

# دليل المنهاج الدراسي



Republic of Iraq - Ministry of Higher Education and Scientific Research  University of Babylon  Bachelor's degree in Electrical Engineering (First cycle)  Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr  Program Curriculum (2025 - 2026)	جمهورية العراق - وزارة التعليم العالي والبحث العلمي  جامعة بابل  بكالوريوس في الهندسة الكهربائية (الدورة الأولى)  أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوروبية - كل وحدة اوروبية = ٢٥ ساعة  المنهاج الدراسي للعام 2025-2026
---	---



Level	Semester	No.	Module Code	New Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)					Exam hr/sem	SSWL	USSWL	SWL	ECT S	Module Type	Prerequisite Module(s) Code	
								CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)		Sem (hr/w)	hr/sem	hr/sem				hr/sem
UGI	One	1	UOBAB0103011	ELEC1111	Mathematics I	رياضيات I	English	3				1		3	63	62	125	5.00	S	
		2	UOBAB0103012	ELEC1112	Basics of Electrical Engineering I	أسس الهندسة الكهربائية I	English	3				1		3	63	62	125	5.00	C	
		3	UOBAB0103013	ELEC1103	Electronics Physics	الفيزياء الالكترونية	English	4						3	63	62	125	5	C	
		4	UOBAB0103014	UOBABb4	Computers I	الحاسوب I	English	1		1		1		3	48	27	75	3	B	
		5	UOBAB0103015	ELEC1104	Engineering Drawing & AutoCAD	الرسم الهندسي والأتوكاد	English	2		4				6	96	4	100	4.00	S	
		6	UOBAB0103016	ELEC1105	Electrical Engineering Laboratories I	مختبرات الهندسة الكهربائية I	English	1		2				2	47	53	100	4.00	S	
		7	UOBAB0103017	UOBABb1101	English Language I *	اللغة الانكليزية I	English	2						3	33	17	50	2.00	B	
		8	UOBAB0103018		Arabic Language I *	اللغة العربية I	Arabic	2						3	33	17	50	2.00	B	
							28	Total	18	0	7	0	3	0	26	446	304	750	30.00	
* University and ministry Requirements																				

Semester	No.	Module Code	New Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Sem n (hr/w)		hr/sem	hr/sem	hr/sem			
Two	1	UOBAB0103021	ELEC1211	Mathematics II	رياضيات II	English	3				1		3	63	62	125	5.00	S	ELEC1111
	2	UOBAB0103022	ELEC1212	Basics of Electrical Engineering II	أسس الهندسة الكهربائية II	English	3				1		3	63	62	125	5.00	C	ELEC1112
	3	UOBAB0103023	ELEC1203	Digital Techniques	التقنيات الرقمية	English	4		2				3	93	57	150	6.00	C	
	4	UOBAB0103024	ELEC1204	Computer Programming Languages	لغات برمجة الحاسوب	English	1		2		1		3	63	12	75	3	B	
	5	UOBAB0103025	ELEC1205	Principles of Mechanical Engineering	مبادئ الهندسة الميكانيكية	English	3		2				3	78	47	125	5.00	S	
	6	UOBAB0103026	ELEC1206	Electrical Engineering Laboratories II	مختبرات الهندسة الكهربائية II	English	1		2				2	47	53	100	4.00	S	
	7	UOBAB0103027	UOBAB1104	Freedom and Democracy *	حرية وديمقراطية	Arabic	1				1		3	33	17	50	2.00	B	
						28	Total	16	0	8	0	4	0	20	440	310	750	30.00	

\* University Requirements

Level	Semester	No.	Module Code	New Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
								CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Sem n (hr/w)							
UGII	Three	1	UOBAB0103031	ELEC2301	Mathematics III	الرياضيات III	English	3				1		3	63	62	125	5	S	ELEC1111
		2	UOBAB0103032	ELEC2302	Electrical Networks	شبكات كهربائية	English	4				1		3	78	47	125	5	C	ELEC1112
		3	UOBAB0103033	ELEC2303	Electronics I	إلكترونيك I	English	2				1		3	48	52	100	4	C	
		4	UOBAB0103034	ELEC2304	Electrical Machines I	المكانن الكهربائية I	English	2				1		3	48	52	100	4	C	
		5	UOBAB0103035	ELEC2305	Computers Programming	برمجة الحاسبات	English	1		2		1		3	63	37	100	4	B	
		6	UOBAB0103036	ELEC2306	Electrical Engineering Laboratories III	مختبرات الهندسة الكهربائية III	English	2		4				3	93	7	100	4	S	
		7	UOBAB0103037	UOBAB2301	Ba'ath Crimes *	جرائم البعث	Arabic	2						3	33	17	50	2	B	
		8	UOBAB0103038	UOBAB2302	English Language II *	اللغة الانكليزية II	English	2						3	33	17	50	2	B	
							29	Total	18	0	6	0	5	0	24	459	291	750	30	

\* University Requirements

Semester	No.	Module Code	New Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Sem n (hr/w)		hr/sem	hr/sem	hr/sem			
Four	1	UOBAB0103041	ELEC2401	Mathematics IV	الرياضيات IV	English	3				1		3	63	62	125	5.00	S	ELEC1211, ELEC2301
	2	UOBAB0103042	ELEC2402	Electromagnetic Fields	المجالات الكهرومغناطيسية	English	4				0		3	63	37	100	4.00	C	
	3	UOBAB0103043	ELEC2403	Electronics II	إلكترونيك II	English	2				1		3	48	52	100	4.00	C	ELEC2303
	4	UOBAB0103044	ELEC2404	Electrical Machines II	المكانن الكهربائية II	English	2				1		3	48	52	100	4.00	C	ELEC2304
	5	UOBAB0103045	ELEC2405	Microprocessor	المعالج الدقيق	English	2		2		1		3	78	22	100	4.00	C	
	6	UOBAB0103046	UOBAB2004	Computer II	الحاسوب II	English	1		1		1		3	48	27	75	3.00	B	
	7	UOBAB0103047	ELEC2406	Electrical Engineering Laboratories IV	مختبرات الهندسة الكهربائية IV	English	2		4				3	93	7	100	4.00	S	
	8	UOBAB0103048	UOBAB1102	Arabic Language I *	اللغة العربية I	Arabic	1				1		3	33	17	50	2.00	B	
					30	Total	17	0	7	0	6	0	24	474	276	750	30.00		

\* University Requirements

Level	Semester	No.	Module Code	New Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
								CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Sem n (hr/w)							
UGIII	Five	1	UOBAB0103051	ELEC3501	Engineering Analysis I	التحليلات الهندسية I	English	3				1		3	63	62	125	5.00	S	
		2	UOBAB0103052	ELEC3502	Electronics III	إلكترونيك III	English	3		2		1		3	93	32	125	5.00	C	ELEC2303
		3	UOBAB0103053	ELEC3503	Communications I	الاتصالات I	English	3				1		3	63	62	125	5.00	C	
		4	UOBAB0103054	ELEC3504	Electrical Power I	قدرة كهربائية I	English	3				1		3	63	62	125	5.00	C	
		5	UOBAB0103055	ELEC3505	Electrical Machines III	المكانن كهربائية III	English	3		2		1		3	93	32	125	5.00	C	ELEC2304
		6	UOBAB0103056	ELEC3507	ELECTIVE I	اختياري I	English	2				1		3	48	27	75	3.00	E	
		7		To be determined	Arabic Language II *	اللغة العربية II	Arabic	2						3	33	17	50	2.00	S	
							29	Total	19	0	4	0	6	0	21	456	277	750	30.00	

Semester	No.	Module Code	New Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Sem n (hr/w)		hr/sem	hr/sem	hr/sem			
six	1	UOBAB0103061	ELEC3601	Engineering Analysis II	التحليلات الهندسية II	English	3				1		3	63	62	125	5.00	S	ELEC3501
	2	UOBAB0103062	ELEC3602	Electronics IV	إلكترونيك IV	English	3				1		3	63	62	125	5.00	C	ELEC2403, ELEC3502
	3	UOBAB0103063	ELEC3603	Communications II	الاتصالات II	English	4		2		1		3	108	17	125	5.00	C	ELEC3503
	4	UOBAB0103064	ELEC3604	Electrical Power II	قدرة كهربائية II	English	3		2		1		3	93	32	125	5.00	C	ELEC3504
	5	UOBAB0103065	ELEC3605	Electrical Machines IV	المكانن كهربائية IV	English	3				1		3	63	62	125	5.00	C	ELEC2404, ELEC3505
	6	UOBAB0103066	ELEC3607	ELECTIVE II	اختياري II	English	3				1		3	63	62	125	5.00	E	
						29	Total	19	0	4	0	6	0	18	453	297	750	30.00	



**University of Babylon**  
**College of Engineering**  
**Electrical Engineering Department**



**Bachelor's Degree (B.Sc.) – Electrical Engineering**

بكالوريوس هندسة كهربائية



Table of Contents		جدول المحتويات
1.	Mission and Vision Statement	بيان المهمة والرؤية
2.	Program Specification	مواصفات البرنامج
3.	Program Goals	اهداف البرنامج
4.	Student Learning Outcomes	مخرجات تعلم الطالب
5.	Academic Staff	الهيئة التدريسية
6.	Credits, Grading and GPA	الاعتمادات والدرجات والمعدل التراكمي
7.	Modules	المواد الدراسية
8.	Contacts	اتصال

## 1. Mission and Vision Statement

The vision of the Electrical Engineering Department is to be a world-class department and a leader in engineering education, innovative research, and building a knowledge society.

