 2007, Thomson learning, Inc. • Digital logic design, 4th edition, Holdsworth, 2002, Elsevier. • Digital systems,10th edition, Tocci, 2007,pearson prentice hall • Digital fundamentals, 10th edition, Floyd, 2009, Pearson prentice hall. • Digital design, 4th edition, Mano, 2007, Pearson prentice hall.
2. Main references (sources)	
A- Recommended books and references (scientific journals, reports…).	None
B-Electronic references, Internet sites…	Laboratory experiments in the (logic Lab.) of the department. http://www.electronics-tutorials.ws/combination

12. The development of the curriculum plan
Maintaining Continuous development of academic curricula in line with the scientific development.

TEMPLATE FOR COURSE SPECIFICATION

COMPUTER PROGRAMMING METHODOLOGY

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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 programme specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Computer Programming Methodology / COE 106
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.

5. Semester/Year	1st and 2nd Academic Semesters 2022 – 2023
6. Number of hours tuition (total)	150 hrs. / 5 hrs., per week
7. Date of production/revision of this Specification	October/ 2022

8. Aims of the Course
A1. This course aims to help students to learn how to use Python programming language to solve real-life and scientific problems. The objective of the course is to provide students with confidence of their ability to write small useful programs.

A2. In addition, the course covers some details of essential programming topics like: program debugging, testing and algorithm development.

A3. Students learn best by experimenting a plenty of programs that that solve useful and interesting problems. The problems tackled cover a wide range of general, and scientific applications although none of them require specialist knowledge.

A4. Students will test all their homework programs included some examples either on a computer in the class laboratory or on their personal computers under supervisions of our staff.

A5. Quizzes are placed at the end of each section so both lecturer and students can check whether they are on the right track.

A6. The programming exercises are also graded, allowing the students gradually to attempt more difficult problems as their confidence and experience increase.

9. Learning Outcomes, Teaching ,Learning and Assessment Method

A. Cognitive goals.

A1. Computers and their uses/ Hardware/Software.
A2. Programming languages/How to use/ run programs.
A3. Design and representation of algorithms/ implementation / testing and verification/ program A4. Complex variables.
A5. Programming in Python/basic syntax: interactive mode programming and script mode programming.
A6. Handling multiple data types and type conversions.

A7. Python program control: Conditions, boolean logic, logical operators, ranges.

A8. Functions in Python.

A9. Python classes and OOP.

B. The skills goals special to the course.

Upon successful completion of the course, students should be able to

B1. Read given source code in Python and understand its behavior

B2. Extend existing source code for new features

B3. Write original source code to solve an engineering problem

B4. Organize source code in a modular form.

B5. Design and implement dynamic data structures using user-defined data types.

B6. Read and write Python programs that use dynamic data structures.

B7. Read and write Python programs that use structures.

Teaching and Learning Methods

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Lab. Experiments.
5. Tests and Exams.
6. In-Class Questions and Discussions.
7. Connection between Theory and Application.
8. Field Trips.
9. Extracurricular Activities.
10. Seminars.
11. In- and Out-Class oral conservations.
12. Reports, Presentations, and Posters.

Assessment methods

1. Lab
2. Quizzes and exams
3. homework
4. assignments

C. Affective and value goals

C1. Ability to analyze.

C2. Ability to program the idea.

C3. Ability to excute.

Teaching and Learning Methods

5. Lectures
6. Homework
7. Lab. Experiments.
8. Discussions

Assessment methods

1. Quizzes and exams
2. homework
3. Lab
4. assignments

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts.
D4. Self-discipline and self-motivation.

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Computers and their uses/ Hardware/Software	From 1 to11 of section 11	From 1 to 4 of section 12
2	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Programming languages/How to use/ run programs	From 1 to11 of section 11	From 1 to 4 of section 12
3	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Using computers in problem solving/ requirement specifications/ analysis	From 1 to11 of section 11	From 1 to 4 of section 12
4	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Design and representation of algorithms/ implementation / testing and verification/ program	From 1 to11 of section 11	From 1 to 4 of section 12
5	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Programming in Python/basic syntax: interactive mode programming and script mode programming	From 1 to11 of section 11	From 1 to 4 of section 12
6	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Python data types: variables, assignments and numerical types.	From 1 to11 of section 11	From 1 to 4 of section 12
7	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Arithmetic and logical operators, precedence of operators	From 1 to11 of section 11	From 1 to 4 of section 12
8	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Numeric data type: using the Math library	From 1 to11 of section 11	From 1 to 4 of section 12
9	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	String data type: simple string processing and string manipulation	From 1 to11 of section 11	From 1 to 4 of section 12
10	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Python text files: reading from and writing to a file	From 1 to11 of section 11	From 1 to 4 of section 12
11	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Python lists: Traversing a list and list operations	From 1 to11 of section 11	From 1 to 4 of section 12

12	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Python dictionary: accessing values in dictionary, updating dictionary and deleting dictionary elements	From 1 to11 of section 11	From 1 to 4 of section 12
13	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Handling multiple data types and type conversions	From 1 to11 of section 11	From 1 to 4 of section 12
14	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Python modules: The import statement	From 1 to11 of section 11	From 1 to 4 of section 12
15	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Python date & time: the time module and the calendar module	From 1 to11 of section 11	From 1 to 4 of section 12
16	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Simple graphics: “turtle” module; simple 2d drawing - colors, shapes.	From 1 to11 of section 11	From 1 to 4 of section 12
17	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Python program control: Conditions, boolean logic, logical operators, ranges.	From 1 to11 of section 11	From 1 to 4 of section 12
18	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	If statement, nested if statement, if-else if ladder else	From 1 to11 of section 11	From 1 to 4 of section 12
19	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Loops: while statement.	From 1 to11 of section 11	From 1 to 4 of section 12
20	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Loops: for statement	From 1 to11 of section 11	From 1 to 4 of section 12
21	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Nested loops	From 1 to11 of section 11	From 1 to 4 of section 12
22	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Skipping loop iterations break and continue.	From 1 to11 of section 11	From 1 to 4 of section 12
23	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Using loops for accessing data in lists, files…	From 1 to11 of section 11	From 1 to 4 of section 12

24	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Functions in Python: new function creation, return values and calls	From 1 to11 of section 11	From 1 to 4 of section 12
25	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Functions in Python: arguments and return values; formal vs actual arguments,	From 1 to11 of section 11	From 1 to 4 of section 12
26	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Functions in Python: Recursive functions.	From 1 to11 of section 11	From 1 to 4 of section 12
27	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Python classes and OOP: classes, objects, attributes and methods.	From 1 to11 of section 11	From 1 to 4 of section 12
28	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Python classes and OOP: Inheritance, polymorphism and encapsulation.	From 1 to11 of section 11	From 1 to 4 of section 12
29	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Python classes and OOP: defining classes	From 1 to11 of section 11	From 1 to 4 of section 12
30	3 the. 1 tut. 2 exp.	From 1 to 8 of section 10	Python classes and OOP: extending classes	From 1 to11 of section 11	From 1 to 4 of section 12

11. Infrastructure	
1. Books Required reading:	• Guttag, John. Introduction to Computation and Programming Using Python. Spring 2013 edition. MIT Press, 2013 • Allen B. Downey. Think Python. Second edition. O'Reilly, 2007.
2. Main references (sources)	

A- Recommended books and references (scientific journals, reports…).	• T. E. Oliphant, "Python for Scientific Computing," in Computing in Science & Engineering, vol. 9, no. 3, pp. 10-20, May-June 2007. • Atanas Radenski. 2006. "Python first": a lab-based digital introduction to computer science. SIGCSE Bull. 38, 3 (June 2006), 197-201. • Douglas Blank, Deepak Kumar, Lisa Meeden, and Holly Yanco. 2003. Pyro: A python-based versatile programming environment for teaching robotics. J. Educ. Resour. Comput. 3, 4, Article 1 (December 2003).
B-Electronic references, Internet sites…	• Laboratory experiments in the (programming Lab) of the department.

12. The development of the curriculum plan
Maintaining Continuous development of academic curricula in line with the scientific development.

TEMPLATE FOR COURSE SPECIFICATION

FUNDAMENTALS OF COMPUTER SYSTEM

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the computer system 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 program specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Fundamentals of Computer System / COE107
4. Modes of Attendance offered	Annual System: There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-weeks regular subjects.

5. Semester/Year	Academic year 2023 – 2022
6. Number of hours tuition (total)	150 hrs. (Totally) 3 hrs. per week in class 2 hrs. per week in lab
7. Date of production/revision of this Specification	October / 2022

8. Aims of the Course
A1. This course is intended for first class students. These students typically will have knowledge of how computer works, how to assemble and disassemble the computer and how to troubleshoot hardware and software issues and these students will be able to have a career in IT.
A2. The students will enhance the capability of using Microsoft Word, Excel, and PowerPoint, because of the wide uses of these applications in the field of education, scientific research and the preparation of research reports.

9. Learning Outcomes, Teaching, Learning and Assessment Method
A. Cognitive goals.
A1. Introduction to Personal Computer. A2. Describe a computer system. A3. Fundamentals of Operating System (OS). A4. Fundamentals of Laptops and Portable devices. A5. Fundamentals for networks, explain the principle of networking. A6. Professional use of Microsoft Application (Word, Excel, and Power Point).

B. The skills goals special to the course.

The student will be able to:

B1. Deal with the computer system.

B2. Identify the names, purposes, and characteristics of system units.

B3. Identify the names, purposes, and characteristics of CPU.

B4. Install and troubleshoot the CPU.

B5. Identify the names, purposes, and characteristics of motherboard.

B6. Install and troubleshoot the motherboard.

B7. Identify the names, purposes, and characteristics of adapter cards.

B8. Install and troubleshoot the adapter cards.

B9. Identify the names, purposes, and characteristics of memory.

B10. Install and troubleshoot memory.

B11. Identify the names, purposes, and characteristics of storage devices.

B12. Install and troubleshoot the storage devices.

B13. Understand the purpose of the operating system.

B14. Install an operating system.

B15. Navigate an operating system GUI

B16. Apply preventive maintenance techniques for operating systems.

B17. Troubleshoot operating systems.

B18. Identify serial and parallel ports that have been standard on PCs since the beginning, as well as the universal serial bus (USB, which has replaced the older serial and parallel ports) and IEEE 1394 also called FireWire interfaces.

B19. Install and troubleshoot the system units.

B20. Learn the computer security against electronic intrusion methods and software license.

B21. Identify the purpose and components of laptops and other portable devices. and troubleshoot laptops and portable devices. apply preventive maintenance techniques for laptops and portable devices.

B22. Identify video hardware devices and their functions.

B23. Identify audio hardware devices and their functions.

B24. Identify various internet connection technologies.

B25. Identify names, purposes, and characteristics of input devices and their operation.

B26. Identify names, purposes, and characteristics of output devices and their operation.

B27. Learn the principles of networking, the basic networking concepts, and technologies.

B28. Use Microsoft Applications (Word, Excel, and Power point) professionally.

B29. Be familiar with minimum key features of Microprocessor and assembly language in simplest structures.

Teaching and Learning Methods

1. Lectures.
2. Lab. Experiments.
3. Tutorials.
4. Homework and Assignments.
5. Tests and Exams.
6. In-Class Questions and Discussions.
7. Seminars.
8. In- and Out-Class oral conservations.
9. Reports, Presentations, and Posters.

Assessment methods

1. Lab reports.
2. Quizzes and exams.
3. Homework.
4. Assignments.

C. Affective and value goals

C1. Ability to install.
C2. Ability to troubleshoot.
C3. Ability to maintain.

Teaching and Learning Methods

1. Lectures
2. Lab. Experiments.
3. Virtual classroom (E-learning)

Assessment methods

1. Quizzes and exams
2. Homework
3. Lab reports
4. Assignments

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

D1. Ability to carry out independent study to take notes, to carry out background reading.

D2. Problem Solving based on understanding.

D3. Ability to learn and remember key-facts.

D4. Self-discipline and self-motivation.

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3 The. 2 Lab.	B1, B2	The. (Development of the PC) Lab. (Experiment No.1: - Identifying Computer Components)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
2	3 The. 2 Lab.	B1, B2	The. (Development of the PC) Lab. (Experiment No.2: Identifying Tools and Software used with personal computers and knowing their purposes.	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
3	3 The. 2 Lab.	B1, B2	The. (PC Components, Features, and System Design) Lab. (Experiment No.3: - Computer Assembling and Disassembling)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
4	3 The. 2 Lab.	B3, B4	The. (Processor Types and Specifications) Lab. (Experiment No.4: - Installing Windows Operating System	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
5	3 The. 2 Lab.	B5, B6	The. (Power Supplies) Lab. (Experiment No.4: - Installing Windows Operating System	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)

6	3 The. 2 Lab.	B5, B6	The. (Motherboards and Buses) Lab. Experiment No.5: -How do you navigate within an operating system GUI and CLI	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
7	3 The. 2 Lab.	B5, B6	The. (Motherboards and Buses) Lab. Experiment No.5: -How do you navigate within an operating system GUI and CLI	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
8	3 The. 2 Lab.	B7, B8	The. (BIOS) Lab. Experiment No.6: -Explore Administrative Tools	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
9	3 The. 2 Lab.	B9, B10	The. (Memory) Lab. Experiment No.6-Explore Administrative Tools	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
10	3 The. 2 Lab.	B9, B10	The. (Memory) Lab. Experiment No.7: - Preventive maintenance procedure for OS	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
11	3 The. 2 Lab.	B11, B12	The. (Hard disk Storage) Lab. Experiment No.7: - Preventive maintenance procedure for OS	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
12	3 The. 2 Lab.	B11, B12	The. (Flash and removable Storage) Lab. (Experiment No.8: - Using windows program, properties, and applications (computer	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
13	3 The. 2 Lab.	B11, B12	The. (Optical storage) Lab. (Experiment No.9: - Formal and Informal Email writing and managing (Google workspace)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
14	3 The. 2 Lab.	B13, B14, B15, B16, B17	The. (Introduction to operating system) Lab. (Experiment No.10: - Creating a Partition in Windows OS)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)

15	3 The. 2 Lab.	B18	The. (External I/O Interface) Lab. (Experiment No.11: -MS Word)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
16	3 The. 2 Lab.	B19	The. (PC Diagnostics, Testing, and Maintenance) Lab. (Experiment No.11: -MS Word)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
17	3 The. 2 Lab.	B19	The. (Building or Upgrading Systems) Lab. (Experiment No.11: -MS Word)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
18	3 The. 2 Lab.	B20	The. (Computer safety and software license) Lab. Experiment No.11: -MS Word)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
19	3 The. 2 Lab.	B21	The. (Laptop and Portable Devices) Lab. (Experiment No.12: - Identify laptop components and Laptop Assembling and disassembling)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
20	3 The. 2 Lab.	B22, B23	The. (Audio and Video hardware) Lab. (Experiment No.13: -MS Power point)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
21	3 The. 2 Lab.	B24	The. (Internet Connectivity) Lab. (Experiment No.13: -MS Power point)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
22	3 The. 2 Lab.	B25	The. (Input Device Types and Operation). Lab. (Experiment No.13: -MS Power point)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
23	3 The. 2 Lab.	B25	The. (Input Device Types and Operation). Lab. (Experiment No.14: -MS Excel)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)

24	3 The. 2 Lab.	B26	The. (Output Device Types and Operation). Lab. (Experiment No.14: -MS Excel)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
25	3 The. 2 Lab.	B26	The. (Output Device Types and Operation). Lab. (Experiment No.14: - MS Excel)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
26	3 The. 2 Lab.	B27	The. (Network Fundamentals) Lab. (Experiment No.15: - Networking UTP-cable configuration and testing)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
27	3 The. 2 Lab.	B27 B28	The. (Introduction to Microprocessor Structure) Lab. (Experiment No.15: - Networking PC to PC interface using UTP-cable, sharing folders, building small network using hub, LAN card and UTP cable)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
28	3 The. 2 Lab.	B29	The. (Introduction to Microprocessor Comparison among different processor types) Lab. (Experiment No.16: - installing MP emulator)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
29	3 The. 2 Lab.	B29	The. (Introduction to Microprocessor Assembly language) Lab. (Experiment No.16: - Writing code with assembly language using emulator)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)
30	3 The. 2 Lab.	B29	The. (Introduction to Microprocessor Assembly language) Lab. (Experiment No.16: - Writing code with assembly language using emulator)	From 1 to 9 of section (Teaching and Learning Methods)	From 1 to 4 of section (Assessment Methods)

11. Infrastructure	
1. Books Required reading:	• أ.م.د زياد محمد عبود, أ.د غسان حميد عبد المجيد , أ.م. د. اميرحسين مراد, م. بلال كمال احمد, "أساسيات الحاسوب و تطبيقاته المكتبية ", الجزء الاول, الدار الجامعية للطباعة و النشروالترجمة , 2014. • أ.م.د زياد محمد عبود, أ.د غسان حميد عبد المجيد, م.د. مصطفى ضياء الحسني, "اساسيات الحاسوب و تطبيقاته المكتبية", الجزء الثاني, الدار الجامعية للطباعة و النشروالترجمة , 2016. • أ.م.د زياد محمد عبود, أ.د.غسان حميد عبد المجيد, أ.م. سهيل نجم عبود , م. م. عدنان خلف شذر, "اساسيات الحاسوب و تطبيقاته
2. Main references (sources)	Scott Mueller, “UPGRADING AND REPAIRING PCs”, 20th edition, 2012.
A- Recommended books and references (scientific journals, reports…).	None
B-Electronic references, Internet sites…	none

12. The development of the curriculum plan
Maintaining Continuous development of academic curricula in line with the scientific development.

Second Stage

TEMPLATE FOR COURSE SPECIFICATION
Engineering Mathematics

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

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	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Engineering Mathematics / COE 202
4. Modes of Attendance offered	Annual System: There is only one mode of delivery, which is a “Day Program”. The students are full-time students and on campus. They attend a full-day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st& 2nd / Academic Year 2022-2023
6. Number of hours tuition (total)	120 hrs. / 4 hrs. per week.
7. Date of production/revision of this specification	October/2022
8. Aims of the Course:	
1. As a brief description for the Goals and objectives, by the completion of the course the goals are: 2. How to relate the skills and concepts learned from Mathematics to understand Engineering Mathematics	

3. How to use the learned skills to understand, derive, and solve the equations in various objects (e.g., Electronics II, DSP, Communications, Digital Control etc.)
4. Representation of an Introduction to advanced calculus.

9. Learning Outcomes, Teaching, Learning and Assessment Methods

A- Cognitive Goals

A1- Understanding the algebra of the Complex numbers and converting them to various forms.

A2- Applying useful topics of integration including numerical integration.

A3- Using Taylor polynomials to linearize functions and forming Taylor and Maclaurin series.

A4- Techniques for solving first order (linear or non-linear) differential equations, how to solve second and higher order (homogenous and non-homogenous) differential equations for determined and undetermined coefficients.\

A5- Using numerical methods to solve the ODE's using Euler and Runge-Kutta methods.

A6- Learning Laplace Transform and its applications in control systems.

A7- Acquiring Difference equations and Z-Transform to be used in DSP.

A8- Studying Fourier series and Transform to be used in Communications.

B- The skills goals special to the course

B1- How to relate the skills and concepts learned from Mathematic to understand Engineering Mathematics.

B2- How to use the learned skills to understand, derived, and solve the equations in various objects (e.g., Electronics II, DSP, Communications, Digital Control etc.)

B3- Representation of an introduction to advanced calculus.

Teaching and Learning Methods

1. Lectures.
2. Tutorials.

3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. The connection between Theory and Application.
7. Seminars.
8. In-and Out-Class oral conservations.
9. Reports, Presentations, and Posters.