The mission of the department is the working to prepare and graduate leading scientific and leadership talents in the field of engineering sciences, equipped with the foundations of knowledge and skills according to international quality standards, in a manner that serves the community, responds to the demands of the local market, and establishes the principles of sustainable development.

Activating postgraduate studies.

Participating in scientific activities through cutting-edge research and participation in seminars and conferences.

Playing a leading role in improving public services related to the electricity sector through scientific consultations with government institutions and the private sector.

## 2. Program Specification

<b>Program Code</b>		<b>ECTS</b>	<b>240</b>
<b>Duration</b>	<b>4 Levels, 8 Semesters</b>	<b>Method of Attendance</b>	<b>Full Time</b>

The B.Sc. program in electrical engineering is offered in the day only by the Faculty of Engineering as a full-time study (day time 8-3 pm) at the University of Babylon Campus in lectures and laboratories. The department utilizes an on-line course management system (Google Classroom) to help organize teaching and learning resources and facilitate students' learning through providing supplementary material to classroom instruction. The credit-hour system is used in the department, whereby one credit per theoretical hour lecture and one and half credit hour per three hours' laboratory work. Students are required to successfully complete the required total number of credit hours in the program to graduate.

### 3. Program Goals

The Department of Electrical Engineering has defined a set of objectives that translate its mission into specific and measurable tasks, as follows:

To prepare graduates capable of practicing electrical engineering in its main fields, such as communications, power engineering, electronics, and digital systems.

To continuously develop skills related to defining, formulating, designing, and analyzing electrical engineering problems.

To apply and practice electrical engineering knowledge in a professional environment, adhering to ethical and safety standards.

To demonstrate scholarship, lifelong learning, leadership, and service among graduates.

To produce graduates capable of developing teamwork and effective communication skills.

### 4. Student Learning Outcomes

Students of the electrical Engineering program will attain (by the time of graduation):

- i) An ability to create and carry out proper measurement and tests with quality assurance, analyze and interpret results, and utilize engineering judgment to make inferences.
- ii) An ability to perceive ethical and professional responsibilities in engineering cases and make brilliant judgments taking into account the consequences in worldwide financial, ecological and societal considerations.
- iii) An ability to distinguish, identify, define, formulate, and solve engineering problems by applying principles of engineering, science and mathematics.
- iv) An ability to skillfully communicate orally with a gathering of people and in writing with various managerial levels.
- v) An ability to produce engineering designs that meet desired needs within certain constraints by applying both analysis and synthesis in the design process.
- vi) An ability to perceive the continual necessity for professional knowledge growth and how to find, assess, assemble and apply it properly.
- vii) An ability to work adequately on teams and to set up objectives, plan activities, meet due dates, and manage risk and uncertainty.

## 5. Academic Staff

Samir Jasim Mohammed Al-Mruraab   Ph.D. in Communication Engineering   Professor Email: <a href="mailto:Dr.Samiralmuraab@uobabylon.edu.iq">Dr.Samiralmuraab@uobabylon.edu.iq</a> Mobile no.: 07801121868
Laith Ali Abdul- Rahaim   Ph.D. in Electronics & Communication Engineering   Professor Email: <a href="mailto:drlaithanzy@uobabylon.edu.iq">drlaithanzy@uobabylon.edu.iq</a> Mobile no.: 07801080458
Haider Sahib Al-Mumen   Ph.D. in Nano-Electronics Engineering   Professor Email: <a href="mailto:eng.almumenh@uobabylon.edu.iq">eng.almumenh@uobabylon.edu.iq</a> Mobile no.: 07713552718
saad mahdi hadi Alwash   Ph.D. in Electronics & Communication Engineering   Assist. Professor Email: <a href="mailto:saad.mahdi@uobabylon.edu.iq">saad.mahdi@uobabylon.edu.iq</a> Mobile no.: 07801737846
Riyad Abdul Hamza Muhammad   Ph.D. in Electronics & Communication Engineering   Assist. Professor Email: <a href="mailto:eng.riath.abdul@uobabylon.iq.edu">eng.riath.abdul@uobabylon.iq.edu</a> Mobile no.: 07805022510
Ahmed Najah Jabbar   Ph.D. in Electronics & Communication Engineering   Professor Email: <a href="mailto:ahmed.jabbar@uobabylon.edu.iq">ahmed.jabbar@uobabylon.edu.iq</a> Mobile no.: 07808249099
Ibrahim Abdullah Murdas   Ph.D. in Electronics & Communication Engineering   Professor Email: <a href="mailto:eng.ibraheem.abdullaa@uobabylon.edu.iq">eng.ibraheem.abdullaa@uobabylon.edu.iq</a> Mobile no.: 07715833212
Haider Jabber abd Nasar   Ph.D. in Electronics & Communication Engineering   Professor Email: <a href="mailto:eng.haider.jabber@uobabylon.edu.iq">eng.haider.jabber@uobabylon.edu.iq</a> Mobile no.: 07829433274
Ahmed Hussein Shatti   Ph.D. in Electronics & Communication Engineering   Assist. Professor Email: <a href="mailto:eng.ahmed.hussein@uobabylon.edu.iq">eng.ahmed.hussein@uobabylon.edu.iq</a> Mobile no.: 07725695482
Haider Abdallatif Mohamed Kazim   Ph.D. in Electronics & Communication Engineering   Assist. Professor Email: <a href="mailto:haider.abdallatif@uobabylon.edu.iq">haider.abdallatif@uobabylon.edu.iq</a> Mobile no.: 07800680903
Ahmed Abdulkadhim Hamad   Ph.D. in Electronics & Communication Engineering   Professor Email: <a href="mailto:eng.ahmed.ak@uobabylon.edu.iq">eng.ahmed.ak@uobabylon.edu.iq</a> Mobile no.: 07811777188
Osama Qasim Jumah Al-Thahab   Ph.D. in Electronics & Communication Engineering   Professor Email: <a href="mailto:eng.osama.qasim@uobabylon.edu.iq">eng.osama.qasim@uobabylon.edu.iq</a> Mobile no.: 07801339812

<p>Ahmed Qasim Jumaah Aldhahab   Ph.D. in Electrical &amp; Computer Engineering   Professor  Email: <a href="mailto:ahmedalthahab82@uobabylon.edu.iq">ahmedalthahab82@uobabylon.edu.iq</a>  Mobile no.: 07808903680</p>
<p>Shamam Fadhil Abbas   Ph.D. in Electrical Power Engineering   Professor  Email: <a href="mailto:shamamalwash@uobabylon.edu.iq">shamamalwash@uobabylon.edu.iq</a>  Mobile no.: 07702807888</p>
<p>Hamzah Kadhim Abdullah   Msc. in Electrical Power Engineering   Assist. Lecturer  Email: <a href="mailto:eng504.hamiza.kadhumi@uobabylon.edu.iq">eng504.hamiza.kadhumi@uobabylon.edu.iq</a>  Mobile no.: 07801329724</p>
<p>Murad obaid abed   MSc. in Electronics Engineering   Assist. Professor  Email: <a href="mailto:eng.marad.obaid@uobabylon.edu.iq">eng.marad.obaid@uobabylon.edu.iq</a>  Mobile no.: 07802603689</p>
<p>Qais Kareem Omran   Ph.D. in Electronics Engineering   Professor  Email: <a href="mailto:eng.qais.karem@uobabylon.edu.iq">eng.qais.karem@uobabylon.edu.iq</a>  Mobile no.: 07821300469</p>
<p>Azhar Abbas Hadi   MSc. in Computer / Network Engineering   Assist. Lecturer  Email: <a href="mailto:azhar@uobabylon.edu.iq">azhar@uobabylon.edu.iq</a>  Mobile no.: 07808580080</p>
<p>Intissar Hamid Obaid   Msc. in Networks Engineering   Lecturer  Email: <a href="mailto:intissar.hamid@uobabylon.edu.iq">intissar.hamid@uobabylon.edu.iq</a>  Mobile no.: 07827953364</p>
<p>Wasan Hashim Jacob Al Masoody   Ph.D. in Electronics &amp; Communication Engineering   Assist. Professor  Email: <a href="mailto:eng.wasan.hashim.lac@uobabylon.edu.iq">eng.wasan.hashim.lac@uobabylon.edu.iq</a>  Mobile no.: 07721378940</p>
<p>Hanaa Mohsin Ali   Ph.D. in Artificial Intelligence   Professor  Email: <a href="mailto:hanaa.ali@uobabylon.edu.iq">hanaa.ali@uobabylon.edu.iq</a>  Mobile no.: 07736664861</p>
<p>Ahmed Samawi Ghthwan   Ph.D. in Electrical Power Engineering   Assist. Professor  Email: <a href="mailto:eng.ahmed.samawi@uobabylon.edu.iq">eng.ahmed.samawi@uobabylon.edu.iq</a>  Mobile no.: 07727113291</p>
<p>Kasim Karam Abdalla   Ph.D. in Electronics &amp; Communication Engineering   Professor  Email: <a href="mailto:eng.kassim.kerem@uobabylon.edu.iq">eng.kassim.kerem@uobabylon.edu.iq</a>  Mobile no.: 07738072115</p>
<p>Ehab Abdulrazzaq Hussein   Ph.D. in Electronics &amp; Communication Engineering   Professor  Email: <a href="mailto:dr.ehab@uobabylon.edu.iq">dr.ehab@uobabylon.edu.iq</a>  Mobile no.: 07702682325</p>
<p>Sarmad Khaleel Ibrahim   Ph.D. in Electrical Power Engineering   Professor  Email: <a href="mailto:sarmad.ibrahim@uobabylon.edu.iq">sarmad.ibrahim@uobabylon.edu.iq</a>  Mobile no.: 07721904270</p>

<p>Saad Saffah Hassoon Hreshee   Ph.D. in Electronics &amp; Communication Engineering   Professor  Email: <a href="mailto:eng.saad.saffah@uobabylon.edu.iq">eng.saad.saffah@uobabylon.edu.iq</a>  Mobile no.: 07704379269</p>
<p>Tahani Al-Mhana  Ph.D. in Electrical Engineering   Assist. Professor  Email: <a href="mailto:eng.tahany.hamodi@uobabylon.edu.iq">eng.tahany.hamodi@uobabylon.edu.iq</a>  Mobile no.: 07815597835</p>
<p>Mohammed Taih Gatte   Ph.D. in Communication Engineering   Assist. Professor  Email: <a href="mailto:mohammed.taih@uobabylon.edu.iq">mohammed.taih@uobabylon.edu.iq</a>  Mobile no.: 07732987988</p>
<p>Mustafa Rashid Ismael   Ph.D. in Electronics &amp; Communication Engineering   Assist. Professor  Email: <a href="mailto:eng.mustafa.rashid@uobabylon.edu.iq">eng.mustafa.rashid@uobabylon.edu.iq</a>  Mobile no.: 07725537929</p>
<p>Muthanna Jaafar Abbas  Msc. in Communication Engineering   Assist. Professor  Email: <a href="mailto:eng.muthanna.j@uobabylon.edu.iq">eng.muthanna.j@uobabylon.edu.iq</a>  Mobile no.: 07802431229</p>
<p>Qasim Mahdi Hamad   Ph.D. in Control and Systems Engineering   Lecturer  Email: <a href="mailto:kasimalhussani@uobabylon.edu.iq">kasimalhussani@uobabylon.edu.iq</a>  Mobile no.: 07828886777</p>
<p>Hilal Abdul Hussein Abbood   Ph.D. in Electronics &amp; Communication Engineering   Professor  Email: <a href="mailto:eng.hilal_al-libawy@uobabylon.edu.iq">eng.hilal_al-libawy@uobabylon.edu.iq</a>  Mobile no.: 07707257190</p>
<p>Riyadh Toman Thahab   Ph.D. in Electrical Engineering   Assist. Professor  Email: <a href="mailto:eng.ryath.toman@uobabylon.edu.iq">eng.ryath.toman@uobabylon.edu.iq</a>  Mobile no.: 07826493350</p>
<p>Rasim Azeez Kadhim   Ph.D. in Communication Engineering   Assist. Professor  Email: <a href="mailto:rasimazeez@uobabylon.edu.iq">rasimazeez@uobabylon.edu.iq</a>  Mobile no.: 07739773196</p>
<p>Anwer Sattar Hamzah   Msc. Communication Engineering   Assist. Lecturer  Email: <a href="mailto:eng593.anwr.satar@uobabylon.edu.iq">eng593.anwr.satar@uobabylon.edu.iq</a>  Mobile no.: 07702666782</p>
<p>Alaa Hamzah Abdullah   Msc. in Electrical power Engineering   Lecturer  Email: <a href="mailto:alaa.abdullah@uobabylon.edu.iq">alaa.abdullah@uobabylon.edu.iq</a>  Mobile no.: 07736664862</p>
<p>Hussein Ali Lafta   Msc. in Communication Engineering   Lecturer  Email: <a href="mailto:hussein.ali556@uobabylon.edu.iq">hussein.ali556@uobabylon.edu.iq</a>  Mobile no.: 0781968473</p>
<p>Anwar Hamza Bresam   Msc. in Electronics &amp; Communication Engineering   Lecturer  Email: <a href="mailto:eng.anwar.hamza@uobabylon.edu.iq">eng.anwar.hamza@uobabylon.edu.iq</a>  Mobile no.: 07817527641</p>
<p>Hassan Jassim Motlak   Ph.D. in Electronics &amp; Communication Engineering   Professor  Email: <a href="mailto:hassan.jasim@uobabylon.edu.iq">hassan.jasim@uobabylon.edu.iq</a></p>

Mobile no.: 07813889725
Hayder Hussein Kadhum   Msc. in Electrical power Engineering   Assist. Professor Email: <a href="mailto:eng.hayder.kadhum@uobabylon.edu.iq">eng.hayder.kadhum@uobabylon.edu.iq</a> Mobile no.: 07830853744
Raed Saleem Hashim   Ph.D. in Electronics & Communication Engineering   Professor Email: <a href="mailto:Raed.almusawi@uobabylon.edu.iq">Raed.almusawi@uobabylon.edu.iq</a> Mobile no.: 07814024111
Karrar Mohsin Ajeel   Msc. in Electrical Power Engineering   Lecturer Email: <a href="mailto:Karrar.ajeel@uobabylon.edu.iq">Karrar.ajeel@uobabylon.edu.iq</a> Mobile no.: 07803692000
Ghadeer Haider Eskander Mancy   Msc. in Electronics & Communication Engineering   Lecturer Email: <a href="mailto:eng.ghadeer.eskander@uobabylon.edu.iq">eng.ghadeer.eskander@uobabylon.edu.iq</a> Mobile no.: 07728790846
Ahmed Qasim Turki   Msc. in Electrical Power Engineering   Assist. Lecturer Email: <a href="mailto:eng.ahmed.qasim@uobabylon.edu.iq">eng.ahmed.qasim@uobabylon.edu.iq</a> Mobile no.: 7732246294
Mayasah Razzaq Abdali   Ph.D. in Electronics & Communication Engineering   Lecturer Email: <a href="mailto:eng142.mayasah.razzaq@uobabylon.edu.iq">eng142.mayasah.razzaq@uobabylon.edu.iq</a> Mobile no.: 07809054995
Ali Habeeb AbdulHussein Habeeb   Msc. In Electrical Power Engineering   Assist. Lecturer Email: <a href="mailto:eng.ali.almosawi@uobabylon.edu.iq">eng.ali.almosawi@uobabylon.edu.iq</a> Mobile no.: 07800487710
Zainab Ali Abd Alhuseen   Msc. Computer Science/ Artificial Intelligence   Assist. Lecturer Email: <a href="mailto:eng298.zainab.qamar@uobabylon.edu.iq">eng298.zainab.qamar@uobabylon.edu.iq</a> Mobile no.: 07726012006
Awwab Qasim Jumaah Althahab  Ph.D. in Electronics & Communication Engineering   Assist. Professor Email: <a href="mailto:eng.awwab.qasim@uobabylon.edu.iq">eng.awwab.qasim@uobabylon.edu.iq</a> Mobile no.: 07819772315
Muthana khallil Ibrahim   Ph.D. in Electronics & Communication Engineering   Assist. Professor Email: Mobile no.: 07825298912
Nabeel Jabal Abed   Msc. in Electronics & Communication Engineering   Assist. Lecturer Email: <a href="mailto:eng.nabil.jabal@uobabylon.edu.iq">eng.nabil.jabal@uobabylon.edu.iq</a> Mobile no.: 07818121987
Sameer Abdul Kadhim khudhair   Msc. in Electronics & Communication Engineering   Assist. Professor Email: <a href="mailto:eng504.sameir.abdalkadhm@student.uobabylon.edu.iq">eng504.sameir.abdalkadhm@student.uobabylon.edu.iq</a> Mobile no.: 07803143821
Mohammed Khalid Ibrahim   PhD. in Electronics & Communication Engineering   Lecturer Email: <a href="mailto:mohammed.ibrahim@uobabylon.edu.iq">mohammed.ibrahim@uobabylon.edu.iq</a> Mobile no.: 07813426134

## 6. Credits, Grading and GPA

### Credits

University of Babylon is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

### Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

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

#### Note:

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

### Calculation of the Cumulative Grade Point Average (CGPA)

The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

CGPA of a 4-year B.Sc. degrees:

$$CGPA = [(1^{st} \text{ module score} \times ECTS) + (2^{nd} \text{ module score} \times ECTS) + \dots] / 240$$

## 7. Modules

Semester 1      30 ECTS      1 ECTS = 25 hrs

New Module Code	Module Name in English	SSWL	USSWL	ECTS	Module Type	Prerequisite Module(s) Code
		hr/sem	hr/sem			
ELEC1111	Mathematics I	63	62	5.00	S	
ELEC1112	Basics of Electrical Engineering I	63	62	5.00	C	
ELEC1103	Electronics Physics	63	62	5	C	
UOBABb4	Computers I	48	27	3	B	
ELEC1104	Engineering Drawing & AutoCAD	96	4	4.00	S	
ELEC1105	Electrical Engineering Laboratories I	47	53	4.00	S	
UOBABb1101	English Language I *	33	17	2.00	B	
	Arabic Language I *	33	17	2.00	B	