Assessment methods

1. Examinations, Tests, and Quizzes.
2. Extracurricular Activities.
3. Student Engagement during Lectures.
4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor)

C- Affective and value goals

C1- An ability to read and comprehend mathematical literature at an appropriate level.

C2- An ability both to follow and correctly to construct mathematical proofs of appropriate degrees of complexity.

C3- An appreciation of the importance of proof, generalization, and abstraction in the logical development of formal theories.

Teaching and Learning Methods

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams

Assessment methods

1. Examinations, Tests, and Quizzes.
2. Extracurricular Activities.
3. Student Engagement during Lectures.
4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor)

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

D1- Relying on online lectures using data show.

D2- Making the lecture more interactive by inclusion techniques.

10- Course Structure:

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3 the. 1 tut.	Item 1,2 of section 10	**Complex Numbers, Operations, Polar and exponential form**	From 1 to 12 of section 11	From 1 to 4 of section 12
2	3 the. 1 tut.	From 1 to 3 section 10	**Phasors and De Moivre Theorem. Quiz**	From 1 to 12 of section 11	From 1 to 4 of section 12
3	3 the. 1 tut.	From 1 to 3 section 10	**Orthogonal Functions and Integrals, Integrations of continuous functions**	From 1 to 12 of section 11	From 1 to 4 of section 12
4	3 the. 1 tut.	From 1 to 3 section 10	**Numerical Integration. Quiz**	From 1 to 12 of section 11	From 1 to 4 of section 12
5	3 the. 1 tut.	From 1 to 3 section 10	**Taylor Polynomials and Linearization**	From 1 to 12 of section 11	From 1 to 4 of section 12
6	3 the. 1 tut.	From 1 to 3 section 10	**Taylor 2nd and n-order polynomials, Remainder Term**	From 1 to 12 of section 11	From 1 to 4 of section 12
7	3 the. 1 tut.	Item 4,5 of section 10	**Taylor and Maclaurin series, Quiz**	From 1 to 12 of section 11	From 1 to 4 of section 12
8	3 the. 1 tut.	Item 7 of section 10	**First-order ODE**	From 1 to 12 of section 11	From 1 to 4 of section 12
9	3 the. 1 tut.	Item 7 of section 10	**Second-order ODE**	From 1 to 12 of section 11	From 1 to 4 of section 12
10	3 the. 1 tut.	Item 7 of section 10	**State-Space**	From 1 to 12 of section 11	From 1 to 4 of section 12
11	3 the. 1 tut.	Item 1 to 5& 7 of section 10	**Numerical Methods, Euler and Runge-Kutta**	From 1 to 12 of section 11	From 1 to 4 of section 12
12	3 the. 1 tut.	Item 7 of section 10	**Term Quiz**	From 1 to 12 of section 11	From 1 to 4 of section 12
13	3 the. 1 tut.	Item 7 of section 10	**Laplace Transform Introduction and properties**	From 1 to 12 of section 11	From 1 to 4 of section 12
14	3 the. 1 tut.	Item 6,7 of section 10	**Inverse Laplace Transform**	From 1 to 12 of section 11	From 1 to 4 of section 12
15	3 the. 1 tut.	Item 5 of section 10	**Partial Fraction, Solving ODE using LT**	From 1 to 12 of section 11	From 1 to 4 of section 12
16	3 the. 1 tut.	Item 5,6,8 of section 10	**Transfer Functions, Poles and Zeros, Quiz**	From 1 to 12 of section 11	From 1 to 4 of section 12
17	3 the. 1 tut.	Item 9 of section 10	**Term Quiz**	From 1 to 12 of section 11	From 1 to 4 of section 12
18	3 the. 1 tut.	Item 5,6,8 of section 10	**Difference Equations and Z-Transform**	From 1 to 12 of section 11	From 1 to 4 of section 12
19	3 the. 1 tut.	Item 5,6,8 of section 10	**Design a digital controller, Numerical solution of DE**	From 1 to 12 of section 11	From 1 to 4 of section 12
20	3 the. 1 tut.	Item 5,6,8 of section 10	**Partial Fraction, Solving ODE using LT**	From 1 to 12 of section 11	From 1 to 4 of section 12
21	3 the. 1 tut.	Item 5,6,8 of section 10	**Transfer Functions, Poles and Zeros, Quiz**	From 1 to 12 of section 11	From 1 to 4 of section 12
22	3 the. 1 tut.	Item 5,6,8 of section 10	**Z-Transform Introduction, properties**	From 1 to 12 of section 11	From 1 to 4 of section 12

23	3 the. 1 tut.	Item 5,6 & 8 of section 10	**Sampling continuous signal, relation of ZT with LT**	From 1 to 12 of section 11	From 1 to 4 of section 12
24	3 the. 1 tut.	Item 6,8 of section 10	**Inverse Z-Transform**	From 1 to 12 of section 11	From 1 to 4 of section 12
25	3 the. 1 tut.	Item 6,8 of section 10	**Partial Fraction, Solving DE using ZT**	From 1 to 12 of section 11	From 1 to 4 of section 12
26	3 the. 1 tut.	Item 9 of section 10	**Term Quiz**	From 1 to 12 of section 11	From 1 to 4 of section 12
27	3 the. 1 tut.	Item 9 of section 10	**Fourier Series, trigonometric and complex forms**	From 1 to 12 of section 11	From 1 to 4 of section 12
28	3 the. 1 tut.	Item 6 of section 10	**Fourier Transform**	From 1 to 12 of section 11	From 1 to 4 of section 12
29	3 the. 1 tut.	Item 9 of section 10	**Discrete Fourier Transform**	From 1 to 12 of section 11	From 1 to 4 of section 12
30	3 the. 1 tut.	Item 9 of section 10	**Term Quiz**	From 1 to 12 of section 11	From 1 to 4 of section 12

11. Infrastructure	
1- Books Required reading:	1- Thomas Calculus, George B. Thomas, 11th Edition, 2005, Pearson Education Inc. 2- Thomas CALCULUS George B. Thomas Maurice D. Weir Global Edition 2010
2- Main references (sources)	3- Croft et al., Engineering Mathematics A Foundation for Electronic, Electrical, Communications and Systems Engineering, 5th Ed., Pearson (2017).
A- Recommended books and references (scientific journals, reports…)	
B- Electronic references, Internet sites…	

12-The development of the curriculum plan

Continuous developing academic curricula in line with the scientific development

TEMPLATE FOR COURSE SPECIFICATION
Electronics II

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

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	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code& Description	Electronics II / COE 203
4. Modes of Attendance offered	Annual System: There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st& 2nd / Academic Year 2023-2022
6. Number of hours tuition (total)	150 hrs. (Totally) 3 hrs. per week in class 2 hrs. per week in lab
7. Date of production/revision of this specification	October/2022
8. Aims of the Course	
1- To understand the following:-	

2- Small signal Amplifier analysis and Design using BJTs.
3- FET structure, Biasing, and small signal Amplifier analysis and Design using FET.
4- Ideal operational amplifiers applications (linear and non-linear).
5- Basic understanding to negative feedback.
6- Oscillators and multivibrators.
7- Logic families and their developments.
8- Analog to digital converters (ADC) and digital to analog converters (DAC).
9- Semiconductor memories.

9·Learning Outcomes

A. Knowledge and Understanding:

A1. Small signal AC analysis of different configurations of BJT amplifiers.

A2. Field Effect Transistors basic structure, operation, and dc biasing.

A3. Small signal AC analysis of different configurations and types of FET amplifiers.

A4. Ideal Operational amplifiers equivalent circuit, characteristics, and applications.

A5. Basic understanding of negative feedback systems.

A6. Oscillators principles of operation and different oscillator circuits.

A7. 555 timers as multivibrators.

A8. Different logic families and their developments.

A9. DACs and ADCs.

A10. Semiconductor memories.

B. Subject-specific skills

B1. design simple electronic circuits.

B2. design amplification circuits according to the desired parameters.

C. Thinking Skills

C1. ability of optimal design.

C2. ability of electronic measurements

D. Personal Development

D1. Electronic device classification.

D2. H/W maintenance

Teaching and Learning Methods (T-methods)

1- Lectures.
2- Tutorials.
3- Homework and Assignments.
4- Lab. Experiments.
5- Tests and Exams.
6- In-Class Questions and Discussions.
7- Connection between Theory and Application.
8- Extracurricular Activities.
9- Seminars.
10- In- and Out-Class oral conservations.
11- Reports, Presentations, and Posters.

Assessment Methods (A-Methods)

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about

Curriculum and Faculty Member (Instructor)

10.Course Structure

week	Hours	ILOs	Topic title	Teaching method	Assessment Method
1	2 the. 1 tut.	Item A1	**The re model of BJT transistors (ac model of BJTs) and common emitter fixed bias configuration ac analysis**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
2	2 the. 1 tut.	Item A1	**AC analysis of different BJT configurations**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
3	2 the. 1 tut.	Item A1	**Effect of load and source resistance on the ac gain**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
4	2 the. 1 tut.	Item A1	**Cascade configuration and design of BJT amplifiers.**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
5	2 the. 1 tut.	Item A2	**Field Effect Transistors basic construction and operation**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)

6	2 the. 1 tut.	Item A2	**Transfer characteristics of different FET amplifiers**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
7	2 the. 1 tut.	Item A2	**FET Biasing of different configurations**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
8	2 the. 1 tut.	Item A2	**FET Biasing of different configurations (continued)**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
9	2 the. 1 tut.	Item A3	**FET amplifiers ac analysis**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
10	2 the. 1 tut.	Item A3	**FET amplifiers ac analysis(continued)**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
11	2 the. 1 tut.	Item A4	**Operational amplifiers applications (linear applications)**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
12	2 the. 1 tut.	Item A4	**Operational amplifiers applications (non-linear applications)**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
13	2 the. 1 tut.	Item A5	**Negative feedback**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
14	2 the. 1 tut.	Item A6	**Basic principles of oscillators**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
15	2 the. 1 tut.	Item A6	**Different types of oscillators**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
16	2 the. 1 tut.	Item A7	**Timing circuits 555 timer applications, 555 timer as a mono stable multivibrator**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
17	2 the. 1 tut.	Item A7	**555 timer as an astable multivibrator and a bistable multivibrator**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
18	2 the. 1 tut.	Item A8	**Logic Families (RTL, DTL)**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
19	2 the. 1 tut.	Item A8	**TTL**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
20	2 the. 1 tut.	Item A8	**ECL**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
21	2 the. 1 tut.	Item A8	**CMOS**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
22	2 the. 1 tut.	Item A9	**DAC**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
23	2 the. 1 tut.	Item A9	**DAC**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
24	2 the. 1 tut.	Item A9	**ADC**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
25	2 the. 1 tut.	Item A9	**ADC**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
26	2 the. 1 tut.	Item A10	**ROM**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
27	2 the. 1 tut.	Item A10	**EPROM**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
28	2 the. 1 tut.	Item A10	**E2PROM**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
29	2 the. 1 tut.	Item A10	**Static RAM**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods)
30	2 the. 1 tut.	Item A10	**Dynamic RAM**	From 1 to 7 of (T-Methods)	From 1 to 4 of (A-methods

11. Infrastructure	
1. Books Required reading:	1-"Electronic Devices and Circuit Theory", Robert Boylestad, Louis Nashelsky, 9th Edition , 2006. Papers 2-Pa McAndrew, Colin C., Alexandra Lorenzo-Cassagnes, and Olin L. Hartin. "Transistor self-heating correction and thermal conductance extraction using only DC data." Microelectronic Test Structures (ICMTS), 2016 International
2. Main references (sources)	3-Socratous, Josephine, et al. "Electronic Structure of Low-Temperature Solution-Processed Amorphous Metal Oxide Semiconductors for Thin-Film Transistor Applications." Advanced functional materials 25.12 (2015): 1873-1885.
A- Recommended books and references (scientific journals, reports…).	Laboratory experiments in the (Electronics & Communications Lab) of the department.
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
Continuous improvement of curriculum and faculty members through training

TEMPLATE FOR COURSE SPECIFICATION
Microprocessor and Microcomputer I

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

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	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code& Description	Microprocessor & Microcomputer I / COE 204
4. Modes of Attendance offered	Annual System: There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st & 2nd / Academic Year 2022-2023
6. Number of hours tuition (total)	90 hrs. / 3 hrs. per week Theory . 60 hrs. / 2 hrs. per week Lab.
7. Date of production/revision of this specification	October 2022
8. Aims of the Course	
1- What are the knowledge and skills expected to be attained by the student upon completion of the course (brief description)?	

2- Knowledge of the software architecture of the 8088/8086 and how to write and run programs using assembly language.
3- Checking architecture of 80x86 microprocessor
4- Studying types of memories and communication principles between memory and the microprocessor.
5- Studying of peripheral devices and communication principles between peripheral devices and the microprocessor.
6- Studying Interrupts Interface.
7- Studying DMA Interface.

9· Learning Outcomes, Teaching , Learning and Assessment Method

A- Cognitive goals:

A1- Describe the software architecture of the 8088/8086 microprocessor.

A2- Know about the microprocessor's registers which includes general purpose registers, special purpose registers, and segment registers.

A3- Explain how a byte or a word of data is stored at a memory address space and the meaning of aligned and misaligned word.

A4- Describe the meaning of a logical address, a physical address and how to use the segment register and the instruction pointer to generate the physical memory address.

A5- Describe the meaning of addressing modes which include the register operand addressing mode, the immediate operand addressing mode and the memory operand addressing mode.

A6- Write a program in an assembly language using the 8086-emulator software (compiling, debugging, and running the program) .

A7- Convert a program that is written in assembly language to machine codes.

A8- Use the instruction set of the 8088/8086 microprocessor that includes data transfer instructions, Arithmetic instructions, Logic instructions and Shift/Rotate instructions in writing a program.

A9- Change the state of the flag status bits by using the flag instructions.

A10- Describe the concept of a stack, when to use the stack and how a value inputs to the stack and return from it using the push and pop instruction.

A11- Write a procedure (function), call a procedure, and return to the main program.

A12- Describe the meaning of a string and how to handle the string using the string instructions.

A13- Write a macro (opcode) and describe the difference between a macro and a procedure.

A14- Describe the hardware architecture of the 8088/8086 microprocessor (pin layout).

A15- Explain how to configure the 8088/8086 microprocessor to work in minimum mode or maximum mode.

A16- Explain the bus system and identify the types of the bus system which includes the address bus , the data bus ,the control bus and how they work .

B. The skills goals special to the course

B1- Explain all the control signals that are needed in implementing the minimum mode interface between the 8088/8086 microprocessor and memory or input/output devices.

B2- Explain all the control signals that are needed in implementing the maximum mode interface between the 8088/8086 microprocessor and memory or input/output devices.

B3- Explain the 8284-clock generator and how it generates the system clock to the 8088/8086 microprocessor.

B4- Define the bus cycle and explain the meaning of memory read, memory write bus cycle and input/output read, input /output write bus cycle.

B5- Draw the read bus cycle and the write bus cycle for memory and input/output devices in both modes.

B6- Define the meaning of the wait state, the idle state and when or where the processor inserts it in the bus cycle system.

B7- Explain the interface between the 8088/8086 microprocessor and the 8288-bus controller to generate the control signals in maximum mode .

B8- Describe the hardware organization of the memory address space and explain the difference between the 8086/8088 microprocessor from this point.

B9- Describe the devices that are needed in implementing the memory interface with the 8088/8086 microprocessor.

B10- Explain why the needs for memory address decoding circuit.

B11- Define the memory types and how they interface with the 8088/8086 microprocessor.

B12- Define the input /output types and how they interface with the 8088/8086 microprocessor.

B13- Use the input/output instructions in transferring data between the microprocessor and the input/output devices.

B14- Explain the interrupt types and how to use the interrupt instruction in software program.

B15- Explain how to interface multiple interrupts using 74f148 encoder.

B16- Understand the concept of direct memory address (DMA) and how the DMA controller works and interfaces with microcomputer system.

Teaching and Learning Methods.

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. Connection between Theory and Application.
7. Seminars.
8. In- and Out-Class oral conservations.
9. Reports, Presentations, and Posters.

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about

Curriculum and Faculty Member (Instructor)

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Methods

1-Tests, quizzes.

2- Activities.

3- Participate during lectures

Assessment methods

1- Study the conditions of former graduates.
2- Relevant committees in management such as scientific, QA.
3- The employee attitudes of our graduates, for example, workplace and job title, will be tracked each year.

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10.Course Structure

week	Hours	ILOs	Topic title	Teaching method	Assessment Method
1	2 the. 2 exp.	Item 1 of section 10	**Introduction to microprocessors& microcomputers.**	From 1 to 8 of section 11	From 1 to 4 of section 12
2	2 the. 2 exp.	Item 2 of section 10	**16-bit Microprocessor Software Architecture (8088/8086 µp): BIU &EU.**	From 1 to 8 of section 11	From 1 to 4 of section 12
3	2 the. 2 exp.	Item 3,4 of section 10	**16-bit Microprocessor Software Architecture (8088/8086 µp): memory organization, physical address generation & IO organization.**	From 1 to 8 of section 11	From 1 to 4 of section 12
4	2 the. 2 exp.	Item 5,6 of	**Introduction to Assembly Language Programming&**	From 1 to 8 of section 11	From 1 to 4 of section 12

		section 10	**Addressing Modes I of the 8088/ 8086.**		
5	2 the. 2 exp.	Item 5,6 of section 10	**Introduction to Assembly Language Programming& Addressing Modes II of the 8088/ 8086.**	From 1 to 8 of section 11	From 1 to 4 of section 12
6	2 the. 2 exp.	Item A3	**Converting Assembly Language Instructions to Machine Code.**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
7	2 the. 2 exp.	Item A3	**Data Transfer instructions [MOV, XCHG, LDS, LES, LEA].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
8	2 the. 2 exp.	Item A3	**Arithmetic Instructions: Addition-[ADD, ADC, INC, AAA, DAA] Subtraction-[SUB, SBB, DEC, NEG, AAS, DAS].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
9	2 the. 2 exp.	Item A3	**Arithmetic Instructions: Multiplication- [MUL, IMUL, AAM] Division-[DIV, IDIV, AAD, CBW, CWD].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
10	2 the. 2 exp.	Item A3	**Logic Instructions [AND, OR XOR, NOT, TEST]. Compare Inst. [CMP].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
11	2 the. 2 exp.	Item A3	**Shift & Rotate Instructions [SHL, SAL, SHR, SAR, ROL, RCL, ROR, RCR].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
12	2 the. 2 exp.	Item A3	**Flag Control Instructions [LAHF, SAHF, CLC, STC, CMC, CLI, STI, CLD, STD].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
13	2 the. 2 exp.	Item A3	**Control Transfer Insts. Unconditional jump [JMP]. Conditional Jump Insts.**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
14	2 the. 2 exp.	Item A3	**LOOP&LOOP-Handling Instructions[LOOP, LOOPE/LOOPZ, LOOPNE/LOOPNZ].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
15	2 the. 2 exp.	Item A2, A3	**The Stack & Subroutines [PUSH, PUSHF, POP, POPF, CALL, RET].**	From 1 to 8 of	From 1 to 4 of A-methods

				T-methods	
16	2 the. 2 exp.	Item A3	**String and String-Handling Instructions:**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
17	2 the. 2 exp.	Item A6	**The 8088 and 8086 µps: [Pin layout, Minimum & Max-Mode Interfaces].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
18	2 the. 2 exp.	Item A7	**System Clock, Bus Cycle & Time States.8088/8086 Fully Buffered.**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
19	2 the. 2 exp.	Item A8	**The Memory System:[Memory bus-cycles read/ write, memory interfacing to 8088/8086 (I)].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
20	2 the. 2 exp.	Item A8	**The Memory System:[Memory types, memory chip requirements].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
21	2 the. 2 exp.	Item Item A8	**The Memory System:[Memory interfacing to 8088/8086 (II)].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
22	2 the. 2 exp.	Item A9	**Input /Output Interface Circuits and Peripheral Devices [Isolated& Memory-mapped I/O, Input/Output Bus cycles].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
23	2 the. 2 exp.	Item A9	**Input /Output Interface Circuits and Peripheral Devices-[LED, Switches, 7-segment].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
24	2 the. 2 exp.	Item A9	**Input /Output Interface Circuits and Peripheral Devices- [Keyboard & Parallel Printer Interface].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
25	2 the. 2 exp.	Item A5	**Introduction to 8279 Keyboard &Display controller and its interface to 8088/8086.**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
26	2 the. 2 exp.	Item A5	**Interrupt-[interrupt types: hardware, software, internal; vector table].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods

27	2 the. 2 exp.	Item A5	**Interrupt-[external hardware interrupt interface using INTR &NMI].**	From 1 to 8 of T-methods	From 1 to 4 of A-methods
28	2 the. 2 exp.	Item A5	**Interrupt-[Multiple Interrupt Interface using 74F148 encoder].**	From 1 to 12 of T-methods	From 1 to 4 of A-methods
29	2 the. 2 exp.	Item A10	**Introduction to Direct Memory Accessing DMA & 8237 DMA controller I.**	From 1 to 12 of T-methods	From 1 to 4 of A-methods
30	2 the. 2 exp.	Item A10	**Introduction to DMA & 8237 DMA controller II.**	From 1 to 12 of T-methods	From 1 to 4 of A-methods

11. Infrastructure	
1. Books Required reading:	The 8088 and 8086 Microprocessors: Programming Interfacing, Software, Hardware, and Applications by Walter A. Triebel, Avtar Singh
2. Main references (sources)	Introduction to 80x86 Assembly Language and Computer Architecture by Richard Detmer. Paper
A- Recommended books and references (scientific journals, reports…).	6-N. Firasta et al., " Intel ® AVX: New frontiers in performance improvements and energy efficiency ", Intel Corporation Tech. Rep., May 2008
B-Electronic references, Internet sites…	

12. The development of the curriculum plan

Continuous improvement of curriculum and faculty members through training programs.