Semester 2      30 ECTS      1 ECTS = 25 hrs

New Module Code	Module Name in English	SSWL	USSWL	ECTS	Module Type	Prerequisite Module(s) Code
		hr/sem	hr/sem			
ELEC1211	Mathematics II	63	62	5.00	S	ELEC1111
ELEC1212	Basics of Electrical Engineering II	63	62	5.00	C	ELEC1112
ELEC1203	Digital Techniques	93	57	6.00	C	
ELEC1204	Computer Programming Languages	63	12	3	B	
ELEC1205	Principles of Mechanical Engineering	78	47	5.00	S	
ELEC1206	Electrical Engineering Laboratories II	47	53	4.00	S	
UOBAB1104	Freedom and Democracy *	33	17	2.00	B	

Semester 3    30 ECTS    1 ECTS = 25 hrs

New Module Code	Module Name in English	SSWL	USSWL	ECTS	Module Type	Prerequisite Module(s) Code
		hr/sem	hr/sem			
ELEC2301	Mathematics III	63	62	5	S	ELEC1111
ELEC2302	Electrical Networks	78	47	5	C	ELEC1112
ELEC2303	Electronics I	48	52	4	C	
ELEC2304	Electrical Machines I	48	52	4	C	
ELEC2305	Computers Programming	63	37	4	B	
ELEC2306	Electrical Engineering Laboratories III	93	7	4	S	
UOBAB2301	Ba'ath Crimes *	33	17	2	B	
UOBAB2302	English Language II *	33	17	2	B	

Semester 4    30 ECTS    1 ECTS = 25 hrs

New Module Code	Module Name in English	SSWL	USSWL	ECTS	Module Type	Prerequisite Module(s) Code
		hr/sem	hr/sem			
ELEC2401	Mathematics IV	63	62	5.00	S	ELEC1211, ELEC2301
ELEC2402	Electromagnetic Fields	63	37	4.00	C	
ELEC2403	Electronics II	48	52	4.00	C	ELEC2303

<b>ELEC2404</b>	<b>Electrical Machines II</b>	<b>48</b>	<b>52</b>	<b>4.00</b>	<b>C</b>	<b>ELEC2304</b>
<b>ELEC2405</b>	<b>Microprocessor</b>	<b>78</b>	<b>22</b>	<b>4.00</b>	<b>C</b>	
<b>UOBAB2004</b>	<b>Computer II</b>	<b>48</b>	<b>27</b>	<b>3.00</b>	<b>B</b>	
<b>ELEC2406</b>	<b>Electrical Engineering Laboratories IV</b>	<b>93</b>	<b>7</b>	<b>4.00</b>	<b>S</b>	
<b>UOBAB1102</b>	<b>Arabic Language I *</b>	<b>33</b>	<b>17</b>	<b>2.00</b>	<b>B</b>	

Semester 5    30 ECTS    1 ECTS = 25 hrs

<b>New Module Code</b>	<b>Module Name in English</b>	<b>SSWL</b>	<b>USSWL</b>	<b>ECTS</b>	<b>Module Type</b>	<b>Prerequisite Module(s) Code</b>
		<b>hr/sem</b>	<b>hr/sem</b>			
<b>ELEC3501</b>	<b>Engineering Analysis I</b>	<b>63</b>	<b>62</b>	<b>5.00</b>	<b>S</b>	
<b>ELEC3502</b>	<b>Electronics III</b>	<b>93</b>	<b>32</b>	<b>5.00</b>	<b>C</b>	<b>ELEC2303</b>
<b>ELEC3503</b>	<b>Communications I</b>	<b>63</b>	<b>62</b>	<b>5.00</b>	<b>C</b>	
<b>ELEC3504</b>	<b>Electrical Power I</b>	<b>63</b>	<b>62</b>	<b>5.00</b>	<b>C</b>	
<b>ELEC3505</b>	<b>Electrical Machines III</b>	<b>93</b>	<b>32</b>	<b>5.00</b>	<b>C</b>	<b>ELEC2304</b>
<b>ELEC3507</b>	<b>ELECTIVE I</b>	<b>48</b>	<b>27</b>	<b>3.00</b>	<b>E</b>	
<b>To be determined</b>	<b>Arabic Language II *</b>	<b>33</b>	<b>17</b>	<b>2.00</b>	<b>S</b>	

Semester 6 30 ECTS 1 ECTS = 25 hrs

New Module Code	Module Name in English	SSWL	USSWL	ECTS	Module Type	Prerequisite Module(s) Code
		hr/sem	hr/sem			
ELEC3601	Engineering AnalysisII	63	62	5.00	S	ELEC3501
ELEC3602	Electronics IV	63	62	5.00	C	ELEC2403, ELEC3502
ELEC3603	Communications II	108	17	5.00	C	ELEC3503
ELEC3604	Electrical Power II	93	32	5.00	C	ELEC3504
ELEC3605	Electrical Machines IV	63	62	5.00	C	ELEC2404, ELEC3505
ELEC3607	ELECTIVE II	63	62	5.00	E	

## 8. Contacts

### Program Manger

Ahmed Qasim Jumaah Aldhahab| Ph.D. in Electrical & Computer Engineering | Professor

Email: [ahmedalthahab82@uobabylon.edu.iq](mailto:ahmedalthahab82@uobabylon.edu.iq)

Mobile no.: 07808903680

### Program Accreditation Organizer

Haider Abdallatif Mohamed Kazim | Ph.D. in Electronics & Communication Engineering | Assist. Professor

Email: [haider.abdallatif@uobabylon.edu.iq](mailto:haider.abdallatif@uobabylon.edu.iq)

Mobile no.: 07800680903

University of Babylon

College of Engineering

Electrical Engineering Department



Bachelor's Degree (B.Sc.) – Electrical Engineering

بكالوريوس هندسة كهربائية



## Table of Contents

1. Overview
2. Undergraduate Modules
3. Contact

## 1. Overview

This catalogue is about the courses (modules) given by the program of Electrical Engineering to gain the Bachelor of Science degree. The program delivers (56) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظرة عامة:

يتناول هذا الدليل المقررات الدراسية (الوحدات) التي يقدمها برنامج الهندسة الكهربائية للحصول على درجة البكالوريوس في العلوم. يتألف ويعتمد تقديم الوحدات الدراسية (ECTS) البرنامج من 56 وحدة دراسية، بإجمالي 6000 ساعة دراسية، و240 وحدة دراسية معتمدة على منهجية بولونيا.

## 2. Undergraduate Courses 2025-2026

### Module 1

Code	Course/Module Title	ECTS	Semester
UOBAB0103011	Mathematics I	5.00	1
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	62
Description			

### Module 2

Code	Course/Module Title	ECTS	Semester
UOBAB0103012	Basics of Electrical Engineering	5.00	1
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	62
Description			

**Module 3**

Code	Course/Module Title	ECTS	Semester
UOBAB0103013	Electronics Physics	5.00	1
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
4	0/0/0/0	63	62
Description			

**Module 4**

Code	Course/Module Title	ECTS	Semester
UOBAB0103014	Computers I	3	1
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
1	0/1/0/1	48	27
Description			

**Module 5**

Code	Course/Module Title	ECTS	Semester
UOBAB0103015	Engineering Drawing & AutoCAD	4	1
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	0/4/0/0	96	4
Description			

**Module 6**

Code	Course/Module Title	ECTS	Semester
UOBAB0103016	Electrical Engineering Laboratories I	4.00	1
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
1	1/0/2/0	47	53
Description			

**Module 7**

Code	Course/Module Title	ECTS	Semester
UOBAB0103017	English Language I *	2.00	1
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	2/0/0/0	33	17
Description			

**Module 8**

Code	Course/Module Title	ECTS	Semester
UOBAB0103018	Arabic Language I *	2.00	1
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	2/0/0/0	33	17
Description			

**Module 9**

Code	Course/Module Title	ECTS	Semester
UOBAB0103021	Mathematics II	5.00	2
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	62
Description			

**Module 10**

Code	Course/Module Title	ECTS	Semester
UOBAB0103022	Basics of Electrical Engineering II	5.00	62
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	17
Description			

**Module 11**

Code	Course/Module Title	ECTS	Semester
UOBAB0103023	Digital Techniques	6.00	57
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
4	0/2/0/0	93	17
Description			

**Module 12**

Code	Course/Module Title	ECTS	Semester
UOBAB0103024	Computer Programming Languages	3.00	2
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
1	0/2/0/1	63	12
Description			

**Module 13**

Code	Course/Module Title	ECTS	Semester
UOBAB0103025	Principles of Mechanical Engineering	5.00	2
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/2/0/0	78	47
Description			

**Module 14**

Code	Course/Module Title	ECTS	Semester
UOBAB0103026	Electrical Engineering Laboratories II	4.00	2
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
1	0/2/0/0	47	53
Description			

**Module 15**

Code	Course/Module Title	ECTS	Semester
UOBAB0103027	Freedom and Democracy *	2.00	2
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
1	0/0/0/1	33	17
Description			

**Module 16**

Code	Course/Module Title	ECTS	Semester
UOBAB0103031	Mathematics III	5.00	3
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	62
Description			

**Module 17**

Code	Course/Module Title	ECTS	Semester
UOBAB0103032	Electrical Networks	5.00	3
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
4	0/0/0/1	78	47
Description			

**Module 18**

Code	Course/Module Title	ECTS	Semester
UOBAB0103033	Electronics I	4.00	3
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	0/0/0/1	48	52
Description			

**Module 19**

Code	Course/Module Title	ECTS	Semester
UOBAB0103034	Electrical Machines I	4.00	3
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	0/0/0/1	48	52
Description			

**Module 20**

Code	Course/Module Title	ECTS	Semester
UOBAB0103035	Computers Programming	4.00	3
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
1	0/2/0/1	63	37
Description			

**Module 21**

Code	Course/Module Title	ECTS	Semester
UOBAB0103036	Electrical Engineering Laboratories III	4.00	3
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	0/4/0/0	93	7
Description			

**Module 22**

Code	Course/Module Title	ECTS	Semester
UOBAB0103037	Ba'ath Crimes *	2.00	3
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	0/0/0/0	33	17
Description			

**Module 23**

Code	Course/Module Title	ECTS	Semester
UOBAB0103038	English Language II *	2.00	3
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	0/0/0/0	33	17
Description			

**Module 24**

Code	Course/Module Title	ECTS	Semester
UOBAB0103041	Mathematics IV	5.00	4
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	62
Description			

**Module 25**

Code	Course/Module Title	ECTS	Semester
UOBAB0103042	Electromagnetic Fields	4.00	4
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
4	0/0/0/0	63	37
Description			

**Module 26**

Code	Course/Module Title	ECTS	Semester
UOBAB0103043	Electronics II	4.00	4
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	0/0/0/1	48	52
Description			

**Module 27**

Code	Course/Module Title	ECTS	Semester
UOBAB0103044	Electrical Machines II	4.00	4
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	0/0/0/1	48	52
Description			

**Module 28**

Code	Course/Module Title	ECTS	Semester
UOBAB0103045	Microprocessor	4.00	4
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	0/2/0/1	78	22
Description			

**Module 29**

Code	Course/Module Title	ECTS	Semester
UOBAB0103046	Computer II	3.00	4
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
1	0/1/0/1	48	27
Description			

**Module 30**

Code	Course/Module Title	ECTS	Semester
UOBAB0103047	Electrical Engineering Laboratories IV	4.00	4
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	0/4/0/0	93	7
Description			

**Module 31**

Code	Course/Module Title	ECTS	Semester
UOBAB0103048	Arabic Language I *	2.00	4
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
1	0/0/0/1	33	17
Description			

**Module 32**

Code	Course/Module Title	ECTS	Semester
UOBAB0103051	Engineering Analysis I	5.00	5
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	62
Description			

**Module 33**

Code	Course/Module Title	ECTS	Semester
UOBAB0103052	Electronics III	5.00	5
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/2/0/1	93	32
Description			

**Module 34**

Code	Course/Module Title	ECTS	Semester
UOBAB0103053	Communications I	5.00	5
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	62
Description			

**Module 35**

Code	Course/Module Title	ECTS	Semester
UOBAB0103054	Electrical Power I	5.00	5
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	62
Description			

**Module 36**

Code	Course/Module Title	ECTS	Semester
UOBAB0103055	Electrical Machines III	5.00	5
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/2/0/1	93	32
Description			

**Module 37**

Code	Course/Module Title	ECTS	Semester
UOBAB0103056	ELECTIVE I	3.00	5
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	0/0/0/1	48	27
Description			

**Module 38**

Code	Course/Module Title	ECTS	Semester
UOBAB0103057	Arabic Language II *	2.00	5
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
2	0/0/0/0	33	17
Description			

**Module 39**

Code	Course/Module Title	ECTS	Semester
UOBAB0103061	Engineering Analysis II	5.00	6
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	62
Description			

**Module 40**

Code	Course/Module Title	ECTS	Semester
UOBAB0103062	Electronics IV	5.00	6
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	62
Description			

**Module 41**

Code	Course/Module Title	ECTS	Semester
UOBAB0103063	Communications II	5.00	6
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
4	0/2/0/1	108	17
Description			

**Module 42**

Code	Course/Module Title	ECTS	Semester
UOBAB0103064	Electrical Power II	5.00	6
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/2/0/1	93	32
Description			

**Module 43**

Code	Course/Module Title	ECTS	Semester
UOBAB0103065	Electrical Machines IV	5.00	6
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	62
Description			

**Module 44**

Code	Course/Module Title	ECTS	Semester
UOBAB0103066	ELECTIVE II	5.00	6
Class (hr/W)	Lect/Lab./Prac./Tutor	SSWL (hr/Sem)	USWL/ (hr/w)
3	0/0/0/1	63	62
Description			

### 3. Contact

#### **Program Manger**

Ahmed Qasim Jumaah Aldhahab| Ph.D. in Electrical & Computer Engineering | Professor

Email: [ahmedalthahab82@uobabylon.edu.iq](mailto:ahmedalthahab82@uobabylon.edu.iq)

Mobile no.: 07808903680

#### **Program Accreditation Organizer**

Haider Abdallatif Mohamed Kazim | Ph.D. in Electronics & Communication Engineering | Assist. Professor

Email: [haider.abdallatif@uobabylon.edu.iq](mailto:haider.abdallatif@uobabylon.edu.iq)

Mobile no.: 07800680903

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Mathematics I</b>	Module Delivery	
Module Type	<b>Support</b>	<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	<b>UOBAB 0103011</b>		
ECTS Credits	<b>5</b>		
SWL (hr/sem)	<b>125</b>		
Module Level	<b>1</b>	Semester of Delivery	<b>1</b>
Administering Department	Electrical Engineering	College	Engineering
Module Leader	Ahmed Qasim Jumaah ALdhahab	e-mail	<a href="mailto:Ahmedalthahab82@uobabylon.edu.iq">Ahmedalthahab82@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Ahmed Qasim Jumaah ALdhahab	e-mail	<a href="mailto:Ahmedalthahab82@uobabylon.edu.iq">Ahmedalthahab82@uobabylon.edu.iq</a>
Peer Reviewer Name	Sameer Abdul Kadhim Alrufaiaat	e-mail	<a href="mailto:eng.samir.abdul@uobabylon.edu.iq">eng.samir.abdul@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ol style="list-style-type: none"><li>1. Students are expected to learn how to deal with functions in terms of Solving Equations and Inequalities, Graphing and Functions, Polynomial Functions, Systems of Equations, etc.</li><li>2. The limit of the functions is very important for the student to know. By employing the limit to the function, student will be able to find the continuity/ discontinuity of the function, graph of the function, finding the derivative to the function, the function behavior when it reaches into both sides of infinity, etc.</li><li>3. The derivative is one of the key ideas in calculus and used to study a wide range of problems in mathematics, science, economics, and medicine. Simplifying the functions through applying derivative is very important for the students to know. Therefore, in derivative chapter, students will learn several things including, Derivative Formulas, Power Rule, Product Rule, Quotient Rule, Chain Rule, Higher Order Derivatives, Implicit Differentiation, Logarithmic Differentiation, Derivatives of Trig Functions, Exponential Functions, Logarithm Functions, Inverse Trig Functions, and Hyperbolic Trig Functions.</li><li>4. One of the most important applications of the derivative is using derivative as a tool to find the optimal (best) solutions to the problems. The derivative is used to find extreme values of functions, to determine and analyze the shapes of graphs, and to solve equations numerically. We also introduce the idea of recovering a function from its derivative. There are many of the derivative applications, such as the Mean Value Theorem, Related Rates, Critical Points, Minimum and Maximum Values, Increasing/Decreasing Functions, Inflection Points, Concavity, Optimization.</li><li>5. To calculate the areas and volumes of general shapes, the method called integration is used. The definite integral is the key tool in calculus for defining and calculating many important quantities, such as areas, volumes, lengths of curved paths, probabilities, averages, energy consumption, etc.</li><li>6. Furthermore, students are expected to learn how to find the area under a curve and the area between two curves, solids of revolution, etc.</li><li>7. Finally, students are expected to deal with the transcendental functions: Inverse Function and their Derivatives, Natural Logarithms, Exponential Functions, Inverse Trigonometric Functions, and Hyperbolic Functions.</li></ol>
	<ol style="list-style-type: none"><li>1. Read different technical books and lecture notes.</li><li>2. Students should learn the principle of Mathematics I (Algebra and Calculus I)</li></ol>

<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>3. Understand the rules and regulations for this type of course.</li> <li>4. Solving and simplifying Equations and Functions</li> <li>5. Understand the problem and turn it into real mathematical problem.</li> <li>6. Students should be able to solve the equality and inequality of the equations successfully.</li> <li>7. Students should be able to solve practical problems.</li> <li>8. Students should be able to find the limits and then check whether the function is continuous or not. Then, student has to be able to see the behavior of the function when it reaches to infinity in both sides.</li> <li>9. Students should be able to derive the function and finding Derivative Formulas, Higher Order Derivatives, Related Rates, Critical Points, Minimum and Maximum Values, Increasing/Decreasing Functions, Inflection Points, Concavity, Optimization, etc.</li> <li>10. Students should be able to integrate the function and finding areas, volumes, lengths of curved paths, probabilities, averages, energy consumption, etc.</li> <li>11. Students has to be able to deal with the inverse function and their derivative. Also, it has the ability to deal with the natural logarithms, exponential function, trigonometric functions, etc.</li> <li>12. Students will learn to deal with the transcendental functions.</li> <li>13. Students should be able to search for topics online and make reports.</li> </ol>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><b>Chapter 1: Brief review:</b> Set, Relations, Intervals, Functions, Range, Domain, and Absolute value. Coordinates and Graphs in Plane, A Slope and An Equation of A Line, Trigonometric Functions (Identities, Domain, Range, etc.) [8 hrs]</p> <p><b>Chapter 2: Limits:</b> Limit of a Functions, Limit Laws, Eliminating Zero Denominators Algebraically, and Sandwich Theorem. Approaching a Limit from One Side, Continuity and Discontinuity, Limits Involving Infinity, and Asymptote of a Graph. [8 hrs]</p> <p><b>Chapter 3: Differentiation:</b> Definition, Slopes and Tangent Lines, Differentiation Rules, Derivatives of Trigonometric Functions, and Chain Rule. High Order</p>