TEMPLATE FOR COURSE SPECIFICATION
Digital System Design

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

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	College of Engineering University of Baghdad
2. University Department/Centre	Department of Computer Engineering
3. Course title/code& Description	Digital System Design / COE 205
4. Modes of Attendance offered	Annual System: There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st & 2nd / Academic Year 2023-2022
6. Number of hours tuition (total)	90 hrs. / 3 hrs. per week Theory 60 hrs. / 2 hrs. per week Lab.
7. Date of production/revision of this specification	October/2022
8. Aims of the Course	
Briefly, Goals and objectives of the completed course are: 1- How to relate the skills and concepts learned from fundamental digital design to understand advance digital design.	

2- How to use the learned skills to understand, derive, and solve the digital & logical equations of digital circuit, and system in various objects (e.g., microprocessor I & II, computer architecture I & II, digital electronics, digital communication, I/O devices etc.).
3- Representation, the fundamental concepts to advanced Digital design and implementation by understanding practical digital devices.

9· Learning Outcomes, Teaching , Learning and Assessment Method

A- Cognitive goals:

A1- Simplify & solved any Boolean equation until to 6 variables using K-map method.

A2- Acknowledge how to design digital problem using state machine approach.

A3- Use registers & registers application in a digital system.

A4- Analysis any sequential circuit of a digital system using state machine design.

A5- Design practical & complex problem using algorithm state machine (ASM) chart approach.

A6- Realize digital system using programmable devices (PLA, ROM, …, etc.)

A7- Separate between synchronous & asynchronous state machine approach in a design.

A8- Design a digital circuit & solve practical problems by applying VHDL language in a design

B- The skills goals special to the course

B1- Simplify & solved any Boolean equation until to 6 variables using K-map method.

B2- Acknowledge how to design digital problem using state machine approach.

B3- Use registers & registers application in a digital system.

B4- Analysis any sequential circuit of a digital system using state machine design.

B5- Design practical & complex problem using algorithm state machine (ASM) chart approach.

B6- Realize digital system using programmable devices (PLA, ROM, …, etc.)

B7- Separate between synchronous & asynchronous state machine approach in a design.

B8- Design a digital circuit & solve practical problems by applying VHDL language in a design

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Methods

1-Tests, quizzes.

2- Activities.

3- Participate during lectures

Assessment methods

1- Study the conditions of former graduates.
2- Relevant committees in management such as scientific, QA.
3- The employee attitudes of our graduates, for example, workplace and job title, will be tracked each year.

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10.Course Structure

Week	Hours	ILOs	Topic title	Teaching method	Assessment Method
1	2 the. 2 exp.	Item 1 of section 10	**Sequence generator & detector, PN generator**	From 1 to12 of section 11	From 1 to 4 of section 12
2	2 the. 2 exp.	Item 2 & 4 of section 10	**Introduction of Synchronous sequential logic**	From 1 to12 of section 11	From 1 to 4 of section 12
3	2 the. 2 exp.	Item 5 of section 10	**State diagram**	From 1 to12 of section 11	From 1 to 4 of section 12
4	2 the. 2 exp.	Item 1 to 4 of section 10	**Tutorials & Quiz**	From 1 to12 of section 11	From 1 to 4 of section 12
5	2 the. 2 exp.	Item 5 of section 10	**State diagram and state diagram reduction**	From 1 to12 of section 11	From 1 to 4 of section 12
6	2 the. 2 exp.	From 1 to 4 of section 10	**Feedback shift registers, sequential circuits using a register and a combination circuit**	From 1 to12 of section 11	From 1 to 4 of section 12
7	2 the. 2 exp.	Item 4 of section 10	**Analysis of Synchronous sequential logic**	From 1 to12 of section 11	From 1 to 4 of section 12
8	2 the. 2 exp.	Item 8 of section 10	**Introduce basic VHDL concepts and constructs, Signal and constant**	From 1 to12 of section 11	From 1 to 4 of section 12
9	2 the. 2 exp.	Item 8 of section 10	**VHDL description of combinational circuits, VHDL models& operators**	From 1 to12 of section 11	From 1 to 4 of section 12
10	2 the. 2 exp.	Item 8 of section 10	**Packages and libraries, IEEE standard logic & Modeling Flip-Flops using VHDL processes**	From 1 to12 of section 11	From 1 to 4 of section 12
11	2 the. 2 exp.	Item 8 of section 10	**Modeling registers and counters using VHDL processes & Quiz**	From 1 to12 of section 11	From 1 to 4 of section 12
12	2 the. 2 exp.	Item 8 of section 10	**Modeling combinational logic using VHDL processes**	From 1 to12 of section 11	From 1 to 4 of section 12
13	2 the. 2 exp.	Item 8 of section 10	**VHDL Modeling of a sequential machine, More about processes and sequential statements**	From 1 to12 of section 11	From 1 to 4 of section 12

14	2 the. 2 exp.	Item 7 of section 10	**Introduction of Asynchronous sequential logic**	From 1 to12 of section 11	From 1 to 4 of section 12
15	2 the. 2 exp.	Item 7 of section 10	**Non- critical race, stability consideration, Hazard (Static, Dynamic & Essential)**	From 1 to12 of section 11	From 1 to 4 of section 12
16	2 the. 2 exp.	Item 7 of section 10	**Determination of flow table for problem reduction of the primitive flow table**	From 1 to12 of section 11	From 1 to 4 of section 12
17	2 the. 2 exp.	From 1 to 8 of section 10	**Tutorial & Quiz**	From 1 to12 of section 11	From 1 to 4 of section 12
18	2 the. 2 exp.	Item 7 of section 10	**Conversion of primitive flow table to transition table and logic diagram**	From 1 to12 of section 11	From 1 to 4 of section 12
19	2 the. 2 exp.	Item 7 of section 10	**State assignment, merging rows of the flow table, race free assignment, hazard,**	From 1 to12 of section 11	From 1 to 4 of section 12
20	2 the. 2 exp.	Item 7 of section 10	**implementation of sequential circuit with SR latches, Quiz**	From 1 to12 of section 11	From 1 to 4 of section 12
21	2 the. 2 exp.	Item 6 of section 10	**Logic circuits and programmable logic devices, PLA, PAL, ROM, FPGA**	From 1 to12 of section 11	From 1 to 4 of section 12
22	2 the. 2 exp.	Item 5 of section 10	**Introduction of Algorithmic state machines (ASM), ASM Chart & Table**	From 1 to12 of section 11	From 1 to 4 of section 12
23	2 the. 2 exp.	Item 5 of section 10	**Practical problems using ASM chart**	From 1 to12 of section 11	From 1 to 4 of section 12
24	2 the. 2 exp.	Item 5 of section 10	**Practical problems using ASM chart**	From 1 to12 of section 11	From 1 to 4 of section 12
25	2 the. 2 exp.	From 5 to 6 of section 10	**Realization ASM Chart using PLA & ROM devices**	From 1 to12 of section 11	From 1 to 4 of section 12
26	2 the. 2 exp.	Item 8 of section 10	**Design of simple processor in VHDL**	From 1 to12 of section 11	From 1 to 4 of section 12
27	2 the. 2 exp.	Item 8 of section 10	**Design of simple processor in VHDL**	From 1 to12 of section 11	From 1 to 4 of section 12
28	2 the. 2 exp.	Item 8 of section 10	**Design of simple processor in VHDL**	From 1 to12 of section 11	From 1 to 4 of section 12

29	2 the. 2 exp.	Item 8 of section 10	**Design of simple processor in VHDL**	From 1 to12 of section 11	From 1 to 4 of section 12
30	2 the. 2 exp.	From 1 to 8 of section 10	**Tutorial & Quiz**	From 1 to12 of section 11	From 1 to 4 of section 12

11. Infrastructure	
1. Books Required reading:	"Fundamentals of Logic Design", Charles H. Roth & Larry L. Kinney, all edition until 6th edition in 2010-2014.
2. Main references (sources)	"Fundamentals of Logic Design", Charles H. Roth & Larry L. Kinney, all edition until 6th edition in 2010-2014.
A- Recommended books and references (scientific journals, reports…).	Deshmane, P. D., Lad, M., Mhetre, P., & Kumar, S. (2014). 8 Bit Microprocessor Using VHDL. International Journal of Latest Technology in
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
Continuous improvement of curriculum and faculty members through training

TEMPLATE FOR COURSE SPECIFICATION
Data Structures and Computer Algorithms

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

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	College of Engineering University of Baghdad
2. University Department/Centre	Department of Computer Engineering
3. Course title/code& Description	Data structures and Computer Algorithms/ COE206
4. Modes of Attendance offered	Annual System: There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st & 2nd / Academic Year 2023-2022
6. Number of hours tuition (total)	60 hrs. / 2 hrs. per week theory 60 hrs. / 2 hrs. per week Lab.
7. Date of production/revision of this specification	October -2022
8. Aims of the Course	
1- In this course we have tried to emphasize the following notions to our students: 2- Learning how to write programs in Object Oriented Programming (OOP) style using JAVA.	

3- The ability to define at a sufficiently high level of abstraction to data structures and algorithms that are needed.
4- The ability to devise alternative implementations of data structure.
5- The ability to write a correct algorithm and for all programs tried our best to structure them appropriately.
6- To be able to describe the accessing functions of all the fundamentals of data structures (linear list, linked list, stack, queue, tree, binary search tree, table, and the hash techniques) and its operations with the help of object-oriented design.

9· Learning Outcomes, Teaching , Learning and Assessment Method

A- Cognitive goals:

A1- Upon Completion of this course the students will acquire the following skills:

A2- Writing programs in OOP style after knowing through the course the advantages of OOP in writing any software.

A3- Using the Object-Oriented Design (OOD) in his/her projects.
A4- Design and implement the solution to a problem with the use of an appropriate data structures.

B. The skills goals special to the course

B1- Upon Completion of this course the students will acquire the following skills:

B2- Writing programs in OOP style after knowing through the course the advantages of OOP in writing any software.

B3- Using the Object-Oriented Design (OOD) in his/her projects.

B4- Design and implement the solution to a problem with the use of an appropriate data structures.

Teaching and Learning Methods.

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. Connection between Theory and Application.

7. Seminars.
8. In- and Out-Class oral conservations.
9. Reports, Presentations, and Posters.

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Methods

1-Tests, quizzes.

2- Activities.

3- Participate during lectures

Assessment methods

1- Study the conditions of former graduates.
2- Relevant committees in management such as scientific, QA.
3- The employee attitudes of our graduates, for example, workplace and job title, will be tracked each year.

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10.Course Structure

week	Hours	ILOs	Topic title	Teaching method	Assessment Method
1	2 the. 2 exp.	From 1 to 2 of section 10	**Basics of OOP**	From 1 to12 of section 11	From 1 to 4 of section 12
2	2 the. 2 exp.	From 1 to 2 of section 10	**Types of member functions**	From 1 to12 of section 11	From 1 to 4 of section 12
3	2 the. 2 exp.	From 1 to 2 of section 10	**Initializing functions/data broker functions**	From 1 to12 of section 11	From 1 to 4 of section 12
4	2 the. 2 exp.	From 1 to 2 of section 10	**Implementation functions/access functions/ auxiliary functions and constant functions**	From 1 to12 of section 11	From 1 to 4 of section 12
5	2 the. 2 exp.	From 1 to 2 of section 10	**Class instantiation**	From 1 to12 of section 11	From 1 to 4 of section 12
6	2 the. 2 exp.	From 1 to 2 of section 10	**Array of class objects/ objects as function arguments**	From 1 to12 of section 11	From 1 to 4 of section 12
7	2 the. 2 exp.	From 1 to 2 of section 10	**Constructors(initializing object/default constructor)**	From 1 to12 of section 11	From 1 to 4 of section 12
8	2 the. 2 exp.	From 1 to 2 of section 10	**Copy constructor/ using custom constructor**	From 1 to12 of section 11	From 1 to 4 of section 12
9	2 the. 2 exp.	From 1 to 2 of section 10	**Destructors**	From 1 to12 of section 11	From 1 to 4 of section 12
10	2 the. 2 exp.	From 1 to 2 of section 10	**Class types, class scope, empty class, nested class**	From 1 to12 of section 11	From 1 to 4 of section 12
11	2 the. 2 exp.	From 1 to 2 of section 10	**Data members, static members**	From 1 to12 of section 11	From 1 to 4 of section 12
12	2 the. 2 exp.	From 1 to 2 of section 10	**Overloading (non-member/ member functions) conversion function and friend functions**	From 1 to12 of section 11	From 1 to 4 of section 12
13	2 the. 2 exp.	From 1 to 2 of section 10	**Overloaded constructor, overloaded operator, and operator as a function call**	From 1 to12 of section 11	From 1 to 4 of section 12

14	2 the. 2 exp.	From 1 to 2 of section 10	**Templates**	From 1 to12 of section 11	From 1 to 4 of section 12
15	2 the. 2 exp.	From 1 to 2 of section 10	**The "this" pointer**	From 1 to12 of section 11	From 1 to 4 of section 12
16	2 the. 2 exp.	From 1 to 2 of section 10	**Simple arrays**	From 1 to12 of section 11	From 1 to 4 of section 12
17	2 the. 2 exp.	From 1 to 2 of section 10	**Multidimensional arrays**	From 1 to12 of section 11	From 1 to 4 of section 12
18	2 the. 2 exp.	From 1 to 2 of section 10	**Lists**	From 1 to12 of section 11	From 1 to 4 of section 12
19	2 the. 2 exp.	From 1 to 2 of section 10	**implantation via arrays, dynamic memory, and via linked**	From 1 to12 of section 11	From 1 to 4 of section 12
20	2 the. 2 exp.	From 1 to 2 of section 10	**Order list**	From 1 to12 of section 11	From 1 to 4 of section 12
21	2 the. 2 exp.	From 1 to 2 of section 10	**Stacks, stack implementations**	From 1 to12 of section 11	From 1 to 4 of section 12
22	2 the. 2 exp.	From 1 to 2 of section 10	**Queues, Queue implementations**	From 1 to12 of section 11	From 1 to 4 of section 12
23	2 the. 2 exp.	From 1 to 2 of section 10	**Circular queue**	From 1 to12 of section 11	From 1 to 4 of section 12
24	2 the. 2 exp.	From 1 to 2 of section 10	**Tables**	From 1 to12 of section 11	From 1 to 4 of section 12
25	2 the. 2 exp.	From 1 to 2 of section 10	**Hash technique**	From 1 to12 of section 11	From 1 to 4 of section 12
26	2 the. 2 exp.	From 1 to 2 of section 10	**Methods for handling collisions**	From 1 to12 of section 11	From 1 to 4 of section 12
27	2 the. 2 exp.	From 1 to 2 of section 10	**Trees**	From 1 to12 of section 11	From 1 to 4 of section 12
28	2 the. 2 exp.	From 1 to 2 of section 10	**building binary tree**	From 1 to12 of section 11	From 1 to 4 of section 12
29	2 the. 2 exp.	From 1 to 2 of section 10	**Tree traversal/ preorder, in order, and post order**	From 1 to12 of section 11	From 1 to 4 of section 12

30	2 the. 2 exp.	From 1 to 2 of section 10	**Binary search tree**	From 1 to12 of section 11	From 1 to 4 of section 12

11. Infrastructure	
1. Books Required reading:	Data Structures and Algorithms in Java™ Michael T. Goodrich, Roberto Tamassia Michael H. Goldwasser, 2014 John Wiley & Sons, Inc.
2. Main references (sources)	Laboratory experiments in the programming Lab) of the department. Available websites related to the subject
A- Recommended books and references (scientific journals, reports…).	Extra lectures by foreign guest lecturers
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
Continuous improvement of curriculum and faculty members through training

TEMPLATE FOR COURSE SPECIFICATION
Communications

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

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	College of Engineering University of Baghdad
2. University Department/Centre	Department of Computer Engineering
3. Course title/code& Description	Communications / COE 207
4. Modes of Attendance offered	Annual System: There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st & 2nd / Academic Year 2022-2023
6. Number of hours tuition (total)	150 hrs. / 4 hrs. per week . 90 hrs./ 3 hrs. per week Theory. 60 hrs./ 2 hrs. per week Lab.
7. Date of production/revision of this specification	October -2022
8. Aims of the Course	
1- What are the knowledge and skills expected to be attained by the student upon completion of the course (brief description)? 2- To understand the following:-	

3- Analog modulation and demodulation such as (AM, DSB-SC, SSB, FM, PM)
4- Digital Modulation and Demodulation such as (PCM, DM, ADM, ASK, FSK, PSK, DPSK)
5- Information theory (Measure of information entropy and channel capacity, Source Coding, Channel coding)

9· Learning Outcomes, Teaching , Learning and Assessment Method

A- Cognitive goals:

A1- What are the knowledge and skills expected to be attained by the student upon completion of the course(should be measurable)?

A2- The student will be able to:

A3- Analyze a complete analog and digital communication system.

A4- Measure of information entropy and channel capacity.

A5- The ability to coding any message, by using Source Coding procedure.

A6- The ability to find the error detection and correction for digital channels.

B. The skills goals special to the course

B1- What are the knowledge and skills expected to be attained by the student upon completion of the course(should be measurable)?

B2- The student will be able to:

B3- Analyze a complete analog and digital communication system.

B4- Measure of information entropy and channel capacity.

B5- The ability to coding any message, by using Source Coding procedure.

B6- The ability to find the error detection and correction for digital channels.

Teaching and Learning Methods.

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. Connection between Theory and Application.
7. Seminars.

8. In- and Out-Class oral conservations.

Reports, Presentations, and Posters.

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Methods

1-Tests, quizzes.

2- Activities.