	<p>Derivatives, Implicit Differentiation, Minima and Maxima , and Derivative as a Rate of Change. [12 hrs]</p> <p><b>Chapter 4: Applications of Derivatives:</b> Extreme Values of Functions, The Mean Value Theorem, Monatomic Functions and the First Derivative Test. [6 hrs]</p> <p><b>Chapter 5: Integration:</b> Definition, Properties, Integration of Trigonometric Functions, Finite Sum, and Sigma Notation. Definite Integral, Definite Integral Rules, and Fundamental Theorem of Integration. [12 hrs]</p> <p><b>Chapter 6: Applications of Integrations:</b> Areas between Curves, and Volumes, Arc Length, and Surface Area of Revolution. [8 hrs]</p> <p><b>Chapter 7: Transcendental Functions:</b> Inverse Function and their Derivatives, Natural Logarithms, Exponential Functions, Inverse Trigonometric Functions, and Hyperbolic Functions. [8 hrs]</p>
--	--

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<p>In this module "Mathematics I", various learning and teaching strategies will be implemented to enhance students' understanding and engagement. Some common strategies are listed below:</p> <ul style="list-style-type: none"> <li>➤ <b>Visualization:</b> Visualization is a useful technique to process or summarize the knowledge that has been instructed in class. When students receive the information through visual means, they are more able to retain both the previous learning and new information for a longer time. Visualization is also a helpful learning process for lower-attaining learners to receive the information in a simpler, clear and systematic way. Thus, an effective teacher would use visual tools such as flow charts, graphic organizers, concept maps, etc.</li> <li>➤ <b>Teamwork:</b> Dividing the class into groups to complete a task is a teaching strategy. It is recommended to encourage students of mixed abilities to work with one another. By doing so, those who have more knowledge of the subject can share their knowledge and help their peers understand the topic better.</li> <li>➤ <b>Inquiry-Based Teaching:</b> Encouraging students to ask a lot of questions is an effective teaching strategy that does not only motivate students to think more practically but also helps them to become independent learners. <b>Inquiry-Based</b></li> </ul>

	<p><b>learning</b> motivates students to ask questions and work with one another to solve any problem.</p> <ul style="list-style-type: none"> <li>➤ <b>Implementing Technology in the Classroom:</b> Using technology in the classroom is a valuable tool that prepares students to learn 21st-century skills. Use of PowerPoint presentations, videos, virtual classrooms, robots and augmented reality (AR) does not only add liveliness to the classroom but may also lead to a more inclusive and effective learning environment that improves inquisitiveness and collaboration between the students and allow educators to compile data on student performance.</li> <li>➤ <b>Assessments and Feedback:</b> Integrating formative assessment strategies in the classroom. Regular assessments, such as quizzes, assignments, and exams, can be used to evaluate students' understanding and progress. Constructive feedback helps students identify areas for improvement and reinforces their learning.</li> <li>➤ <b>Critical Thinking:</b> Advancing critical thinking skills, using graphic organizers to help students organize their thinking, is another way of learning strategies. Provide playful learning experiences that promote divergent thinking.</li> <li>➤ <b>Personalized learning or Self-Learning:</b> Since students are not exactly alike, <b>personalized learning</b> builds a learning experience that addresses the unique abilities of each student.</li> <li>➤ <b>Link mathematics to real-life problems:</b> A common thought that many math's students have is along the lines of "when is this theorem ever used in real life situations?". Whenever possible, use a relevant topical example where the theory taught was applied.</li> </ul> <p>Implementing these learning and teaching strategies in the module of "Mathematics" will help students to understand the module very well and faster. Hence, employing these techniques in module of "Mathematics" will led to accomplish the aim of the module faster.</p>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.13
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	25% (25)	3, 5, 8, 12	LO # 4, 6, 8, and 9
	Assignments	2	5% (5)	13, 14	LO # 9, 10, 11, and 12
	Projects / Lab.	NA	NA	NA	
	Report	1	10% (10)	15	LO # 4, 6, 8, 9, 10, 11, and 12
Summative assessment	Midterm Exam	2 hr	10% (10)	8 or 9	LO # 4, 6, 8, and 9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	<b>Brief review:</b> Set, Relations, Intervals, Functions, Range, Domain, and Absolute value.
Week 2	<b>Brief review:</b> Coordinates and Graphs in Plane, A Slope and An Equation of A Line, Trigonometric Functions (Identities, Domain, Range, etc.)
Week 3	<b>Limits:</b> Limit of a Functions, Limit Laws, Eliminating Zero Denominators Algebraically, and Sandwich Theorem.
Week 4	<b>Limits:</b> Approaching a Limit from One Side, Continuity and Discontinuity, Limits Involving Infinity, and Asymptote of a Graph.
Week 5	<b>Differentiation:</b> Definition, Slopes and Tangent Lines, Differentiation Rules, Derivatives of Trigonometric Functions, and Chain Rule.
Week 6	<b>Differentiation:</b> High Order Derivatives and Implicit Differentiation
Week 7	<b>Differentiation:</b> Minima and Maxima , and Derivative as a Rate of Change. <b>Applications of Derivatives:</b> Extreme Values of Functions.
Week 8	<b>Mid Term Exam. Applications of Derivatives:</b> The Mean Value Theorem, and Monatomic Functions and the First and second Derivative Test.
Week 9	<b>Integration:</b> Definition, Properties, Integration of Trigonometric Functions, Finite Sum, and Sigma Notation.

<b>Week 10</b>	<b>Integration:</b> Definite of indefinite Integral. Indefinite Integral Rules and their properties.
<b>Week 11</b>	<b>Integration:</b> Definite Integral, Definite Integral Rules, and Fundamental Theorem of Integration
<b>Week 12</b>	<b>Applications of Integrations:</b> Areas between Curves, and Volumes.
<b>Week 13</b>	<b>Applications of Integrations:</b> Arc Length, and Surface Area of Revolution.
<b>Week 14</b>	<b>Transcendental Functions:</b> Inverse Function and their Derivatives, Natural Logarithms, and Exponential Functions.
<b>Week 15</b>	<b>Transcendental Functions:</b> Inverse Trigonometric Functions, and Hyperbolic Functions.
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	<b>Text</b>	<b>Available in the Library?</b>
<b>Required Texts</b>	1. Hass, Joel, Christopher Heil, Maurice D. Weir, and George B. Thomas, <i>Thomas' calculus</i> , Pearson, thirteen Edition. 2. Courant, Richard, and Fritz John, <i>Introduction to calculus and analysis I</i> , Springer Science & Business Media, 2012.	Yes
<b>Recommended Texts</b>	1. Stewart, James, Daniel K. Clegg, and Saleem Watson, <i>Calculus: early transcendentals</i> , Cengage Learning, 2020. 2. Jerrold Marsden and Alan Weinstein, <i>Calculus I</i> , Second Edition, Springer-Verlag New York Berlin Heidelberg	Yes
<b>Websites</b>	<a href="https://tutorial.math.lamar.edu/">https://tutorial.math.lamar.edu/</a>	

## Grading Scheme

### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Basics of Electrical Engineering I		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103012		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	1
Administering Department	Electrical Engineering	College	College of Engineering
Module Leader	Dr. Saad Saffah Hreshee	e-mail	<a href="mailto:eng.saad.saffah@uobabylon.edu.iq">eng.saad.saffah@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Saad Saffah Hreshee	e-mail	<a href="mailto:eng.saad.saffah@uobabylon.edu.iq">eng.saad.saffah@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Hassen Jassim	e-mail	<a href="mailto:hassan.jasim@uobabylon.edu.iq">hassan.jasim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p>The module "Basics of Electrical Engineering" aims to provide students with a fundamental understanding of the principles, concepts, and applications of electrical engineering. The specific aims of this module are the following objectives are targeted:</p> <ol style="list-style-type: none"><li>1. Introduction to Electrical Engineering: The module aims to introduce students to the field of electrical engineering, its historical background, and its significance in various technological applications.</li><li>2. Circuit Analysis: Students are taught the fundamentals of circuit analysis, including Ohm's Law, Kirchhoff's Laws, network theorems (such as Thevenin's and Norton's theorem), and techniques for solving simple and complex circuits.</li><li>3. DC Circuits: The module aims to provide an understanding of direct current (DC) circuits, including the behavior of passive circuit elements like resistors. Students will learn how to analyze and solve circuits involving DC sources.</li><li>4. Electric Power Systems: The module covers the basics of electric power systems.</li><li>5. Basic Electrical Measurements: Students will be introduced to different electrical measurement techniques and instruments, including voltmeters, ammeters, oscilloscopes, and multimeters. They will learn how to make accurate measurements of voltage, current, and resistance in electrical circuits.</li><li>6. Basic Electrical Measurements: Students will be introduced to different electrical measurement techniques and instruments, including voltmeters, ammeters, oscilloscopes, and multimeters. They will learn how to make accurate measurements of voltage, current, and resistance in electrical circuits.</li><li>7. Problem-Solving Skills: Through practical examples, assignments, and laboratory work, the module aims to develop students' problem-solving skills in electrical engineering. They will learn how to apply theoretical concepts to solve real-world electrical engineering problems.</li></ol> <p>Overall, the module "Basics of Electrical Engineering" aims to provide students with a solid foundation in electrical engineering principles, preparing them for more advanced topics and practical applications in the field.</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>Upon completion of the module "Basics of Electrical Engineering," students are expected to achieve the following learning outcomes:</p> <ol style="list-style-type: none"><li>1. Understanding of Electrical Principles: Students should demonstrate a solid understanding of the fundamental principles and concepts of electrical engineering, including Ohm's Law, Kirchhoff's Laws, network theorems, and basic circuit analysis techniques.</li><li>2. Competence in Circuit Analysis: Students should be able to analyze and solve simple and complex electrical circuits using appropriate techniques and tools. They should be able to calculate voltages, currents, and power dissipation in circuits accurately.</li><li>3. Ability to Make Electrical Measurements: Students should be able to use electrical measurement instruments, such as voltmeters, ammeters, and oscilloscopes, to make accurate measurements of voltage, current, and resistance in electrical circuits. They should understand measurement techniques and be capable of interpreting measurement results.</li><li>4. Awareness of Safety and Standards: Students should be aware of electrical safety</li></ol>