3- Participate during lectures

Assessment methods

1- Study the conditions of former graduates.
2- Relevant committees in management such as scientific, QA.
3- The employee attitudes of our graduates, for example, workplace and job title, will be tracked each year.

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10. Course Structure

week	Hours	ILOs	Topic title	Teaching method	Assessment Method
1	2 the. 2 lab.	Item 1 of section 10	**Definitions, Elements of communication system, types of communication system**	From 1 to12 of section 11	From 1 to4 of section 12
2	2 the. 2 lab.	Item 1 of section 10	**Fourier series, Fourier transform**	From 1 to12 of section 11	From 1 to4 of section 12
3	2 the. 2 lab.	Item 1 of section 10	**Normalized power, Normalized energy, Convolution**	From 1 to12 of section 11	From 1 to4 of section 12
4	2 the. 2 lab.	Item 1 of section 10	**Unit impulse, Frequency response, Bandwidth of the system and signal**	From 1 to12 of section 11	From 1 to4 of section 12
5	2 the. 2 lab.	Item 1 of section 10	**Analog signal transmission, Modulation, Types of modulation, Reasons for modulation**	From 1 to12 of section 11	From 1 to4 of section 12
6	2 the. 2 lab.	Item 1 of section 10	**Amplitude modulation (AM), Normal AM (DSB-LC), Carrier and sideband power in AM**	From 1 to12 of section 11	From 1 to4 of section 12
7	2 the. 2 lab.	Item 1 of section 10	**Generation of AM signal, Modulator using multiplier, Modulator using non-linearity, Switching modulation, Detection of AM signal**	From 1 to12 of section 11	From 1 to4 of section 12
8	2 the. 2 lab.	Item 1 of section 10	**DSB-SC modulation, Generation of DSB-SC signal, Balanced modulator, Ring modulator, Detection of DSB-SC signal (product detector)**	From 1 to12 of section 11	From 1 to4 of section 12
9	2 the. 2 lab.	Item 1 of section 10	**SSB modulation, Generation of SSB signal, Detection of SSB signal, VSB modulation, Superheterodyne AM receiver**	From 1 to12 of section 11	From 1 to4 of section 12

10	2 the. 2 lab.	Item 1 of section 10	**Angle modulation , Narrowband FM, generation of NBFM signal**	From 1 to12 of section 11	From 1 to4 of section 12
11	2 the. 2 lab.	Item 1 of section 10	**Wideband FM, Power, and bandwidth of FM signal**	From 1 to12 of section 11	From 1 to4 of section 12
12	2 the. 2 lab.	Item 1 of section 10	**Generation of FM signal, Direct method, Indirect method**	From 1 to12 of section 11	From 1 to4 of section 12
13	2 the. 2 lab.	Item 1 of section 10	**FM detection, Frequency discriminator, Zero crossing detector**	From 1 to12 of section 11	From 1 to4 of section 12
14	2 the. 2 lab.	Item 1 of section 10	**Superheterodyne FM receiver,**	From 1 to12 of section 11	From 1 to4 of section 12
15	2 the. 2 lab.	Item 1 of section 10	**Frequency division multiplexing (FDM)**	From 1 to12 of section 11	From 1 to4 of section 12
16	2 the. 2 lab.	Item 1 of section 10	**Noise in AM system, Noise in DSB-SC system**	From 1 to12 of section 11	From 1 to4 of section 12
17	2 the. 2 lab.	Item 1 of section 10	**Noise in FM system**	From 1 to12 of section 11	From 1 to4 of section 12
18	2 the. 2 lab.	Item 1 of section 10	**Digital communication, Sampling theory**	From 1 to12 of section 11	From 1 to4 of section 12
19	2 the. 2 lab.	Item 1 of section 10	**Pulse code modulation (PCM)**	From 1 to12 of section 11	From 1 to4 of section 12
20	2 the. 2 lab.	Item 1 of section 10	**Bandwidth and signal rate for PCM**	From 1 to12 of section 11	From 1 to4 of section 12
21	2 the. 2 lab.	Item 1 of section 10	**Noise in PCM system**	From 1 to12 of section 11	From 1 to4 of section 12

22	2 the. 2 lab.	Item 1 of section 10	**ASK, FSK, PSK, Generation and detection of ASK signal**	From 1 to12 of section 11	From 1 to4 of section 12
23	2 the. 2 lab.	Item 1 of section 10	**Generation and detection of PSK signal**	From 1 to12 of section 11	From 1 to4 of section 12
24	2 the. 2 lab.	Item 1 of section 10	**Differential PSK, Generation of FSK signal**	From 1 to12 of section 11	From 1 to4 of section 12
25	2 the. 2 lab.	Item 1 of section 10	**Detection of FSK signal (Using BPF, Using multiplier), Comparison of binary digital modulation systems**	From 1 to12 of section 11	From 1 to4 of section 12
26	2 the. 2 lab.	Item 1 of section 10	**TDM, TDM-telephony system**	From 1 to12 of section 11	From 1 to4 of section 12
27	2 the. 2 lab.	Item 2 of section 10	**Measure of information**	From 1 to12 of section 11	From 1 to4 of section 12
28	2 the. 2 lab.	Item 2 of section 10	**Memoryless channel, channel capacity**	From 1 to12 of section 11	From 1 to4 of section 12
29	2 the. 2 lab.	Item 3 of section 10	**Source Coding**	From 1 to12 of section 11	From 1 to4 of section 12
30	2 the. 2 lab.	Item 3 of section 10	**Channel coding**	From 1 to12 of section 11	From 1 to4 of section 12

11. Infrastructure	
1. Books Required reading:	1- Principles of Communications, Systems, Modulation, and Noise. Rodger E. Ziemer / William H. Tranter. Fifth Edition. John Wiley, 2002.
2. Main references (sources)	- Introduction to Communications Systems. Ferrel G.Stremler. 3rd edition, Addison Wesley, 1990.
A- Recommended books and references (scientific journals, reports…).	Buchali, F., Böcherer, G., Idler, W., Schmalen, L., Schulte, P., & Steiner, F. (2015, September). Experimental demonstration of capacity increase and rate-adaptation by probabilistically shaped 64-QAM. In Optical Communication (ECOC), 2015 European Conference on (pp. 1-3). IEEE.
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
Continuous improvement of curriculum and faculty members through training programs.

Third Stage

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

Computer Architecture I

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 programme specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Computer Architecture I / COE301
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	Academic Year 2022 – 2023.
6. Number of hours tuition (total)	90 hrs. / 3 hrs. per week
7. Date of production/revision of this Specification	October- 2022
8. Aims of the Course	
The course provides the basic knowledge necessary to understand the hardware operation of digital computers and covers some of the subjects associated with computer hardware.	

9· Learning Outcomes, Teaching, Learning and Assessment Method

A- Cognitive goals:

A1. Write RTL for hardware jobs.
A2. Define and explain the principles of computer architecture and the interfacing between its hardware and software components
A3. Understand the data path inside a processor
A4. Understand the micro programmed control organization
A5. Know the organization and architecture of the CPU with an emphasis on the user's view of the computer.
A6.Understand of parallel processing and pipeline.
A7.Understand of architectural blocks involved in computer arithmetic, both integer and floating point.
A8. Understand computer busses and input/output peripherals.
A9. Analyze computer memory hierarchy
A10. Understand multi-processor architectures.

B-

B. The skills goals special to the course

B1- Mathematical concepts and basic algorithms for describing and solving engineering problems.

B2 - Initial developments in Computer Architecture majors.

B3 - developing the ability to conduct experiments and analyze data.

B5- Identifying, formulating and solving Computer Architecture problems using modern engineering tools, techniques, and skills,

B6 - cooperation in group projects,

B7 - Developing written and verbal communication skills through presentations from the project results,

B8 - obtaining an appreciation for some of the ethical problems that exist in the practice of the profession.

Teaching and Learning Methods.

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. Connection between Theory and Application.
7. Seminars.
8. In- and Out-Class oral conservations.

9. Reports, Presentations, and Posters.

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Methods

1-Tests, quizzes.

2- Activities.

3- Participate during lectures

Assessment methods

1- Study the conditions of former graduates.
2- Relevant committees in management such as scientific, QA.
3- The employee attitudes of our graduates, for example, workplace and job title, will be tracked each year.

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10. Course Structure

weak	Hours	ILOs	Topic title	Teaching method	Assessment Method
1	3 the.	Item 1 of section 10	**Register Transfer Language**	From 1 to 9 of section 11	From 1 to 4 of section 12
2	3 the.	Item 1 of section 10	**Arithmetic Micro operations**	From 1 to 9 of section 11	From 1 to 4 of section 12
3	3 the.	Item 2 of section 10	**Instruction Codes**	From 1 to 9 of section 11	From 1 to 4 of section 12
4	3 the.	Item 2 of section 10	**Timing and Control**	From 1 to 9 of section 11	From 1 to 4 of section 12
5	3 the.	Item 2 of section 10	**Memory-Reference Instructions**	From 1 to 9 of section 11	From 1 to 4 of section 12
6	3 the.	Item 3 of section 10	**Complete Computer Description**	From 1 to 9 of section 11	From 1 to 4 of section 12
7	3 the.	Item 3 of section 10	**Design of Accumulator Logic**	From 1 to 9 of section 11	From 1 to 4 of section 12
8	3 the.	Item 3of section 10	**The Assembler**	From 1 to 9 of section 11	From 1 to 4 of section 12
9	3 the.	Item 3of section 10	**Control Memory**	From 1 to 9 of section 11	From 1 to 4 of section 12
10	3 the.	Item 4 of section 10	**Micro program Example**	From 1 to 9 of section 11	From 1 to 4 of section 12
11	3 the.	Item 4 section 10	**Design of Control Unit**	From 1 to 9 of section 11	From 1 to 4 of section 12
12	3 the.	Item 5 of section 10	**Central Processing Unit**	From 1 to 9 of section 11	From 1 to 4 of section 12
13	3 the.	Item 5 of section 10	**Instruction Formats**	From 1 to 9 of section 11	From 1 to 4 of section 12
14	3 the.	Item 5 of section 10	**Addressing Modes**	From 1 to 9 of section 11	From 1 to 4 of section 12
15	3 the.	Item 5 of section 10	**Program Control**	From 1 to 9 of section 11	From 1 to 4 of section 12
16	3 the.	Item 5 of section 10	**Reduced Instruction Set Computer**	From 1 to 9 of section 11	From 1 to 4 of section 12
17	3 the.	Item 6 of section 10	**Parallel Processing**	From 1 to 9 of section 11	From 1 to 4 of section 12
18	3 the.	Item 6 of section 10	**Instruction Pipeline**	From 1 to 9 of section 11	From 1 to 4 of section 12
19	3 the.	Item 6 of section 10	**Vector Processing**	From 1 to 9 of section 11	From 1 to 4 of section 12
20	3 the.	Item 7 of section 10	**Computer Arithmetic**	From 1 to 9 of section 11	From 1 to 4 of section 12
21	3 the.	Item 7 of section 10	**Division Algorithms**	From 1 to 9 of section 11	From 1 to 4 of section 12
22	3 the.	Item 7 of section 10	**Decimal Arithmetic Unit**	From 1 to 9 of section 11	From 1 to 4 of section 12
23	3 the.	Item 8 of section 10	**Input-Output Organization**	From 1 to 9 of section 11	From 1 to 4 of section 12
24	3 the.	Item 8 of section 10	**Asynchronous Data Transfer**	From 1 to 9 of section 11	From 1 to 4 of section 12

25	3 the.	Item 8 of section 10	**Priority Interrupt**	From 1 to 9 of section 11	From 1 to 4 of section 12
26	3 the.	Item 8 of section 10	**Input-Output Processor**	From 1 to 9 of section 11	From 1 to 4 of section 12
27	3 the.	Item 9 of section 10	**Memory Organization**	From 1 to 9 of section 11	From 1 to 4 of section 12
28	3 the.	Item 9 of section 10	**Associative Memory**	From 1 to 9 of section 11	From 1 to 4 of section 12
29	3 the.	Item 10 of section 10	**Characteristics of Multiprocessors**	From 1 to 9 of section 11	From 1 to 4 of section 12

11. Infrastructure	
1. Books Required reading:	Books: • M. Morris. Mano, "Computer System Architecture" 3rd Edition • William Stalling, "Computer Organization and Architecture" 6th edition.
2. Main references (sources)	• Computer Architecture A Quantitative Approach, Sixth Edition, John L. Hennessy, David A. Patterson, 2019.
A- Recommended books and references (scientific journals, reports…).	• P. Trivedi and R. P. Tripathi, "Design & analysis of 16 bit RISC processor using low power pipelining," International Conference on Computing, Communication & Automation, Noida, 2015, pp. 1294-1297. • B. W. Bomar, "Implementation of microprogrammed control in FPGAs," in *IEEE Transactions on Industrial Electronics*, vol. 49, no. 2, pp. 415-422, Apr 2002.
B-Electronic references, Internet sites…	• J. L. Cruz, A. Gonzalez, M. Valero and N. P. Topham, "Multiple-banked register file architectures," Proceedings of 27th International Symposium on Computer Architecture (IEEE Cat. No.RS00201), Vancouver, BC, Canada, 2000, pp. 316-325. • C. Hamacher, Z. Vranesic, S. Zaky, N. Manjikian "Computer Organization and Embedded Systems", Sixth Edition

12. The development of the curriculum plan

Continuous developing academic curricula in line with the scientific development

TEMPLATE FOR COURSE SPECIFICATION
Digital Control Systems

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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 programmer specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Digital Control Systems (COE 302)
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects
5. Semester/Year	1st & 2nd semester / Academic Year 2022 – 2023.
6. Number of hours tuition (total)	3 hrs. per week in class 2 hrs. per week in lab
7. Date of production/revision of this Specification	October-2022
8. Aims of the Course	
1- This subject has been prepared as a comprehensive for a first study of control engineering.	
2- This subject also helps the students to design control systems for variety of engineering applications	

3- This subject covers both conventional control theory and modern control theory in digital and continuous systems.

9· Learning Outcomes, Teaching , Learning and Assessment Method

A- Cognitive goals.

A1- Learn the basic components of a control system, the concept of feedback, closed loop control versus open-loop control. For continuous and digital systems

A2- Learn to find transfer functions for linear time-invariant electrical, mechanical and electromechanical systems

A3- Learn how to describe and quantify transients-response specifications of first and second-order systems

A4- Learn how to find the steady-state error for unity and non-unity-gain feedback

A5- Learn how to determine the stability of a system

A6 - Learn how to use root-locus and frequency domain methods to design basic controllers

B- The skills goals special to the course.

B1. Recognize between open-loop and closed-loop control system in terms of their applications

B2. Find the response of closed loop system (Transient response and steady-state response)

B3. Sketch the root locus of different order systems

B4.How to check the stability of Control systems in time domain and frequency domain

B5.Compute the response of sampled data systems and Check the stability of Digital control system

Teaching and Learning Methods

1- Lectures
2- Tutorials
3- Homework and Assignments.
4- Lab. Experiments and Reports.
5- Tests and Exams.
6- In-Class Questions and Discussions.
7- Connection between Theory and Application.
8- Seminars.
9- In- and Out-Class oral conservations.

Assessment methods

1. Examinations, Tests, and Quizzes.

2. Presentations and student Engagement during Lectures.

3. Extracurricular Activities.

C. Affective and value goals

C1. Designing
C2. Analyzing
C3. Ability to work within the team.
C4. Problem solving, by applying the learning outcomes and subject -specific skills to solve practical design problems.

Teaching and Learning Methods

1- Assignment
2- Seminars
3- Group Discussion

Assessment methods

1. Quizzes
2. Test
3. Homework
4. Oral Discussion
5. Independent research.

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

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation.

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	2 theory 1 tutorial 2 labs.	A1	**Open loop system, closed loop system,**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
3-4	2 theory 1 tutorial 2 labs.	A2	**Classification of feedback control system Mathematical models : Models of electrical systems, Mechanical, thermal and liquid system,**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
5	2 theory 1 tutorial 2 labs.	A2	**Transfer function concept, D.C. servo and A.C. servo motors as examples of electromechanical system,**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
6	2 theory 1 tutorial 2 labs.	A1, A2	**Block diagram algebra, signal flow graphs.**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
7	2 theory 1 tutorial 2 labs.	A3	**Transient response analysis - Transient response specification**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
8-10	2 theory 1 tutorial 2 labs.	A4, A5	**Stability. - Routh's stability criterion. Study state error coefficient. Static error coefficients. Dynamic error coefficients**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
11-14	2 theory 1 tutorial 2 labs.	A6	**Root locus method of analysis and design Sketch the Root locus for first order system, second order system and higher order system**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
15-18	2 theory 1 tutorial 2 labs.	A6	**Frequency response methods : Introduction Main concept of Bode.**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method

			Frequency response measurements. Performance Specifications in frequency domain. Log magnitude and phase Diagrams		
19	2 theory 1 tutorial 2 labs.	A5,A6	**Stability in Frequency domain: Nyquist Criterion**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
20	2 theory 1 tutorial 2 labs.	A1	**Introduction to digital control systems**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
21	2 theory 1 tutorial 2 labs.	A1	**Digital Computer Control System Applications**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
22	2 theory 1 tutorial 2 labs.	A1	**Sampled-Data Systems**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
23	2 theory 1 tutorial 2 labs.	A5	**Stability of Digital Systems: Jury Test**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
24	2 theory 1 tutorial 2 labs.	A1,A5	**Closed-Loop Feedback Sampled-Data Systems**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
25	2 theory 1 tutorial 2 labs.	A1,A5	**Closed-Loop Systems with Digital Computer Compensation**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
26-28	2 theory 1 tutorial 2 labs.	A1,A5	**Design of digital controller based on root locus**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
26-28	2 theory 1 tutorial 2 labs.	A1,A5	**Design of digital controller based on root locus**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method
29-30	2 theory 1 tutorial 2 labs.	A1,A5	**Design of digital controller based on continuous controller**	From 1 to9 of Teaching and Learning Methods	From 1 to3 of Assessment Method

11. Infrastructure	
1. Books Required reading:	Modern Control Engineering, Ogata K. Fourth edition , Prentice-Hall ,2002. Modern Control System Analysis and DesignUsing MATLAB and Simulink, Bishop R., Addison-Wesley ,2000.
2. Main references (sources)	Modern control systems, Drof R. C. and Bishop R, 12th edition ,Prentice-Hall, 2010 Feedback control of dynamic systems, Franklin G.F. and et.al., Prentice-Hall, 2006. Digital Control Systems Analysis and design, charles H. Philips and et. al. third edition , Prentice-Hall,2001 Discrete- time control systems , Ogata K., Second edition Prentice-Hall ,1995
A- Recommended books and references (scientific journals, reports…).	Feng, "A Survey on Analysis and Design of Model-Based Fuzzy Control Systems", IEEE Trans. Fuzzy Systems, Vol. 14, No. 5, October 2006. A. J. Calise et al., "Adaptive Output Feedback Control of Nonlinear Systems using Neural Networks", Elsevier Automatica, Vol. 37, Issue 8, August 2001. B. Chen et al., "Composite Nonlinear Feedback Control for Linear Systems With Input Saturation Theory and an Application", IEEE Trans. Automatic Control, Vol. 48, No. 3, March 2003.
B-Electronic references, Internet sites…	

12. The development of the curriculum plan
Continuous improvement of curriculum and faculty members through training

TEMPLATE FOR COURSE SPECIFICATION

Microprocessors and Microcomputers II

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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 programme specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Microprocessors and Microcomputers II COE 303
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects
5. Semester/Year	1st & 2nd semester / Academic Year 2023 – 2022.
6. Number of hours tuition (total)	2 Theory hours per week (60 hours total) 1 Tutorial hour per week (30 hours total) 2 Lab. hours per week (60 hours total)
7. Date of production/revision of this Specification	October-2022

8. Aims of the Course

1- How to relate the skills and concepts learned from Microprocessor/ Microcomputer I to understand Microprocessor/Microcomputer II
2- Teaching students how to design microprocessor-based embedded systems:
3- understand the different components of a microcomputer system
4- design some parts of a microcomputer system
5- develop the required software to program it

9. Learning Outcomes, Teaching ,Learning and Assessment Method

C. Cognitive goals.

A1. Microprocessor-based microcomputer design.
A2. Memory interface of different microprocessors
A3. Peripheral interfaces
A4. Interrupt driven operation and interface

B. The skills goals special to the course.

B1. How to interface memory to microprocessors with different data bus size.
B2. How to interface different I/O devices and control them through software.
B3. How to develop interrupt service procedures and expand the interrupt structure through the 8259A interrupt controller

Teaching and Learning Methods

10. Lectures
11. Homework
12. Lab. Experiments.
13. Discussions.

Assessment methods

1. Lab
2. Quizzes and exams
3. homework
4. assignments

C. Affective and value goals

C1. Ability to Analyze
C2. Ability to Design
C3. Ability to Problem solving

Teaching and Learning Methods

9. Lectures
10. Homework
11. Lab. Experiments.
12. Discussions

Assessment methods

1. Quizzes and exams
2. homework
3. Lab
4. assignments

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2 Th. 1 Tu. 2 Lab.	A1	Review of Intel Microprocessors 8088-Pentium hardware and software architecture	Items 1, 2, and 4 of teaching and learning methods	Items 1, 2, and 4 of Assessment methods
2	2 Th. 1 Tu. 2 Lab.	A1	Memory management in protected mode	Items 1, 2, and 4 of teaching and learning methods	Items 1, 2, and 4 of Assessment methods
3	2 Th. 1 Tu. 2 Lab.	A1	Memory management in protected mode	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
4	2 Th. 1 Tu. 2 Lab.	A2	Memory interface (8-bit)	Items 1, 2, and 4 of teaching and learning methods	Items 1, 2, and 4 of Assessment methods
5	2 Th. 1 Tu. 2 Lab.	A2	Introduction to 16 bit memory interface	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods

6	2 Th. 1 Tu. 2 Lab.	A2	Memory interface (16-bit)	Items 1, 2, and 4 of teaching and learning methods	Items 1, 2, and 4 of Assessment methods
7	2 Th. 1 Tu. 2 Lab.	A2	Memory interface (32-bit)	Items 1, 2, and 4 of teaching and learning methods	Items 1, 2, and 4 of Assessment methods
8	2 Th. 1 Tu. 2 Lab.	A2	Memory interface (64-bit)	Items 1, 2, and 4 of teaching and learning methods	Items 1, 2, and 4 of Assessment methods
9	2 Th. 1 Tu. 2 Lab.		Exam		
10	2 Th. 1 Tu. 2 Lab.	A3	Basic I/O interface	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
11	2 Th. 1 Tu. 2 Lab.	A3	Basic I/O interface and studying some I/O devices	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
12	2 Th. 1 Tu. 2 Lab.	A3	8255 Programmable peripheral controller mode 0	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
13	2 Th. 1 Tu. 2 Lab.	A3	8255 Programmable peripheral controller mode 0	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
14	2 Th. 1 Tu. 2 Lab.	A3	8255 Programmable peripheral controller mode 0	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods

15	2 Th. 1 Tu. 2 Lab.	A3	8255 Programmable peripheral controller mode 1	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
16	2 Th. 1 Tu. 2 Lab.	A3	8255 Programmable peripheral controller mode 1 and mode 2	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
17	2 Th. 1 Tu. 2 Lab.	A3	8279 Keyboard/display interface	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
18	2 Th. 1 Tu. 2 Lab.	A3	8279 Keyboard/display interface	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
19	2 Th. 1 Tu. 2 Lab.	A3	8279 Keyboard/display interface	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
20	2 Th. 1 Tu. 2 Lab.		Exam		
21	2 Th. 1 Tu. 2 Lab.	A3	16550 serial communication interface	Items 1, 2, and 4 of teaching and learning methods	Items 1, 2, and 4 of Assessment methods
22	2 Th. 1 Tu. 2 Lab.	A3	8254 Programmable interval timer	Items 1, 2, and 4 of teaching and learning methods	Items 1, 2, and 4 of Assessment methods
23	2 Th. 1 Tu. 2 Lab.	A3	8254 Programmable interval timer	Items 1, 2, and 4 of teaching and	Items 1, 2, and 4 of Assessment methods

				learning methods	
24	2 Th. 1 Tu. 2 Lab.	A4	Interrupt driven I/O devices	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
25	2 Th. 1 Tu. 2 Lab.	A4	8259 Programmable Interrupt controller	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
26	2 Th. 1 Tu. 2 Lab.	A4	8259 Programmable Interrupt controller	Items 1 to 4 of teaching and learning methods	Items 1 to 4 of Assessment methods
27	2 Th. 1 Tu. 2 Lab.	A3	Direct Memory Access I/O devices	Items 1, 2, and 4 of teaching and learning methods	Items 1, 2, and 4 of Assessment methods
28	2 Th. 1 Tu. 2 Lab.	A3	Direct Memory Access I/O devices	Items 1, 2, and 4 of teaching and learning methods	Items 1, 2, and 4 of Assessment methods
29	2 Th. 1 Tu. 2 Lab.	A3	8237 Direct Memory Access Controller	Items 1, 2, and 4 of teaching and learning methods	Items 1, 2, and 4 of Assessment methods
30	2 Th. 1 Tu. 2 Lab.		Exam		

11. Infrastructure	
1. Books Required reading:	• The Intel Microprocessors, 8086/8088, 80186/80188, 80286,… Core" by Barray B, Brey
2. Main references (sources)	• The Intel Microprocessors, 8086/8088, 80186/80188, 80286,… Core" by Barray B, Brey
A- Recommended books and references (scientific journals, reports…).	• Olukotun, Kunle, and Lance Hammond. "The future of microprocessors." Queue 3.7 (2005): 26-29. • Venkatachalam, Vasanth, and Michael Franz. "Power reduction techniques for microprocessor systems." ACM Computing Surveys (CSUR) 37.3 (2005): 195-237.
B-Electronic references, Internet sites…	Extra lectures by foreign guest lecturers

12. The development of the curriculum plan
Continuous improvement of curriculum and faculty members through training

TEMPLATE FOR COURSE SPECIFICATION

Operating Systems

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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 programme specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Operating Systems /COE 304
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects
5. Semester/Year	1st & 2nd semester / Academic Year 2023 – 2022.
6. Number of hours tuition (total)	90 hrs. / 3 hrs. per week Theory
7. Date of production/revision of this Specification	October – 2022
8. Aims of the Course	

What are the knowledge and skills expected to be attained by the student upon completion of the course (brief description)?

1. Present, as clearly and completely as possible, the nature and characteristics of modern day operating systems.
2. Provide a thorough discussion of the fundamentals of operating system design and to relate these to contemporary design issues and to current directions in the development of operating systems.
3. The course mainly will study: Process management. Synchronization, via semaphore operations, of processes executing within a shared memory. Mapping virtual address to physical addresses in paged and segmentation virtual memory system. Page faulting and page replacement algorithms in virtual memory system. Processor scheduling algorithms.

9. Learning Outcomes, Teaching ,Learning and Assessment Methods

A. Cognitive goals.

A1. Understanding process management, process description, process states, process control block, process switching, mode switching.

A2. Understanding memory management,: partitioning, paging, segmentation .

A3. Understanding virtual memory: paging, segmentation, virtual memory; hardware and control structures.

A4. Processor scheduling: types of processor scheduling, processor scheduling algorithms.

A5. Concurrency, synchronization, mutual exclusion.

B. The skills goals special to the course

B1- Mathematical concepts and basic algorithms for describing and solving engineering problems.

B2 - Initial developments in Computer Architecture majors.

B3 - developing the ability to conduct experiments and analyze data.

B5- Identifying, formulating and solving Computer Architecture problems using modern engineering tools, techniques, and skills,

B6 - cooperation in group projects,

B7 - Developing written and verbal communication skills through presentations from the project results,

B8 - obtaining an appreciation for some of the ethical problems that exist in the practice of the profession.

Teaching and Learning Methods.

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. Connection between Theory and Application.
7. Seminars.
8. In- and Out-Class oral conservations.
9. Reports, Presentations, and Posters.

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Methods

1-Tests, quizzes.

2- Activities.

3- Participate during lectures

Assessment methods

1- Study the conditions of former graduates.
2- Relevant committees in management such as scientific, QA.
3- The employee attitudes of our graduates, for example, workplace and job title, will be tracked each year.

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1.Thinking of operating system as a supervisor programs, and no H/W without supervisor S/W.

D2.Help students to design and build their OS for different devices.

D3. Writing system software like input/output drivers.

D4. Developing OS for different systems such as embedded systems.

D5. Writing software for controlling devices interfaced to the system.

10. Course Structure

Week	Hours	ILos	Topic title	Teaching method	Assessment Method
1	3 the. 3 the.	Item A1	**Computer Organization, processor registers instruction**	From 1 to12 of T-methods	From 1 to4 of A-methods
2	3 the.	Items A1, A2	**Interrupts, memory organization**	From 1 to12 of T-methods	From 1 to4 of A-methods
3	3 the.	Item A1	**I/O Communication Techniques**	From 1 to12 of T-methods	From 1 to4 of A-methods
4	3 the.	Item A1	**The evolution of operating systems, modern OS**	From 1 to12 of T-methods	From 1 to4 of A-methods
5	3 the.	Item A4	**Time-Sharing, multitasking**	From 1 to12 of T-methods	From 1 to4 of A-methods
6	3 the.	Item A1	**Process Description**	From 1 to12 of T-methods	From 1 to4 of A-methods
7	3 the.	Item A1	**Process states**	From 1 to12 of T-methods	From 1 to4 of A-methods

8	3 the.	Item A1	**Process Control Block**	From 1 to12 of T-methods	From 1 to4 of A-methods
9	3 the.	Item A1	**Process switching, mode switching**	From 1 to12 of T-methods	From 1 to4 of A-methods
10	3 the.	Item A1	**Operating system Kernel**	From 1 to12 of T-methods	From 1 to4 of A-methods
11	3 the.	Item A2	**Memory Management Requirements, partitioning**	From 1 to12 of T-methods	From 1 to4 of A-methods
12	3 the.	Item A2	**Paging**	From 1 to12 of T-methods	From 1 to4 of A-methods
13	3 the.	Item A2	**Segmentation**	From 1 to12 of T-methods	From 1 to4 of A-methods
14	3 the.	Item A3	**Virtual memory: paging**	From 1 to12 of T-methods	From 1 to4 of A-methods
15	3 the.	Item A3	**Virtual memory: Segmentation**	From 1 to12 of T-methods	From 1 to4 of A-methods
16	3 the.	Item A3	**VM; Hardware and control structures**	From 1 to12 of T-methods	From 1 to4 of A-methods
17	3 the.	Item A3	**VM: Operating Systems Software**	From 1 to12 of T-methods	From 1 to4 of A-methods
18	3 the.	Item A3	**Page faulting: page Replacement Algorithms**	From 1 to12 of T-methods	From 1 to4 of A-methods
19	3 the.	Item A4	**Processor Scheduling**	From 1 to12 of T-methods	From 1 to4 of A-methods
20	3 the.	Item A4	**Types of Scheduling**	From 1 to12 of T-methods	From 1 to4 of A-methods
21	3 the.	Item A4	**Processor Scheduling Algorithms**	From 1 to12 of T-methods	From 1 to4 of A-methods
22	3 the.	Item A5	**Principles of Concurrency**	From 1 to12 of T-methods	From 1 to4 of A-methods
23	3 the.	Item A5	**Mutual Exclusion**	From 1 to12 of T-methods	From 1 to4 of A-methods
24	2 the. 2 exp.	Item A5	**Synchronization**	From 1 to12 of T-methods	From 1 to4 of A-methods
25	3 the.	Item A5	**Mutual Exclusion: Software Support**	From 1 to12 of	From 1 to4 of

				T-methods	A-methods
26	3 the.	Item A5	**Mutual Exclusion: Hardware Support**	From 1 to12 of T-methods	From 1 to4 of A-methods
27	3 the.	Item A5	**Starvation, Deadlock**	From 1 to12 of T-methods	From 1 to4 of A-methods
28	3 the.	Item A5	**Special Machine Instructions**	From 1 to12 of T-methods	From 1 to4 of A-methods
29	3 the.	Item A5	**Semaphores**	From 1 to12 of T-methods	From 1 to4 of A-methods
30	3 the.	Item A5	**Message Passing**	From 1 to12 of T-methods	From 1 to4 of A-methods

11. Infrastructure	
1. Books Required reading:	Operating Systems by William Stallings, Pearson International Edition, Eighth Edition, 2015.
2. Main references (sources)	1- Operating Systems Concepts by: Abraham Silberscatz, Peter B. galvin, International Student Edition, 8th Edition, 2010. 2- Operating Systems by Ramez Elmasri, McGRAW-HILL International Edition, 2010. 3- Operating Systems by: H. M. Deitel, Prentice Hall, 3rd Edition,2004.

A- Recommended books and references (scientific journals, reports…).	1- Comparison of different Operating System by Niti gupta , Amrita ticku, Manoj kumar3. Proceedings of National Conference on Recent Advances in Electronics and Communication Engineering (RACE-2014), 28-29 March 2014. 2- Operating System and Decision Making by: Hussain A. Alhassan, Dr. Christian Bach. ASEE 2014 Zone I Conference, April 3-5, 2014, University of Bridgeport, Bridgpeort, CT, USA. 3- Comparative Study of Different Mobile Operating Systems by: T.N.Sharma, Mahender Kr. Beniwal, Arpita Sharma. International Journal of Advancements in Research & Technology, Volume 2, Issue3, March-2013.
B-Electronic references, Internet sites…	Extra lectures by foreign guest lecturers Available websites related to the subject

12. The development of the curriculum plan
The development of the curriculum plan by updating the references

TEMPLATE FOR COURSE SPECIFICATION

Computer Networks

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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 programme specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Computer Networks/COE 305
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects
5. Semester/Year	1st & 2nd semester / Academic Year 2023 – 2022.
6. Number of hours tuition (total)	90 hrs. / 3 hrs. per week Theory. 60 hrs. / 2 hrs. per week Lab.
7. Date of production/revision of this Specification	October-2022
8. Aims of the Course	

1. What are the knowledge and skills expected to be attained by the student upon completion of the course (brief description)?
2. As a brief description for the Goals and objectives, by the completion of the course the goals are:
3. Introduce the concepts and meaning of network in live and work.
4. Understand "How it Works?" of every little detail of information transmit from sender to receiver through whole media.
5. Compare the differences of using certain media instead of others.
6. Ability to cope with the accelerated knowledge of the computer networks fields.

Learning the concepts of common network devices, such as routers, switches, servers …etc, which are the nerves of any network all over the world.

9· Learning Outcomes, Teaching , Learning and Assessment Method

A. Cognitive goals

A1. Design a complete network project: give the correct decisions of choosing devices, doing all cabling work, and complete configuration of end user devices such as computer and servers.

A2. Analyze the addressing schemes through OSI layers (MAC, IP and Port Addressing).

A3. Trouble shoots and maintains problems that occur in networks through confident list of cause and effect (reason and answer).

A4. Configure Cisco Routers through the use of static and dynamic routing protocols.

A5. Ability to calculate and classify any given IP address

B. The skills goals special to the course.

B1. Know all parts and levels of network.

B2. Network maintenance and developing.

Teaching and Learning Methods

1. Lectures
2. Homework
3. Lab. Experiments.
4. Discussions.

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Method

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Lab. Experiments.
5. Tests and Exams.
6. In-Class Questions and Discussions.
7. Connection between Theory and Application.
8. Field Trips.
9. Extracurricular Activities.
10. Seminars.
11. In- and Out-Class oral conservations.
12. Reports, Presentations, and Posters.

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about

Curriculum and Faculty Member (Instructor)

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10.Course Structure:

Weak	Hours	ILos	Topic title	Teaching method	Assessment Method
1	3 the. 2 exp.	Item A1	Introduction to computer Networks	From 1 to12 of T-Methods	From 1 to4 of A-Methods
2	3 the. 2 exp.	Item A1	Introduction to computer Networks	From 1 to12 of T-Methods	From 1 to4 of A-Methods
3	3 the. 2 exp.	Item A1	Introduction to computer Networks	From 1 to12 of T-Methods	From 1 to4 of A-Methods
4	3 the. 2 exp.	Item A1	Principles of Network Applications	From 1 to12 of T-Methods	From 1 to4 of A-Methods
5	3 the. 2 exp.	Item A1	The Web and HTTP	From 1 to12 of T-Methods	From 1 to4 of A-Methods
6	3 the. 2 exp.	Item A1	The Web and HTTP	From 1 to12 of T-Methods	From 1 to4 of A-Methods
7	3 the. 2 exp.	Item A1	DNS	From 1 to12 of T-Methods	From 1 to4 of A-Methods
8	3 the. 2 exp.	Item A1	Introduction to Transport Layer	From 1 to12 of T-Methods	From 1 to4 of A-Methods
9	3 the. 2 exp.	Item A1	UDP	From 1 to12 of T-Methods	From 1 to4 of A-Methods
10	3 the. 2 exp.	Item A1	Principles of Reliable Data Transfer	From 1 to12 of T-Methods	From 1 to4 of A-Methods
11	3 the. 2 exp.	Item A1	TCP	From 1 to12 of T-Methods	From 1 to4 of A-Methods
12	3 the. 2 exp.	Item A1	Pipelined Protocols	From 1 to12 of T-Methods	From 1 to4 of A-Methods
13	3 the. 2 exp.	Item A1	Flow control	From 1 to12 of T-Methods	From 1 to4 of A-Methods

14	3 the. 2 exp.	Item A1	Principles of Congestion Control	From 1 to12 of T-Methods	From 1 to4 of A-Methods
15	3 the. 2 exp.	Item A1	TCP Congestion Control	From 1 to12 of T-Methods	From 1 to4 of A-Methods
16	3 the. 2 exp.	Item A2	Introduction to Network Layer	From 1 to12 of T-Methods	From 1 to4 of A-Methods
17	3 the. 2 exp.	Item A2	Virtual Circuit and Datagram Networks	From 1 to12 of T-Methods	From 1 to4 of A-Methods
18	3 the. 2 exp.	Item A2	The Router Internals	From 1 to12 of T-Methods	From 1 to4 of A-Methods
19	3 the. 2 exp.	Item A2	The Internet Protocol (IP)	From 1 to12 of T-Methods	From 1 to4 of A-Methods
20	3 the. 2 exp.	Item A2	Routing Algorithms	From 1 to12 of T-Methods	From 1 to4 of A-Methods
21	3 the. 2 exp.	Item A2	Routing Algorithms	From 1 to12 of T-Methods	From 1 to4 of A-Methods
22	3 the. 2 exp.	Item A2	Routing in the Internet	From 1 to12 of T-Methods	From 1 to4 of A-Methods
23	3 the. 2 exp.	Item A2	Broadcast and Multicast Routing	From 1 to12 of T-Methods	From 1 to4 of A-Methods
24	3 the. 2 exp.	Item A3	Introduction to Data Link Layer	From 1 to12 of T-Methods	From 1 to4 of A-Methods
25	3 the. 2 exp.	Item A3	Error Detection and Correction Techniques	From 1 to12 of T-Methods	From 1 to4 of A-Methods
26	3 the. 2 exp.	Item A3	Multiple Access Links and Protocols	From 1 to12 of T-Methods	From 1 to4 of A-Methods
27	3 the. 2 exp.	Item A4, A5	Switched LANs	From 1 to12 of T-Methods	From 1 to4 of A-Methods
28	3 the. 2 exp.	Item A4, A5	LAN Virtualization	From 1 to12 of T-Methods	From 1 to4 of A-Methods
29	3 the. 2 exp.	Item A4, A5	Data Center Networking	From 1 to12 of T-Methods	From 1 to4 of A-Methods
30	3 the. 2 exp.	Item A4, A5	Physical Layer	From 1 to12 of T-Methods	From 1 to4 of A-Methods

11. Infrastructure	
1. Books Required reading:	• Computer Network A Top Down Approach, by *James F. Kourse*, 6 th edition 2017.
2. Main references (sources)	• Data Communications and Networking, by *Behrouz A. Forouzan* , 5th Edition 2013. • Computer Network by *Andrew S. Tanenbaum*, 5th Edition 2011. • TCP/IP Protocol Suite, by *Behrouz A. Forouzan* , 4th Edition 2010. • Data and Computer Communications, by *William Stallings*, 10th Edition 2014.
A- Recommended books and references (scientific journals, reports…).	• Paper1: Wu, C., et al.: WILL: Wireless indoor Localization without site survey. IEEE Trans. Parallel Distrib. Syst. 24(4), 839-848(2013). • Paper2: Vucic, J. and Langer, K.-D., "High-speed visible light communications: State-of-the-art," in [Optical Fiber Communication Conference and Exposition (OFC/NFOEC), 2012 and the National Fiber Optic Engineers Conference], 1–3 (2012. • J. Korhonen, Y. Wang, "Effect of packet size on loss rate and delay in wireless links," Wireless Communications and Networking Conference, 2005 IEEE , vol.3, no., pp. 1608- 1613 Vol. 3, 13-17 March.
B-Electronic references, Internet sites…	• Available websites related to the subject • Extra lectures by foreign guest lecturers

12. The development of the curriculum plan

TEMPLATE FOR COURSE SPECIFICATION

Digital Signal Processing

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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 programme specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Digital Signal Processing (DSP) /COE 306
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects
5. Semester/Year	1st & 2nd semester / Academic Year 2023 – 2022.
6. Number of hours tuition (total)	60 hrs. / 2 hrs. per week.
7. Date of production/revision of this Specification	October-2022
8. Aims of the Course	

As a brief description, the Goals and objectives by the completion of the course are:

1. To learn the distinction between continuous-time and discrete-time systems and their applications, then provide a thorough discussion of the fundamentals of these system and to relate these to the current directions in the development of digital system.
2. To understand the specific ways to design digital filters.
3. To make use of frequency domain properties and learn the nature of signals and systems.

9· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Cognitive goals.

A1. An ability to read and comprehend DSP literature at an appropriate level.

A2. An ability both to follow correctly and to construct mathematical proofs of appropriate degrees of complexity.

A3. An understanding of time-domain and frequency-domain analysis.

A4. An appreciation of the importance of DSP for computer engineers.

B. The skills goals special to the course.

B1. Develop the ability of Digital filter design.

B2. Increase the ability of mathematic analysis

B3. Develop the ability of DSP design using computer system.

Teaching and Learning Methods

1. Lectures
2. Homework
3. Lab. Experiments.
4. Discussions.
5. Seminar.

Assessment methods

1. Oral Quizzes.
2. Quizzes and exams
3. homework
4. assignments

C. Affective and value goals

C1. Minimization using mathematical simplification.

C2. Developing systems by digital features.

C3. Thinking to live in digital world.

Teaching and Learning Methods

1. Lectures
2. Homework
3. Lab. Experiments.
4. Discussions

Assessment methods

Quizzes and exams
2. homework
3. Lab
4. assignments

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Developing digital processes.

D2. Using special DSP H/W in digital design.

D3. Analysis of special DSP processors.

10. Course Structure

week	Hours	ILos	Topic title	Teaching method	Assessment Method
1	2 the.	Items A1 & A2	**Basic Concepts of DSP**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
2	2 the	Items A1 & A2	**Properties of systems and signals**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods

3	2 the	Items A1 & A2	**linear Time-Invariant (LTI) systems**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
4	2 the	Items A1 & A2	**Basic types of discrete-time signals**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
5	2 the	Items A1 & A2	**Sampling Theory**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
6	2 the	Items A1 & A2	**Quantization Theory**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
7	2 the	Items A1 & A2	**Quantization Theory + Quiz**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
8	2 the	Items A1 & A2	**Difference equations**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
9	2 the	Items A1 & A2	**Convolution**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
10	2 the	Items A1 & A2	**Discrete Convolution**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
11	2 the	Items A1 - A2	**Frequency domain analysis+ Quiz**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
12	2 the	Items A1 - A2	**Frequency response**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
13	2 the	Items A1 - A2	**The discrete Fourier Series (DFS)**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
14	2 the	Items A1 - A2	**The discrete-time Fourier transform (DTFT)**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
15	2 the	Items A1 - A2	**The discrete Fourier transform (DFT)**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
16	2 the	Items A1 - A2	**The fast Fourier transform (FFT)**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
17	2 the	Items A1 - A2	**Quiz**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
18	2 the	Items A1 - A3	**The Z-transform**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
19	2 the	Items A1 - A3	**The Inverse of Z-transform**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
20	2 the	Items A1 - A3	**Infinite Impulse Response Filter Design (IIR design Part 1)**	From 1 to 12 of	From 1 to4 of

				T-Methods	A-Methods
21	2 the	Items A1 - A3	**Infinite Impulse Response Filter Design (IIR design Part 2)**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
22	2 the	Items A1 - A3	**The windowing method**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
23	2 the	Items A1 - A3	**The finite-impulse response (FIR) digital filters**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
24	2 the	Items A1 - A3	**Design of FIR digital filters**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
25	2 the	Items A1 - A3	**Quiz+ Seminars**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
26	2 the	Items A1 - A3	**Analog filter design**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
27	2 the	Items A1 - A3	**The impulse invariance method**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
28	2 the	Items A1 - A3	**Quiz+** Seminars	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
29	2 the	Items A1 - A3	**The bilinear transformation method**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods
30	2 the	Items A1 - A4	**The bilinear transformation method**	From 1 to 12 of T-Methods	From 1 to4 of A-Methods

11. Infrastructure	
1. Books Required reading:	• Tan, Lizhe, and Jean Jiang. Digital signal processing: fundamentals and applications. Academic Press, 2018. • Proakis, J.G., Digital signal processing: principles, algorithms and applications. 2001: Pearson Education India.

2. Main references (sources)	• Smith, S. (2013). Digital signal processing: a practical guide for engineers and scientists. Elsevier. • Lectures on Statistical Signal Processing Paperback – June 5, 2016 by Prof Nuha A. S. Alwan. • L. C. Ludeman, "Fundamentals of digital signal processing", Harper and Row, 1986.
A- Recommended books and references (scientific journals, reports…).	1. D.S. Kim et al., "Auditory Processing of Speech Signals for Robust Speech Recognition in Real-World Noisy Environments", IEEE Trans. Speech and Audio Processing, Vol. 7, No. 1, January 1999. 2. S. Lawrence Marple Jr., "Computing the Discrete-Time 'Analytic' Signal Via FFT", IEEE Trans. Signal Processing, Vol. 47, No. 9, September 1999.
B-Electronic references, Internet sites…	Available websites related to the subject.

12. The development of the curriculum plan
Continuous improvement of curriculum and faculty members through training programs. And strengthening a number of faculty members for the higher scientific classes.

TEMPLATE FOR COURSE SPECIFICATION

Database Systems

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

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 programme specification.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Database System/ COE 307
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects
5. Semester/Year	1st & 2nd semester / Academic Year 2022 – 2023.
6. Number of hours tuition (total)	60 hrs. / 2 hrs. per week .
7. Date of production/revision of this Specification	October / 2022
8. Aims of the Course	

What are the knowledge and skills expected to be attained by the student upon completion of the course (brief description)?

Upon completion of this course the student will be able to:

1. Demonstrate a working knowledge of a particular Database Management System (in Access 2016).

2. Plan, define and design a database.

3. Explain the value of using a Database Management System to store and retrieve information.

9· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Cognitive goals

What is the knowledge and skills expected to be attained by the student upon completion of the course (should be measurable)?

The student will understand:

A1. What the database is, what the different types of databases are.

A2. The main functions of database management system.

A3. How data models can be classified.

A4. The relational database model.

A5. How data redundancy is handled in the relational database model.

A6. Design database model using ERD.

A7. What is normalization?

A8. Advanced Data Modeling.

A9. Database Design.

A10. What is the distributed database system?

B. The skills goals special to the course.

B1. Realizing the Database important.

B2. Designing and modeling some database applications.

Teaching and Learning Methods

1. Lectures
2. Homework

3. Lab. Experiments.
4. Discussions.

Assessment methods

1. Lab
2. Quizzes and exams
3. homework
4. assignments

C. Affective and value goals

C1. Understanding the database concepts.

C2. Understanding database instructions.

C4. Understanding database responsibility of different parameters.

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

D1. Thinking of database as a supervisor programs, and no H/W without supervisor S/W.

D2.Help students to design and build their database programs.

D3. Writing database codes.

D4. Developing OS for different systems such as embedded systems.

10.Course Structure

week	Hours	ILos	Topic title	Teaching method	Assessment Method
1	2 the. 2 exp.	From 1 to 3 of section 10	File systems and database	From 1 to12 of section 11	From 1 to4 of section 12
2	2 the. 2 exp.	From 1 to 3 of section 10	File systems and database	From 1 to12 of section 11	From 1 to4 of section 12
3	2 the. 2 exp.	From 1 to 3 of section 10	File systems and database	From 1 to12 of section 11	From 1 to4 of section 12
4	2 the. 2 exp.	Item 6 of section 10	Data Models :Data Model Basic Building Blocks	From 1 to12 of section 11	From 1 to4 of section 12

5	2 the. 2 exp.	Item 6 of section 10	Data Models : Business Rules	From 1 to12 of section 11	From 1 to4 of section 12
6	2 the. 2 exp.	Item 6 of section 10	Data Models : The Evolution of Data Models	From 1 to12 of section 11	From 1 to4 of section 12
7	2 the. 2 exp.	Item 6 of section 10	Data Models :Degrees of Data Abstraction	From 1 to12 of section 11	From 1 to4 of section 12
8	2 the. 2 exp.	Item 6 of section 10	Design concepts: The Relational Database Model	From 1 to12 of section 11	From 1 to4 of section 12
9	2 the. 2 exp.	Item 6 of section 10	Design concepts: Entity Relationship (ER) Modeling	From 1 to12 of section 11	From 1 to4 of section 12
10	2 the. 2 exp.	Items 4,5 of section 10	Design concepts: Relational Algebra	From 1 to12 of section 11	From 1 to4 of section 12
11	2 the. 2 exp.	Items 4,5 of section 10	Design concepts: Data Redundancy	From 1 to12 of section 11	From 1 to4 of section 12
12	2 the. 2 exp.	Items 4,5 of section 10	Entity relationship modeling	From 1 to12 of section 11	From 1 to4 of section 12
13	2 the. 2 exp.	Items 4,5 of section 10	Entity relationship modeling	From 1 to12 of section 11	From 1 to4 of section 12
14	2 the. 2 exp.	Items 4,5 of section 10	Developing an ER Diagram	From 1 to12 of section 11	From 1 to4 of section 12
15	2 the. 2 exp.	Item 7 of section 10	Normalization of Database Tables	From 1 to12 of section 11	From 1 to4 of section 12
16	2 the. 2 exp.	Item 7 of section 10	Normalization of Database Tables	From 1 to12 of section 11	From 1 to4 of section 12
17	2 the. 2 exp.	Item 7 of section 10	Normalization of Database Tables	From 1 to12 of section 11	From 1 to4 of section 12

18	2 the. 2 exp.	Item 7 of section 10	Denormalization	From 1 to12 of section 11	From 1 to4 of section 12
19	2 the. 2 exp.	Item 8 of section 10	Advanced Data Modeling	From 1 to12 of section 11	From 1 to4 of section 12
20	2 the. 2 exp.	Item 8 of section 10	The Extended Entity Relationship Model	From 1 to12 of section 11	From 1 to4 of section 12
21	2 the. 2 exp.	Item 8 of section 10	Entity Integrity: Selecting Primary Keys	From 1 to12 of section 11	From 1 to4 of section 12
22	2 the. 2 exp.	Item 9 of section 10	Database Design: The Information System	From 1 to12 of section 11	From 1 to4 of section 12
23	2 the. 2 exp.	Item 9 of section 10	Database Design: The Systems Development Life Cycle	From 1 to12 of section 11	From 1 to4 of section 12
24	2 the. 2 exp.	Item 9 of section 10	Database Design: The Database Life Cycle	From 1 to12 of section 11	From 1 to4 of section 12
25	2 the. 2 exp.	Item 10 of section 10	Database Design: Conceptual Design	From 1 to12 of section 11	From 1 to4 of section 12
26	2 the. 2 exp.	Item 10 of section 10	Database Design: Logical Design and Physical Design	From 1 to12 of section 11	From 1 to4 of section 12
27	2 the. 2 exp.	Item 10 of section 10	Database Performance Tuning and Query Optimization	From 1 to12 of section 11	From 1 to4 of section 12
28	2 the. 2 exp.	Item 10 of section 10	Database Performance Tuning and Query Optimization	From 1 to12 of section 11	From 1 to4 of section 12
29	2 the. 2 exp.	Item 10 of section 10	Distributed systems	From 1 to12 of section 11	From 1 to4 of section 12
30	2 the. 2 exp.	Item 10 of section 10	Distributed systems	From 1 to12 of section 11	From 1 to4 of section 12

11. Infrastructure	
1. Books Required reading:	Database systems (design, implementation and management).by Beter Rob and Carlos Coronel, 14th Edition 2019.
2. Main references (sources)	1- Database design and programming with Access, SQL and Visual Basic, by John Carter, 2019. 2 -Database Design, and Application Development & Administration
A- Recommended books and references (scientific journals, reports…).	1- Centralized vs. Distributed Databases. Case Study, by Nicoleta Magdalena Iacob1 , Mirela Liliana Moise2, 2015 2- A Comparative Study of Databases with Different Methods of Internal Data Management, by Mokhtar A. Alworafi , Atyaf Dhari, Asma A. Al-Hashmi, 2016.
B-Electronic references, Internet sites…	• Available websites related to the subject • Extra lectures by foreign guest lecturers

12. The development of the curriculum
Continuous improvement of curriculum and faculty members through training programs.

Fourth Stage

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

Internet Technology

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	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Internet Technology / COE 401
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st & 2nd / Academic Year 2023 – 2022
6. Number of hours tuition (total)	90 hrs. / 3 hrs. per week Theory. 60 hrs. / 2 hrs. per week Lab.
7. Date of production/revision of this Specification	October-2022
8. Aims of the Course	
As a brief description for the Goals and objectives, by the completion of the course the goals are: 1. Develop the ability to apply knowledge of Internet Service Providers Types and Switching Types and the Important Internet Protocols and the type of the broadband connection to the end user. 2. Develop skills to communicate effectively through seminars and homework. 3. Prepare students to be active at the practical life after graduate.	

9· Learning Outcomes, Teaching , Learning and Assessment Method

C- Cognitive goals:

A1. Write RTL for hardware jobs.

A2. Define and explain the principles of Internet Technology and the interfacing between its hardware and software components

A3. Understand the data path inside Internet.

A4. Understand the Internet Technology organization

A5. Know the organization and architecture of the Internet with an emphasis on the user's view of the computer Network.

A6. Understand of layers of protocol and network.

A7. Understand of architectural blocks involved in Internet Technology.

A8. Understand problems of speed and congestion in Internet networks.

A9. Analyze Internet and cloud structures.

A10. Understand Internet architectures.

B. The skills goals special to the course

B1- Mathematical concepts and basic algorithms for describing and solving engineering problems.

B2 - Initial developments in Internet Technology majors.

B3 - developing the ability to conduct experiments and analyze data.

B5- Identifying, formulating and solving Internet Technology problems using modern engineering tools, techniques, and skills,

B6 - cooperation in group projects,

B7 - Developing written and verbal communication skills through presentations from the project results,

B8 - obtaining an appreciation for some of the ethical problems that exist in the practice of the profession.

10. Teaching and Learning Methods.

9. Lectures.
10. Tutorials.
11. Homework and Assignments.
12. Tests and Exams.
13. In-Class Questions and Discussions.
14. Connection between Theory and Application.
15. Seminars.
16. In- and Out-Class oral conservations.

9. Reports, Presentations, and Posters.

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

Grading Policy

1. Exams and Quizzes: There will be at least seven closed books and notes exams and quizzes during the academic year.

2. Oral and written assessment: The students are encouraged to participate their ideas to solve the problems during the lecture. The oral and written assessment.

3. Final Exam: - The final exam will be comprehensive, closed books and notes.

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Methods

1-Tests, quizzes.

2- Activities.

3- Participate during lectures

Assessment methods

4- Study the conditions of former graduates.
5- Relevant committees in management such as scientific, QA.
6- The employee attitudes of our graduates, for example, workplace and job title, will be tracked each year.

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.