	<p>practices and understand the importance of following safety guidelines in electrical engineering.</p> <ol style="list-style-type: none"> <li>5. Problem-Solving Skills: Students should demonstrate the ability to apply their knowledge of electrical engineering principles to solve practical problems. They should be able to identify and analyze electrical engineering problems, develop appropriate solution strategies, and effectively communicate their solutions.</li> <li>6. Critical Thinking and Analytical Skills: Students should develop critical thinking and analytical skills through the module, enabling them to evaluate and interpret electrical engineering concepts, principles, and data. They should be able to think logically and make informed decisions in solving electrical engineering problems.</li> <li>7. Teamwork and Communication: Students should have opportunities to work in teams and develop effective communication skills. They should be able to collaborate with others, share knowledge, and present their ideas and solutions clearly and concisely.</li> </ol> <p>By achieving these learning outcomes, students will have a strong foundation in the basics of electrical engineering, enabling them to pursue further studies in the field or apply their knowledge in various engineering disciplines and industries.</p>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p><b>Part A - DC Circuit Theory</b> Basic concepts and units, basic DC circuits Laws, [12 hrs]. Current and voltage definitions, Current and voltage sources, [12 hrs]. dependent and non-dependent Current and voltage sources [12 hrs]. Passive circuit elements, Combining resistive elements in series and parallel, [12 hrs]. Ohm's law, [11 hrs].</p> <p><b>Part B – DC Circuit Analysis</b> Kirchhoff's laws, [11 hrs]. Mesh and Nodal analysis, [11 hrs]. Superposition theorem, Source transformation, [11 hrs]. Thevenin and Norton analysis Methods, [11 hrs]. Maximum power transfer, [11 hrs]. Millman's theorem, reciprocity theorem, [11 hrs].</p>

<p style="text-align: center;"><b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم</p>	
<p><b>Strategies</b></p>	<p>The module "Basics of Electrical Engineering" can employ various learning and teaching strategies to enhance students' understanding and engagement. Here are some common strategies used in this module:</p> <ol style="list-style-type: none"> <li>1. Lectures: Lectures are a primary teaching method in this module, where instructors deliver theoretical concepts, principles, and explanations. Lectures can include visual aids such as slides, diagrams, and animations to facilitate understanding. Instructors may also provide real-life examples and applications to make the content more relatable.</li> </ol>

2. **Practical Examples and Problem-Solving:** Instructors can use practical examples and problem-solving exercises to help students apply theoretical concepts to real-world situations. By presenting and solving problems related to electrical circuits, students can develop critical thinking and analytical skills.
3. **Laboratory Work:** Laboratory sessions provide hands-on experience and reinforce theoretical concepts. Students can perform experiments and measurements using electrical components and instruments. This allows them to apply theoretical knowledge, gain practical skills, and understand the behavior of electrical systems in a controlled environment.
4. **Group Discussions and Collaborative Learning:** Group discussions and collaborative learning activities encourage students to engage actively in the learning process. Students can work together to solve problems, analyze case studies, or discuss challenging concepts. This promotes peer learning, critical thinking, and communication skills.
5. **Tutorials and Workshops:** Tutorials and workshops offer opportunities for students to seek additional help and clarification on specific topics. Instructors or teaching assistants can provide individual or small-group assistance, address students' questions, and guide them through problem-solving exercises.
6. **Multimedia and Interactive Tools:** Multimedia resources, such as videos, animations, and interactive simulations, can be used to enhance understanding and engage students. These resources can provide visual representations of abstract concepts and allow students to interact with the content, fostering active learning.
7. **Guest Lectures and Industry Visits:** Inviting guest speakers from industry or conducting visits to electrical engineering-related facilities can provide students with real-world perspectives and insights. Professionals can share their experiences, current trends, and practical applications, giving students a broader understanding of the field.
8. **Assessments and Feedback:** Regular assessments, such as quizzes, assignments, and exams, can be used to evaluate students' understanding and progress. Constructive feedback helps students identify areas for improvement and reinforces their learning. Feedback can be provided through written comments, discussions, or one-on-one consultations.
9. **Online Resources and Platforms:** Online resources, such as e-learning platforms, online forums, and educational websites, can support student learning outside the classroom. These resources can provide additional readings, practice exercises, and interactive modules to supplement classroom teaching.
10. **Self-directed Learning:** Encouraging students to take ownership of their learning through self-directed study is important. Students can explore additional resources, conduct independent research, and deepen their understanding of specific topics. This cultivates lifelong learning skills and promotes curiosity in the field of electrical

	<p>engineering.</p> <p>By combining these learning and teaching strategies, the module "Basics of Electrical Engineering" aims to create an interactive and engaging learning environment that caters to different learning styles, promotes critical thinking, and prepares students for further studies and professional practice in electrical engineering.</p>
--	--

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.133
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	125		

<b>Module Evaluation</b> تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	3	10% (10)	4, 9, 12	LO # 2,3,7,8,10 and 11
	<b>Assignments</b>	3	10% (10)	3, 8, 14	LO # 2, 7, and 13
	<b>Lab.</b>	1	10% (10)	Continuous	
	<b>Report</b>	1	10% (10)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	8	LO # 1-7
	<b>Final Exam</b>	3hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

## Delivery Plan (Weekly Syllabus)

### المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Basics of Network Elements
<b>Week 2</b>	Current and voltage sources, (dependent and non-dependent)
<b>Week 3</b>	Resistance and Resistivity, Combining resistive elements in series and parallel
<b>Week 4</b>	Ohm's Law
<b>Week 5</b>	Kirchhoff's Laws
<b>Week 6</b>	Circuit Analysis - Nodal and Mesh
<b>Week 7</b>	Circuit Analysis – Super Node and Super Mesh
<b>Week 8</b>	<b>Mid-term Exam</b> + Linearity and Superposition
<b>Week 9</b>	Linearity and Superposition
<b>Week 10</b>	Source Transformations
<b>Week 11</b>	Thévenin Equivalent circuits
<b>Week 12</b>	Norton Equivalent circuits
<b>Week 13</b>	maximum power transfer
<b>Week 14</b>	Millman's theorem
<b>Week 15</b>	reciprocity theorem
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

## Learning and Teaching Resources

### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Fundamentals of Electric Circuits, 4 <sup>th</sup> edition, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
<b>Recommended Texts</b>	Introduction to Circuit Analysis, 10 <sup>th</sup> edition, Boylestad .	Yes
<b>Websites</b>		

## Grading Scheme

### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electronics Physics		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103013		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	
Administering Department	Electrical Engineering	College	Engineering collage
Module Leader	Sameer Abdul Kadhim Alrufaiaat	e-mail	<a href="mailto:eng.samir.abdul@uobabylon.edu.iq">eng.samir.abdul@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	MS.c
Module Tutor	Sameer Abdul Kadhim Alrufaiaat	e-mail	<a href="mailto:eng.samir.abdul@uobabylon.edu.iq">eng.samir.abdul@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Hassan Jasim	e-mail	<a href="mailto:hassan.jasim@uobabylon.edu.iq">hassan.jasim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p>The aims of this modules</p> <p>1- The module aims to equip students with basic principles of material and how its deal with energy to remove the ambiguity in understanding the complex work of electrical appliances which will physical in subsequent years</p> <p>2-It is the basic concepts and terminology for understanding semiconductors. Of particular importance are the concepts of energy band, the two kinds of electrical charge carriers called electrons and holes, and how the carrier concentrations can be controlled with the addition of dopants. Another group of valuable facts and tools is the Fermi distribution function and the concept of the Fermi level. The electron and hole concentrations are closely linked to the Fermi level.</p> <p>3-This module introduces several devices that are formed by joining two different materials together. PN junction and metal–semiconductor junction are analyzed in the forward-bias and reverse-bias conditions. Of particular importance are the concepts of the depletion region and minority carrier injection. Solar cells and light-emitting diode are presented in some detail because of their rising importance for renewable energy generation and for energy conservation through solid-state lighting, respectively.</p> <p>4-This module introduces the bi polar junction transistor (BJT) operation and then presents the theory of the bipolar transistor I-V characteristics, current gain, and output conductance. High-level injection and heavy doping induced band narrowing are introduced. Si ,Ge transistor, transit time, and cutoff voltage are explained. Several bipolar transistor models are introduced, i.e. , Ebers–Moll model, small-signal model, and charge control model. Each model has its own areas of applications</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>On completion of this module students are expected to:</p> <ul style="list-style-type: none"> <li>• Understand and be able to apply physics and electronics concepts.</li> <li>• Possess skills relevant to physics and electronics, e.g. experimental design and experimental technique.</li> <li>• Be able to demonstrate skills in mathematical analysis and problem solving..</li> <li>• Be sufficiently prepared for undertaking the module Physics and Electronics II.</li> <li>• Students should be able to analysis electrical circuits successfully.</li> <li>• Students should be able to solve practical problems.</li> <li>• Students should be able to design electrical circuits and networks based on data given.</li> <li>• Students should be able to search topics online and make reports.</li> </ul>
<p><b>Indicative Contents</b></p>	