D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10. Course Structure

weak	Hours	ILOs	Topic title	Teaching method	Assessment Method
1	2 the. 2 exp.	Item 1 of section 10	Introduction	From 1 to12 of section 11	From 1 to4 of section 12
2	2 the. 2 exp.	Item 1 of section 10	ISP (Internet Service Provider)	From 1 to12 of section 11	From 1 to4 of section 12
3	2 the. 2 exp.	Item 1 of section 10	ISP (Internet Service Provider)	From 1 to12 of section 11	From 1 to4 of section 12
4	2 the. 2 exp.	Item 1 of section 10	Web Hosting	From 1 to12 of section 11	From 1 to4 of section 12
5	2 the. 2 exp.	Item 1 &2 of section 10	Content Delivery Networks	From 1 to12 of section 11	From 1 to4 of section 12
6	2 the. 2 exp.	Item 1 & 2 of section 10	Content Delivery Networks	From 1 to12 of section 11	From 1 to4 of section 12
7	2 the. 2 exp.	Item 1&2 of section 10	Circuit Switching	From 1 to12 of section 11	From 1 to4 of section 12
8	2 the. 2 exp.	From 1 to 3of section 10	Circuit Switching	From 1 to12 of section 11	From 1 to4 of section 12
9	2 the. 2 exp.	From 1 to 3of section 10	Dedicated Circuits	From 1 to12 of section 11	From 1 to4 of section 12
10	2 the. 2 exp.	From 1 to 3of section 10	Dedicated Circuits	From 1 to12 of section 11	From 1 to4 of section 12
11	2 the. 2 exp.	From 1 to 3of section 10	Dedicated Circuits	From 1 to12 of section 11	From 1 to4 of section 12
12	2 the. 2 exp.	From 1 to 3of section 10	Packet Switching.	From 1 to12 of section 11	From 1 to4 of section 12
13	2 the. 2 exp.	From 1 to 3of section 10	Packet Switching.	From 1 to12 of section 11	From 1 to4 of section 12
14	2 the. 2 exp.	From 1 to 3of section 10	Packet Switching.	From 1 to12 of section 11	From 1 to4 of section 12
15	2 the. 2 exp.	From 1 to 3of section 10	Broadband Internet Access Technologies.	From 1 to12 of section 11	From 1 to4 of section 12
16	2 the. 2 exp.	From 1 to 3of section 10	Broadband Internet Access Technologies.	From 1 to12 of section 11	From 1 to4 of section 12

17	2 the. 2 exp.	From 1 to 3of section 10	Broadband Internet Access Technologies.	From 1 to12 of section 11	From 1 to4 of section 12
18	2 the. 2 exp.	From 1 to 3of section 10	Broadband Internet Access Technologies.	From 1 to12 of section 11	From 1 to4 of section 12
19	2 the. 2 exp.	From 1 to 3of section 10	ARP	From 1 to12 of section 11	From 1 to4 of section 12
20	2 the. 2 exp.	From 1 to 3of section 10	ARP	From 1 to12 of section 11	From 1 to4 of section 12
21	2 the. 2 exp.	From 1 to 3of section 10	FTP	From 1 to12 of section 11	From 1 to4 of section 12
22	2 the. 2 exp.	From 1 to 3of section 10	FTP	From 1 to12 of section 11	From 1 to4 of section 12
23	2 the. 2 exp.	From 1 to 3of section 10	Email.	From 1 to12 of section 11	From 1 to4 of section 12
24	2 the. 2 exp.	From 2 to 5of section 10	Email.	From 1 to12 of section 11	From 1 to4 of section 12
25	2 the. 2 exp.	From 2 to 5of section 10	Email.	From 1 to12 of section 11	From 1 to4 of section 12
26	2 the. 2 exp.	From 2 to 5of section 10	DNS	From 1 to12 of section 11	From 1 to4 of section 12
27	2 the. 2 exp.	From 2 to 5of section 10	DNS	From 1 to12 of section 11	From 1 to4 of section 12
28	2 the. 2 exp.	From 2 to 5of section 10	DNS	From 1 to12 of section 11	From 1 to4 of section 12
29	2 the. 2 exp.	From 2 to 5of section 10	DNS	From 1 to12 of section 11	From 1 to4 of section 12

11. Infrastructure	
1. Books Required reading:	1. Oliver Heckmann, "THE COMPETITIVE INTERNET SERVICE PROVIDER ", 2006, John Wiley & Sons Ltd. 2. Margaret Levine Young et al, " Internet: The Complete Reference ", 2nd Edition, 2002, McGraw-Hill. 3. Edward Insam, " TCP/IP Embedded Internet Applications ", 1st publish Edition, 2003, Linacre House, Jordan Hill. 4. Huub van Helvoort, " Next Generation SDH/SONET Evolution or Revolution?", 2005, John Wiley & Sons Ltd. **5.** Eric A. Hall, " Internet Core Protocols The Definitive Guide", 2000, O'Reilly & Associates, Inc.
2. Main references (sources)	1. Oliver Heckmann, "THE COMPETITIVE INTERNET SERVICE PROVIDER ", 2006, John Wiley & Sons Ltd. 2. Margaret Levine Young et al, " Internet:

A- Recommended books and references (scientific journals, reports…).	**PAPERS** 1. Pallis, George, and Athena Vakali. "Insight and perspectives for content delivery networks." Communications of the ACM 49.1 (2006): 101-106. 2. Bertschek, Irene, Daniel Cerquera, and Gordon J. Klein. "More bits–more bucks? Measuring the impact of broadband internet on firm performance." Information Economics and Policy 25.3 (2013): 190-203. 3. Van der Wee, Marlies, et al. "Techno-economic evaluation of open access on FTTH networks." IEEE/OSA Journal of Optical Communications and Networking 7.5 (2015): 433-444.
B-Electronic references, Internet sites…	• Laboratory experiments in the (Computer network Lab) of the department. Available websites related to the subject Extra lectures by foreign guest lecturers

12.The development of the curriculum plan

Continuous developing academic curriculum line with the scientific development

Computer Architecture II

COURSE SPECIFICATION

This course covers the current the advancement in computer architecture including the internal organization of processors , multi-core CPU's architecture, many-core PU's architecture, and the memory hierarchy . The learning outcomes that a typical student might reasonably be expected to achieve are based on the three tenets that all computer architects and designers are believed on, namely: parallelism, pipelining and the principle of locality. In doing so, the student takes full advantage of the learning opportunities to participate and contribute to modern research and development that reflects the state-of-the-art as well as the art-of-the-practice in modern computer design and computing in both hardware and software domain..	
1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Computer Architecture II / COE 402
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular
5. Semester/Year	1st & 2nd / Academic Year 2023 – 2022
6. Number of hours tuition (total)	90hrs. / 3 hrs. per week Theory.
7. Date of production/revision of this Specification	October-2022
8. Aims of the Course	

- Explore the advancement in computer architecture and makes the student ready to design and facilitate the current trends in computer architecture. This involve:
- How to determine the performance of computer in both theoretical and practical manner.
- Understanding the Moore's law and its impact on computer engineering.
- Understanding the pipelining principle for both static and dynamic pipeline and three hazards encounter in pipeline, namely: Structural hazards, Data hazards, and branch hazards. In addition, the current trends to solve these hazards. Furthermore, how to deal with Interrupt and Exception behavior from the computer architects point of view.
- Understanding compiler optimization, loop unrolling, branch prediction.
- Understanding ILP, TLP, DLP
- Understanding the Advanced Pipelining, involve: super scalar, VLIW, and software pipelining.
- Going from unicore to multicore and many core architecture, and discuss the principle of "lazy boy era is finished". This involve: implicit and explicit threading and processing, fine-grained, coarse grained, and SMT multithreading from hardware point of view and leads to concrete understanding and imagination of the sole of this subject.
- Understanding the memory Hierarchy design and Organization, how the cache memory work and the 4C's principle in Cache memory.

9· Learning Outcomes, Teaching , Learning and Assessment Method

A- Cognitive goals:

A1. Write RTL for hardware jobs.
A2. Define and explain the principles of Computer Architecture and the interfacing between its hardware and software components
A3. Understand the data path inside Computer Architecture.
A4. Understand the Computer Architecture organization
A5. Know the organization and architecture of the Internet with an emphasis on the user's view of the computer Network.
A6. An appreciation of the importance of proof, generalization and abstraction in the logical development of formal theories
A7. Understand of architectural blocks involved in computer architecture.
A8. Understand problems of Computer Architecture.
A9. How to apply Engineering analysis (time, cost, performance) in Computer design.
A10. Understand Internet architectures.

B. The skills goals special to the course

B1- Mathematical concepts and basic algorithms for describing and solving engineering problems.

B2 - Initial developments in Internet Technology majors.

B3 - developing the ability to conduct experiments and analyze data.

B5- Identifying, formulating and solving Internet Technology problems using modern engineering tools, techniques, and skills,

B6 - cooperation in group projects,

B7 - Developing written and verbal communication skills through presentations from the project results,

B8 - obtaining an appreciation for some of the ethical problems that exist in the practice of the profession.

Teaching and Learning Methods.

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. Connection between Theory and Application.
7. Seminars.
8. In- and Out-Class oral conservations.
9. Reports, Presentations, and Posters.

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Methods

1-Tests, quizzes.

2- Activities.

3- Participate during lectures

Assessment methods

7- Study the conditions of former graduates.
8- Relevant committees in management such as scientific, QA.
9- The employee attitudes of our graduates, for example, workplace and job title, will be tracked each year.

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10. Course Structure					
Week	**Hours**	**ILOs**	**Unit/Module or Topic Title**	**Teaching Method**	**Assessment Method**
1-6	**12**	**A1** **A2** **A3** **A4** **B1** **B2** **B3** **C1** **C2** **C3**	**New Trends in Computer Architecture and CPU's Performance Equations**	Attract the student to the topics Guided Discovery Power Point Lecturing that summarizes the full text, in addition, a full text also available. Assignment Seminars Playing some Videos to stress and improve the student capability Do some practical examples that integrate the computer engineering subjects by Java programming language. Group Discussion	Motivation Quizzes Test Home work Peer assessment Oral assessment Discussion on Extra examples

7-12	**12**	**A1** **A2** **A3** **A4** **B1** **B2** **B3** **C1** **C2** **C3**	**Static and Dynamic Pipelining**	Attract the student to the topics Guided Discovery Power Point Lecturing that summarizes the full text, in addition, a full text also available. Assignment Seminars Playing some Videos to stress and improve the student capability Do some practical examples that integrate the computer engineering subjects by Java programming language. Group Discussion	Motivation Quizzes Test Home work Peer assessment Oral assessment Discussion on Extra examples
13-20	**16**	**A1** **A2** **A3** **A4** **B1** **B2** **B3**	**Superscalar**	Attract the student to the topics Guided Discovery	Motivation Quizzes Test Home work

		C1 **C2** **C3**		Power Point Lecturing that summarizes the full text, in addition, a full text also available. Assignment Seminars Playing some Videos to stress and improve the student capability Do some practical examples that integrate the computer engineering subjects by using Java programming language. Group Discussion	Peer assessment Oral assessment Discussion on Extra examples
21-24	**8**	**A1** **A2** **A3** **A4** **B1** **B2** **B3** **C1** **C2** **C3**	**Branch prediction**	Attract the student to the topics Guided Discovery Power Point Lecturing that summarizes the full text, in addition, a	Motivation Quizzes Test Home work Peer assessment Oral assessment Discussion on Extra examples

				full text also available. Assignment Seminars Playing some Videos to stress and improve the student capability Do some practical examples that integrate the computer engineering subjects by using Java programming language. Group Discussion	
25-28	**8**	**A1 A2 A3 A4 B1 B2 B3 C1 C2 C3**	**Memory Hierarchy**	Attract the student to the topics Guided Discovery Power Point Lecturing that summarizes the full text, in addition, a full text also available. Assignment Seminars	Motivation Quizzes Test Home work Peer assessment Oral assessment Discussion on Extra examples

				Playing some Videos to stress and improve the student capability Do some practical examples that integrate the computer engineering subjects by using Java programming language. Group Discussion	
29-31	**6**	**A1** **A2** **A3** **A4** **B1** **B2** **B3** **C1** **C2** **C3**	**Overview of Multi-Core, Many-Core Architecture and Parallel Processing**	Attract the student to the topics Guided Discovery Power Point Lecturing that summarizes the full text, in addition, a full text also available. Assignment Seminars Playing some Videos to stress and improve the student capability	Motivation Quizzes Test Home work Peer assessment Oral assessment Discussion on Extra examples

				Do some practical examples that integrate the computer engineering subjects by using Java programming language. Group Discussion	
1-31	**30**	**A1 A2 A3 A4 A5 A6 B1 B2 B3 B4 C1 C2 C3 C4 C5 C6**	**Review, Seminars, Project Discussion on up-to-date topics in Computer Architecture**	Attract the student to the topics Guided Discovery Power Point Lecturing that summarizes the full text, in addition, a full text also available. Assignment Seminars Playing some Videos to stress and improve the student capability Do some practical examples that integrate the computer engineering	Quizzes Test Home work Peer report Group report Mini-project assignment Oral Discussion Practical examples Independent research.

				subjects by using Java programming language Group Discussion Seminars Do a group based mini project by arranging with Operating System Libratory.	

11. Infrastructure

1. Books Required reading:	1. Computer Architecture a Quantitative Approach , Hennessey & Patterson, (3rd, 4th, & 5th editions), Elsevier, (2003 , 2006, & 2012). 2. Computer Organization and Architecture Design for Performance, William Stalling, 9th edition, Pearson, 2013. 3. Computer Organization and Design: The Hardware/Software Interface Patterson & Hennessey, 4th edition, The Morgan Kaufmann Series in Computer Architecture and Design, 2008. 4. Microprocessor Architecture, Jean-Loup Baer, Cambridge University Press, 2010. 5. Structure Computer Organization, Tanenbaum, 5th edition, Prentice Hall,2006. 6. OpenCL Programming by Example, **Banger & Bhattacharyya,** PACKT, 2013. 7. Modern X86 Assembly Language Programming_ 32-bit, 64-bit, SSE, and AVX, Kusswurm, APRESS, December 2014. 8. The Java Tutorial, 6th Edition, Gallardo et. al., Addison-Wesley Professional, December 2014.
2. Main references (sources)	1. Computer Architecture a Quantitative Approach , Hennessey & Patterson, (3rd, 4th, & 5th editions), Elsevier, (2003 , 2006, & 2012).

A- Recommended books and references (scientific journals, reports…).	Papers: • P. Trivedi and R. P. Tripathi, "Design & analysis of 16 bit RISC processor using low power pipelining," International Conference on Computing, Communication & Automation, Noida, 2015, pp. 1294-1297. • B. W. Bomar, "Implementation of microprogrammed control in FPGAs," in *IEEE Transactions on Industrial Electronics*, vol. 49, no. 2, pp. 415-422, Apr 2002. J. L. Cruz, A. Gonzalez, M. Valero and N. P. Topham, "Multiple-banked register file architectures," Proceedings of 27th International Symposium on Computer Architecture (IEEE Cat. No.RS00201), Vancouver, BC, Canada, 2000, pp. 316-325.
B-Electronic references, Internet sites…	Data Show. Internet. NetBeans IDE in the Lab. A Good Sounding system in the Lecture Hall. E-Learning Platform. Smart Board.

12.The development of the curriculum plan
Continuous developing academic curricula in line with the scientific development.

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

Embedded System

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	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Embedded Systems / COE 403
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st & 2nd / Academic Year 2023 – 2022
6. Number of hours tuition (total)	90 hrs. / 3 hrs. per week Theory. 60 hrs. / 2 hrs. per week Lab.
7. Date of production/revision of this Specification	October-2022
8. Aims of the Course	
As a brief description for the Goals and objectives, by the completion of the course the goal is: To provide students with basic knowledge and skills in embedded systems design.	
9· Learning Outcomes, Teaching , Learning and Assessment Method	

A1. Design, program and evaluate systems in real time.
A2. Designing electronic circuits for the processing of information in communications and control systems.
A3. The ability to analyze, design, test and maintain complex embedded systems.
A4. The ability to describe, validate and optimize embedded electronic systems in different areas of industrial application.
A5. The ability to evaluate hardware and software requirements for communication and control applications.
A6. The ability to solve industrial problems in control and automation systems.
A7. The ability to write reports on and present the systems designed.
A8. Understanding and applying the properties of sensors for designing electronic systems that integrate measurement and behavior in different areas of industrial production.
A9. Understanding and knowing how to use the methods and tools for the development and refinement of programs implemented on microprocessors, microcontrollers and DSPs.
A10. Understanding the most suitable processing of signaling and the associated hardware.

B. The skills goals special to the course

B1- Mathematical concepts and basic algorithms for describing and solving engineering problems.

B2 - Initial developments in Embedded systems majors.

B3 - developing the ability to conduct experiments and analyze data.

B5- Identifying, formulating and solving Internet Technology problems using modern engineering tools, techniques, and skills,

B6 - cooperation in group projects,

B7 - Developing written and verbal communication skills through presentations from the project results,

B8 - obtaining an appreciation for some of the ethical problems that exist in the practice of the profession.

10. Teaching and Learning Methods.

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

4. Tests and Exams.
5. In-Class Questions and Discussions
6. Connection between Theory and Application.
7. Seminars.
8. In- and Out-Class oral conservations.

9. Reports, Presentations, and Posters.

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

Grading Policy

1. Exams and Quizzes: There will be at least seven closed books and notes exams and quizzes during the academic year.

2. Oral and written assessment: The students are encouraged to participate their ideas to solve the problems during the lecture. The oral and written assessment.

3. Final Exam: - The final exam will be comprehensive, closed books and notes.

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Methods

1-Tests, quizzes.

2- Activities.

3- Participate during lectures

Assessment methods

1- Study the conditions of former graduates.

2- Relevant committees in management such as scientific, QA.
3- The employee attitudes of our graduates, for example, workplace and job title, will be tracked each year.

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10. Course Structure

weak	Hours	ILOs	Topic title	Teaching method	Assessment Method
Week	Hours	LOs	**Topic title**	Teaching method	Assessment Method
1	2 the. 2 exp.	Item 1 of section 10	**Review of microcontrollers and Digital Signal Processors (DSP), architecture, peripheral modules.**	From 1 to12 of section 11	From 1 to 4 of section 12
2	2 the. 2 exp.	Item 2 & 3 of section 10	**Embedded micro controller cores (ARM, RISC, CISC, SOC), addressing modes.**	From 1 to12 of section 11	From 1 to 4 of section 12
3	2 the. 2 exp.	Item 4 of section 10	**Interrupts structure, hardware multiplier, pipelining.**	From 1 to12 of section 11	From 1 to 4 of section 12
4	2 the. 2 exp.	Item 4 of section 10	**Hardware/Software co-design. Architecture of embedded systems.**	From 1 to12 of section 11	From 1 to 4 of section 12
5	2 the. 2 exp.	Item 1 to 4 of section 10	**Tutorials & Quiz**	From 1 to12 of section 11	From 1 to 4 of section 12
6	2 the. 2 exp.	Item 5 of section 10	**Assemblers, linkers and loaders. Binary file formats for processor executable files.**	From 1 to12 of section 11	From 1 to 4 of section 12
7	2 the. 2 exp.	Item 5 of section 10	**Typical structure of timer-interrupt driven programs.**	From 1 to12 of section 11	From 1 to 4 of section 12
8	2 the. 2 exp.	Item 5 of section 10	**GNU-GCC compiler introduction, programming with Linux environment and gnu debugging.**	From 1 to12 of section 11	From 1 to 4 of section 12
9	2 the. 2 exp.	Item 5 of section 10	**GNU insight with step level trace debugging, make file interaction, building and execution.**	From 1 to12 of section 11	From 1 to 4 of section 12
10	2 the. 2 exp.	Item 6 of section 10	**Introduction to ARM instruction set, addressing modes, operating modes with ARM core.**	From 1 to12 of section 11	From 1 to 4 of section 12
11	2 the. 2 exp.	Item 6 of section 10	**ARM TDMI modes, ADC, Timers, Interrupt structure.**	From 1 to12 of section 11	From 1 to 4 of section 12

12	2 the. 2 exp.	Item 7 of section 10	**Byte ordering (LE, BE), Thumb mode normal mode instructions changes.**	From 1 to12 of section 11	From 1 to 4 of section 12
13	2 the. 2 exp.	Item 7 of section 10	**Pipeline utilization with all register allocations.**	From 1 to12 of section 11	From 1 to 4 of section 12
14	2 the. 2 exp.	Item 7 of section 10	**Compare the ARM7, ARM9, and ARM11 with new features additions. System design with ARM processor.**	From 1 to12 of section 11	From 1 to 4 of section 12
15	2 the. 2 exp.	Item 8 of section 10	**Interfacing switches, keyboards, LED's and LCD's.**	From 1 to12 of section 11	From 1 to 4 of section 12
16	2 the. 2 exp.	Item 8 of section 10	**Transistors used for digital-controlled switches, digital-controlled relays, solenoids & Quiz**	From 1 to12 of section 11	From 1 to 4 of section 12
17	2 the. 2 exp.	Item 8 of section 10	**Interfacing of DC, AC and stepper motors.**	From 1 to12 of section 11	From 1 to 4 of section 12
18	2 the. 2 exp.	Item 8 of section 10	**Analog interfacing and data acquisition systems.**	From 1 to12 of section 11	From 1 to 4 of section 12
19	2 the. 2 exp.	Item 9 of section 10	**Real Time Operating System Concepts, Kernel Structure.**	From 1 to12 of section 11	From 1 to 4 of section 12
20	2 the. 2 exp.	Item 9 of section 10	**Critical Sections, Multitasking, Task Management.**	From 1 to12 of section 11	From 1 to 4 of section 12
21	2 the. 2 exp.	Item 9 of section 10	**Time Management, Schedulers, Event Control**	From 1 to12 of section 11	From 1 to 4 of section 12
22	2 the. 2 exp.	Item 9 of section 10	**Blocks, Priorities, Deadlocks.**	From 1 to12 of section 11	From 1 to 4 of section 12
23	2 the. 2 exp.	From 5 to 8 of section 10	**Tutorial & Quiz**	From 1 to12 of section 11	From 1 to 4 of section 12
24	2 the. 2 exp.	Item 9 of section 10	**Synchronization, Semaphore Management, Mutual Exclusion.**	From 1 to12 of section 11	From 1 to 4 of section 12
25	2 the. 2 exp.	Item 9 of section 10	**Message Mailbox Management, Message Queue Management, Memory Management**	From 1 to12 of section 11	From 1 to 4 of section 12
26	2 the. 2 exp.	Item 9 of section 10	**Tutorial & Quiz**	From 1 to12 of section 11	From 1 to 4 of section 12
27	2 the. 2 exp.	Item 10 of section 10	**Applications of Embedded Systems**	From 1 to12 of section 11	From 1 to 4 of section 12
28	2 the. 2 exp.	Item 10 of section 10	**Applications of Embedded Systems**	From 1 to12 of section 11	From 1 to 4 of section 12
29	2 the. 2 exp.	Item 10 of section 10	**Applications of Embedded Systems**	From 1 to12 of section 11	From 1 to 4 of section 12
30	2 the. 2 exp.	From 1 to 10 of section 10	**Tutorial & Quiz**	From 1 to12 of section 11	From 1 to 4 of section 12

11. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	**1** Embedded / Real-Time Systems: Concepts, Design & Programming - Dr. K.V. K. K. Prasad – dream tech Press, India. **2** An Embedded Software Primer - David E. Simon - Pearson Education South Asia. **3** Embedded Systems, Architecture, Programming and Design - Raj Kamal - Tata McGraw Hill. **4** Embedded Realtime Systems Programming - Sriram V Iyer, Pankaj Gupta - Tata McGraw Hill. **5** ARM System Developer's Guide Designing and Optimizing System Software - Andrew N. Sloss, Dominic Sysmes and Chris Wright - Elsevier Inc.
2. Main references (sources)	

A- Recommended books and references (scientific journals, reports…).	**Papers** **1** S. Edwards, L. Lavagno, E. A. Lee and A. Sangiovanni-Vincentelli, "Design of embedded systems: formal models, validation, and synthesis," in Proceedings of the IEEE, vol. 85, no. 3, pp. 366-390, March 1997. **2** Daler Rakhmatov and Sarma Vrudhula. 2003. Energy management for battery-powered embedded systems. ACM Trans. Embed. Comput. Syst. 2, 3 (August 2003), 277-324.
B-Electronic references, Internet sites…	

12. The development of the curriculum plan

Continuous developing academic curricula in line with the scientific development

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

Computer Security

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	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Computer Security /COE 404
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st & 2nd / Academic Year 2023 – 2022
6. Number of hours tuition (total)	90 hrs. / 3 hrs. per week Theory.
7. Date of production/revision of this Specification	October-2022
8. Aims of the Course	
1. Being aware of most security aspects and thoughts. 2. Exploring the most famous algorithms of Security systems 3- Learning the main parameters required for Security system design.	

9· Learning Outcomes, Teaching , Learning and Assessment Method

The knowledge and skills expected to be attained by the student upon completion of the course are listed below:

A. Knowledge and Understanding:

A1. Understanding and dealing with OSI security architecture.

A2. Design and analyze a basic model of classical encryption techniques.

A3. Evaluate the security models

A4. Diagnose the main weak point in security systems.

A5. Analyze an advanced encryption techniques.

B1. encryption system design

B2. ability to analyze a basic model of classical encryption techniques.

C. Thinking Skills

C1. thinking of secure communication and jobs.

C2. discover new encryption techniques

D. Personal Development

D1. become secure person.

D2. determine optimal secure model.

10. Teaching and Learning Methods.

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions
6. Connection between Theory and Application.
7. Seminars.

8. In- and Out-Class oral conservations.

9. Reports, Presentations, and Posters.

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Methods

1-Tests, quizzes.

2- Activities.

3- Participate during lectures

Assessment methods

4- Study the conditions of former graduates.
5- Relevant committees in management such as scientific, QA.
6- The employee attitudes of our graduates, for example, workplace and job title, will be tracked each year.

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10. Course Structure

weak	Hours	ILOs	Topic title	Teaching method	Assessment Method
week	Hours	Los	Topic title	Teaching method	Assessment Method
1	3 the.	From A1-A5	Introduction to Security Trends, OSI Architecture	From 1 to12 of T-Methods	From 1 to4 of A-Methods
2	3 the.	From A1-A5	A Model of network security	From 1 to12 of T-Methods	From 1 to4 of A-Methods
3	3 the.	From A1-A5	Classical Encryption techniques	From 1 to12 of T-Methods	From 1 to4 of A-Methods
4	3 the.	From A1-A5	Symmetric Key Cryptography	From 1 to12 of T-Methods	From 1 to4 of A-Methods
5	3 the.	From A1-A5	DES	From 1 to12 of T-Methods	From 1 to4 of A-Methods
6	3 the.	From A1-A5	DES	From 1 to12 of T-Methods	From 1 to4 of A-Methods
7	3 the.	From A1-A5	Finite Field	From 1 to12 of T-Methods	From 1 to4 of A-Methods
8	3 the.	From A1-A5	AES	From 1 to12 of T-Methods	From 1 to4 of A-Methods
9	3 the.	From A1-A5	Modes of Operation	From 1 to12 of T-Methods	From 1 to4 of A-Methods
10	3 the.	From A1-A5	Message Authentication	From 1 to12 of T-Methods	From 1 to4 of A-Methods
11	3 the.	From A1-A5	Public Key Cryptography	From 1 to12 of T-Methods	From 1 to4 of A-Methods
12	3 the.	From A1-A5	Public Key Cryptography	From 1 to12 of T-Methods	From 1 to4 of A-Methods
13	3 the.	From A1-A5	Digital Signature	From 1 to12 of T-Methods	From 1 to4 of A-Methods
14	3 the.	From A1-A5	User Authentication	From 1 to12 of T-Methods	From 1 to4 of A-Methods
15	3 the.	From A1-A5	User Authentication	From 1 to12 of T-Methods	From 1 to4 of A-Methods
16	3 the.	From A1-A5	Access Control	From 1 to12 of T-Methods	From 1 to4 of A-Methods
17	3 the.	From A1-A5	Access Control	From 1 to12 of T-Methods	From 1 to4 of A-Methods
18	3 the.	From A1-A5	Malware	From 1 to12 of T-Methods	From 1 to4 of A-Methods
19	3 the.	From A1-A5	Malware	From 1 to12 of T-Methods	From 1 to4 of A-Methods
20	3, the.	From A1-A5	Denial of Service Attacks	From 1 to12 of T-Methods	From 1 to4 of A-Methods
21	S3 the.	From A1-A5	Denial of Service Attacks	From 1 to12 of T-Methods	From 1 to4 of A-Methods
22	3 the.	From A1-A5	Firewall	From 1 to12 of T-Methods	From 1 to4 of A-Methods
23	3 the.	From A1-A5	Firewall	From 1 to12 of T-Methods	From 1 to4 of A-Methods
24	3 the.	From A1-A5	Intrusion Detection System	From 1 to12 of T-Methods	From 1 to4 of A-Methods

25	3 the.	From A1-A5	**Trusted Computing**	From 1 to12 of T-Methods	From 1 to4 of A-Methods
26	3 the.	From A1-A5	**Trusted Computing**	From 1 to12 of T-Methods	From 1 to4 of A-Methods
27	3 the.	From A1-A5	**Web Security**	From 1 to12 of T-Methods	From 1 to4 of A-Methods
28	3 the.	From A1-A5	**Web Security**	From 1 to12 of T-Methods	From 1 to4 of A-Methods
29	3 the.	From A1-A5	**Internet Security**	From 1 to12 of T-Methods	From 1 to4 of A-Methods
30	3 the.	From A1-A5	**Internet Security**	From 1 to12 of T-Methods	From 1 to4 of A-Methods

11. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	▪ Computer Security, 3rd edition, William stalling, 2015. ▪ Cryptography and Network Security, 7th edition , William stalling, 2017. ▪ Applied Cryptography, 2nd edition, Bruce Schneier, 1996.

2. Main references (sources)	
A- Recommended books and references (scientific journals, reports…).	▪ paper1: van der Veen, V.; dutt-Sharma, N.; Cavallaro, L., and Bos, H. "Memory errors: the past, the present, and the future." in Proceedings of the 15th international conference on Research in Attacks, Intrusions, and Defenses (RAID'12), Springer-Verlag, pp. 86–106, 2012 ▪ Paper2: Felten, E. "Understanding Trusted Computing: Will Its Benefits Outweigh its Drawbacks?" *IEEE Security and Privacy*, May/June 2003. ▪ Paper3: Cheng, T., et al. "Evasion Techniques: Sneaking through Your Intrusion Detection/Prevention Systems." *IEEE Communications Surveys &Tutorials,* Fourth Quarter 2012.
B-Electronic references, Internet sites…	

12.The development of the curriculum plan Continuous developing academic curricula in line with the scientific development

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

Artificial Intelligent and Robotics

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	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Artificial Intelligent and Robotics \COE 405
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st & 2nd / Academic Year 2023 – 2022
6. Number of hours tuition (total)	90 hrs. / 3 hrs. per week Theory.
7. Date of production/revision of this Specification	October-2022

8. Aims of the Course

1. This subject has been prepared as a comprehensive for a first study of control engineering.
2. also helps the students to understand the artificial intelligent and robotics system for variety of engineering applications
3. covers the artificial intelligent and robotics system

9· Learning Outcomes, Teaching , Learning and Assessment Method

A. Knowledge and Understanding

A1.- Learn the basic fundamentals of Artificial Intelligent

In the field, which encompasses logic, probability, and continuous mathematics; perception, reasoning, learning, and action; and everything from microelectronic devices to robotic explorers.

A2.L Define AI as the study of agents that receive percepts from the environment and perform actions

A3. We explain the role of learning as extending the reach of the designer into unknown environments.

A4.Learn the Robotics system

A5. Learn the kinematics of Robotics

A6 . Learn the path planning of robotics

B1. Understand the AI theory

B2. Find the learning algorithms

B3: study the Artificial neural networks

B4.How to compute all the learning algorithms

B5.Compute the path planning of robotics based on AI C. Thinking Skills

10. Teaching and Learning Methods.

1. Lectures.

2. Tutorials.

3. Homework and Assignments.

4. Tests and Exams.

5. In-Class Questions and Discussions

6. Connection between Theory and Application.

7. Seminars. 8. In- and Out-Class oral conservations. 9. Reports, Presentations, and Posters.
Assessment Methods 1. Examinations, Tests, and Quizzes. 2. Extracurricular Activities. 3. Student Engagement during Lectures. 4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Methods

1-Tests, quizzes.

2- Activities.

3- Participate during lectures

Assessment methods

7- Study the conditions of former graduates.
8- Relevant committees in management such as scientific, QA.
9- The employee attitudes of our graduates, for example, workplace and job title, will be tracked each year.

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	2 theory 1 tutorial	A1	**Introduction** **What Is AI?** **The Foundations of Artificial Intelligence** **The History of Artificial Intelligence** **The State of the Art**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
3-4	2 theory 1 tutorial	A2	**Intelligent Agents** **Agents and Environments.** **Good Behavior: The Concept of Rationality.** **The Nature of Environments.** **The Structure of Agents**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
5	2 theory 1 tutorial	A2	**Learning** **Learning from Examples** **Forms of Learning .**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
6	2 theory 1 tutorial	A1, A2	**Supervised Learning** **Learning Decision Trees** **Evaluating and Choosing the Best Hypothesis.**	From 1 to 8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
7	2 theory 1 tutorial	A3	**The Theory of Learning** **Regression and Classification with Linear Models.**	From 1 to 8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
8-10	2 theory 1 tutorial	A4, A5	**Artificial Neural Networks** **Nonparametric Models**	From 1 to 8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
11-14	2 theory 1 tutorial	A6	**Support Vector Machines** **Ensemble Learning**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method

15-18	2 theory 1 tutorial 2 labs.	A6	**Practical Machine Learning**	From 1 to 8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
19	2 theory 1 tutorial	A5,A6	**Learning Probabilistic Models**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
20	2 theory 1 tutorial	A1	**Reinforcement Learning**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
21	2 theory 1 tutorial	A1	**Robotics Introduction**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
22	2 theory 1 tutorial	A1	**Robot Hardware**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
23	2 theory 1 tutorial	A5	**Robotic Perception**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
24	2 theory 1 tutorial	A1,A5	**Planning to Move**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
25	2 theory 1 tutorial	A1,A5	**Planning Uncertain Movements**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
26-28	2 theory 1 tutorial	A1,A5	**Moving**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
26-28	2 theory 1 tutorial	A1,A5	**Robotic Software Architectures**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method
29-30	2 theory 1 tutorial	A1,A5	**Application Domain**	From 1 to8 of Teaching and Learning Methods	From 1 to3 of Assessment Method

11. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1. **Stuart J. Russell and Peter Norvig "Artificial Intelligence: A Modern Approach", 2010 by Pearson Education, Inc., Third Edition.** 2. **M.W.Spong , S. Hutchinson and M. Vidyasagar, "Robot Modeling and Control", 2006.** 3. **Kevin M. Lynch and Frank C. Park, "Modern Robotics Mechanics, Planning, And Control", 2017.**
2. Main references (sources)	**JACEK M. ZURADA, "Introduction to Artificial Neural Systems" , 1992.**

A- Recommended books and references (scientific journals, reports…).	
B-Electronic references, Internet sites…	

12. The development of the curriculum plan

Continuous developing academic curricula in line with the scientific development

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

Computer Vision and Pattern Recognition

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	College of Engineering University of Baghdad
2. University Department/Centre	Computer Engineering Department (COED)
3. Course title/code	Computer Vision and Pattern Recognition / COE 406
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st & 2nd / Academic Year 2023 – 2022
6. Number of hours tuition (total)	90 hrs. / 3 hrs. per week Theory.
7. Date of production/revision of this Specification	October-2022

8. Aims of the Course

What are the knowledge and skills expected to be attained by the student upon completion of the course (brief description)?

1. Present, as clearly and completely as possible, the main principles of modern computer vision systems equipped with pattern recognition capabilities.
2. Provide a thorough discussion of the fundamentals of computer vision basic algorithms and with emphasis to the analysis and implementation of certain algorithms from the literature.
3. The course mainly will study: relation between computer vision and human vision system, color spaces and their relations, multi-level features, feature extraction and matching, optical flow, machine learning, and object detection.

9· Learning Outcomes, Teaching , Learning and Assessment Method

A. Knowledge and Understanding:

- A1. Analyze scientific research and describe computer vision and pattern recognition/classification algorithms.
- A2. Acquire data from a camera source.
- A3. Process the acquired image/video data.
- A4. Extract discriminative features from the image/video data.
- A5. Apply pattern recognition/classification algorithms in order to distinguish different patterns.
- A6. Build a full computer vision system.
- A7. Analyze the performance of a full computer vision system.

B. Subject-specific skills

- B1. Realizing the relationship between computer vision and human visual system.
- B2. Understanding computer vision and pattern recognition algorithms.
- B3. Design and modeling a computer vision and pattern recognition algorithm.

C. Thinking Skills

C1. Understanding the relationship between computer vision algorithm and human visual system.
C2. Understanding features including feature extraction and feature matching
C3. Understanding visual classification, tracking, and retrievals.

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

D1. Thinking of computer vision system as a system that is used to replace human visual system in computer system.
D2. Help students to design and build their computer vision algorithms.
D3. Design a computer vision and pattern recognition algorithm for embedded systems.
D4. Developing computer vision algorithms.

Design and develop algorithms for controlling devices interfaced to visual devices.

Teaching and Learning Methods.

1. Lectures.

2. Tutorials.

3. Homework and Assignments.

4. Tests and Exams.

5. In-Class Questions and Discussions

6. Connection between Theory and Application.

7. Seminars.

8. In- and Out-Class oral conservations.

9. Reports, Presentations, and Posters.

Assessment Methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

Grading Policy

1. Exams and Quizzes: There will be at least seven closed books and notes exams and quizzes during the academic year.

2. Oral and written assessment: The students are encouraged to participate their ideas to solve the problems during the lecture. The oral and written assessment.

3. Final Exam: - The final exam will be comprehensive, closed books and notes.

C. Affective and value goals

C1-Student collaborative evaluation data is obtained from students at the end of the cooperative experiment.

C2- Conducting a survey for each year to determine the extent to which students achieve the desired results

C3- The evaluation is based on student data during the questionnaire distributed to the educational students and academic courses.

Teaching and Learning Methods

1-Tests, quizzes.

2- Activities.

3- Participate during lectures

Assessment methods

10- Study the conditions of former graduates.
11- Relevant committees in management such as scientific, QA.
12- The employee attitudes of our graduates, for example, workplace and job title, will be tracked each year.

D- General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Ability to carry out Independent study to take notes, to carry out background reading.
D2. Problem Solving based on understanding.
D3. Ability to learn and remember key facts
D4. Self-discipline and self-motivation

10. Course Structure

Week	Hours	Los	Topic title	Teaching method	Assessment Method
1	2 the. 1 tut.	Item A1	**Introduction to Computer Vision and Pattern Recognition.**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
2-3	4 the. 2 tut.	Items A1	**Human Vision, Color Spaces and Transforms**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
3-4	4 the. 2 tut.	Item A2	**Image coordinates and resizing**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
5-8	6 the. 3 tut.	Item A3	**Filters and convolutions**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
9-10	4 the. 2 tut.	Item A3	**Harris detector and matching**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
11-13	6 the. 3 tut.	Item A4	**Matching, RANSAC, HOG, and SIFT**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
13-14	4 the. 2 tut.	Item A4	**Optical Flow**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
15	2 the. 1 tut.	Item A5	**Machine Learning**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
16	2 the. 1 tut.	Item A5	**Machine Learning for Computer Vision**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
17-18	4 the. 2 tut.	Item A4-A5	**Feature extraction**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
19-20	4 the. 2 tut.	Item A5	**Neural Networks**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
21-22	4 the. 2 tut.	Item A5	**Support Vector Machine**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
23	2 the. 1 tut.	Item A5	**Introduction to Convolutional Neural Networks**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
24-25	4 the. 2 tut.	Item A5	**Object Detection**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
26-27	4 the. 2 tut.	Item A4-A5	**Segmentation**	From 1 to 10 of	From 1 to 4 of

				T-methods	A-methods
27-28	4 the. 2 tut.	Item A6	**Face detection and recognition**	From 1 to 10 of T-methods	From 1 to 4 of A-methods
29-30	4 the. 2 tut.	Item A6-A7	**Seminars**	From 1 to 10 of T-methods	From 1 to 4 of A-methods

11. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	***References:*** 4- Feature extraction image processing for computer vision, Nixon, Mark S and Aguado, Alberto S, 2012, Academic Press. 5- Color image processing: methods and applications, Lukac, Rastislav and Plataniotis, Konstantinos N, 2006, CRC press.
2. Main references (sources)	Computer Vision: Algorithms and Applications Rick Szeliski, 2010.

A- Recommended books and references (scientific journals, reports…).	***Papers***: 4- Abdulhussain, Sadiq H. and Ramli, Abd Rahman and Mahmmod, Bahseera M and Al-Haddad, S A R and Jassim, Wissam A. "Image Edge Detection Operators based on Orthogonal Polynomials." International Journal of Image and Data Fusion 8.3 (2017), 293-308. 5- Mahmmod, Basheera M. and bin Ramli, Abd Rahman and Abdulhussain, Sadiq H and Al-Haddad, Syed Abdul Rahman and Jassim, Wissam A. "Signal compression and enhancement using a new orthogonal-polynomial-based discrete transform." IET Signal Processing 12.1(2018): 129-142. 6- Lowe, David G. "Distinctive image features from scale-invariant keypoints." International journal of computer vision 60.2 (2004): 91-110.
B-Electronic references, Internet sites…	DataShow. Internet. A Good Sounding system in the Lecture Hall. SmartBoard

12. The development of the curriculum plan

Continuous developing academic curricula in line with the scientific development