## Learning and Teaching Strategies

## استراتيجيات التعلم والتعليم

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

## Student Workload (SWL)

## الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

## Module Evaluation

## تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	5 , 10	LO # 3 and 4, 8 and 9
	Assignments	2	10% (10)	6 , 12	LO # 4 and 5, 10 and 11
	Projects / Lab.	0			
	Report	1	10% (10)	13	Continuous
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	16 or 17	All
Total assessment			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Atomic Structure and Energy Levels
Week 2	Hydrogen Atom Model
Week 3	Photoelectric Effect
Week 4	De-Broglie Theory and Einstein's Photoelectric Equation
Week 5	Energy Bands Theory
Week 6	Energy Distribution of Electrons in Conductors
Week 7	Mid Term Examination + Electrical Conduction in Metals
Week 8	Intrinsic Semiconductor
Week 9	N and P-Types Semiconductor
Week 10	P-N Junction
Week 11	Forward and Reverse Biases Junction
Week 12	Capacitance of P-N Junction
Week 13	Diode Application
Week 14	Special Diodes and There Application
Week 15	Bipolar Junction Transistor
Week 16	Preparatory week before the final Exam

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	

Week 7	
Week 8	Mid-term Exam
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1- Solid State Electronic Devices, Ben G. Streetman 2- Electronic Devices and Circuits, Millimans	Yes
Recommended Texts	1- Physics for Scientists and Engineers, Serway. 2- Semiconductor Physics & Devices, Donald A. Neamen	No
Websites		

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Principles of Computers I		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103014		
ECTS Credits	2		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	1
Administering Department	Electrical engineering	College	College of Engineering
Module Leader	Dr. Hanaa Mohsin Ali	e-mail	<a href="mailto:hanaa.ali@uobabylon.edu.iq">hanaa.ali@uobabylon.edu.iq</a>
Module Leader's Acad. Title	assistant prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Hanaa Mohsin Ali	e-mail	<a href="mailto:Hanaa.ali@uobabylon.edu.iq">Hanaa.ali@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Hassen Jassim	e-mail	<a href="mailto:hassan.jasim@uobabylon.edu.iq">hassan.jasim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<p>This course provides an in-depth analysis of the fundamental principles of computer science. The exposition of these principles is fully reinforced by many practical problems that illustrate the concepts discussed.</p> <ol style="list-style-type: none"><li>1. Beginning with precise and quantitative information about computer science origin and development.</li><li>2. Study the representation of data inside the computer system.</li><li>3. Understand the concept of data processing.</li><li>4. Study how the data transfer from outside to inside the computer system.</li><li>5. Define and describe computer information theory.</li><li>6. Define and describe the computer system and its parts.</li><li>7. Describe and understand the differences among the number of computer operating systems.</li><li>8. Clearly understand and studies (MS-DOS and Windows).</li><li>9. Use Windows system and its applications.</li><li>10. Apply Microsoft Office (Word, Excel and PowerPoint).</li><li>11. Define Network and Internet (services and terminologies).</li><li>12. Introduce a mini project about what they learned from the lectures they got.</li></ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<p>Upon completion of the module " Principles of Computers I ", students are expected to achieve the following learning outcomes:</p> <ol style="list-style-type: none"><li>1. Study the representation of data inside the computer system.</li><li>2. Understand the concept of data processing.</li><li>3. Study how the data transfer from outside to inside the computer system.</li><li>4. Define and describe computer information theory.</li><li>5. Define and describe the computer system and its parts.</li><li>6. Describe and understand the differences among the number of computer operating systems.</li><li>7. Understand the software applications (Ms. Word, ms. excel and PowerPoint)</li></ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p><b>Part 1:</b> Beginning with precise and quantitative information about computer science origin and development. Study the representation of data inside the computer system. Understand the concept of data processing. Study how the data transfer from outside to inside the computer system. Define and describe computer information theory. Define and describe the computer system and</p>

	<p>its parts. Describe and understand the differences among the number of computer operating systems. Clearly understands and studies (MS-DOS and Windows). Use Windows system and its applications. Understand the software applications (Ms. Word, ms. excel and PowerPoint. Define Network and Internet (services and terminologies). Introduce a mini project about what they learned from lectures they got [30 hrs].</p> <p><b>Part 2:</b> Operating system – MS-DOS system (create a directory, change a directory and delete a directory). Operating System - Windows 2010 (log on, introduce desktop, change time and date, taskbar, notification area and change computer personnel). Operating System - Windows 2010 (create folder, copy folder, delete folder, change folder name, and start menu). Microsoft Office – MS Word (access MS-word, screen layout, cursor, using the keyboard in MS-word, create new doc., open doc., text, selecting text and formatting text) as well as for MS- excel and PowerPoint [30 hrs].</p>
--	--

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<ol style="list-style-type: none"> <li>1. Learning Technologies on Campus using Whiteboard and TV monitor.</li> <li>2. Hand out lecture notes.</li> <li>3. Video lectures on YouTube and google classroom.</li> </ol>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	2.466
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

<b>Module Evaluation</b> تقييم المادة الدراسية	
---	--

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	5, 7 and 15	LO # 1, 2 and 3
	Assignments	3	10% (10)	5, 7 and 15	LO # 1, 2 and 3
	Projects	3	15% (10)	Continuous	
	Report	1	5% (10)	14	Continuous
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	16 or 17	All
Total assessment			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b>	
المنهاج الاسبوعي النظري	
	Material Covered
<b>Week 1</b>	<b>Introduction to a computer system</b> (definition, functionalities and types of computers)
<b>Week 2</b>	<b>Basic parts of a computer system</b> (hardware- CPU, input devices, output devices, memory and software-system, application)
<b>Week 3</b>	<b>Operating system – MS-DOS system</b> (log in, type commands, error-command, read directory and display directory contents)
<b>Week 4</b>	Operating system – MS-DOS system (create a directory, change a directory and delete a directory)
<b>Week 5</b>	Operating System - Windows 2010 (log on, introduce desktop, change time and date, taskbar, notification area and change computer personalize)
<b>Week 6</b>	Operating System - Windows 2010 (create folder, copy folder, delete folder, change folder name, and start menu).
<b>Week 7</b>	Microsoft Office – MS Word (access MS-word, screen layout, cursor, using the keyboard in MS-word, create new doc., open doc., text, selecting text and formatting text)
<b>Week 8</b>	<b>Mid-term Exam</b> + Microsoft Office – MS Word (MS-office bottom, text alignment, copy and paste, save text and doc., and print)
<b>Week 9</b>	Microsoft Office – MS Word (insert table, change table style, insert a text box, change style, insert the picture, insert shapes, insert a symbol, insert blank page and formatting page)
<b>Week 10</b>	Microsoft Office – MS Excel (Understand the use of spreadsheets and Excel, parts of the Excel window, Create and save a workbook file, Enter text, numbers, and dates into a worksheet)
<b>Week 11</b>	Microsoft Office – MS Excel (Insert, and remove columns and rows, insert formulas and functions, Insert, delete, move, and rename worksheets, Preview and print a workbook).
<b>Week 12</b>	Microsoft Office – MS-PowerPoint (Familiarize with the workspace, Name and save the presentation,

	add, rearrange, and delete slides, apply a new layout to a slide and Enter text on a slide)
<b>Week 13</b>	Microsoft Office – MS-PowerPoint (Adding Transition to the slides, using background (themes), Adding clip art, previewing your presentation, Print slides
<b>Week 14</b>	Mini Project Presentation (Introduce mini project of PowerPoint + paper sheet containing some of the texts in Word)
<b>Week 15</b>	Introduction to the Internet (Define Network, define Internet, Internet services, Internet Terminology and searching the Web)
<b>Week 16</b>	<b>A preparatory week before the Final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

	<b>Material Covered</b>
<b>Week 1</b>	Operating system – MS-DOS system (log in, type commands, error-command, read directory and display directory contents)
<b>Week 2</b>	Operating system – MS-DOS system (create a directory, change a directory and delete a directory)
<b>Week 3</b>	Operating the computer, shut down, folder, file, menu, icons
<b>Week 4</b>	Windows, bars, tabs, Deskbar
<b>Week 5</b>	Operating System - Windows 2010, introduce desktop, change time and date, taskbar, notification area and change computer personnel.
<b>Week 6</b>	Operating System - Windows 2010 (create folder, copy folder, delete folder, change folder name, and start menu).
<b>Week 7</b>	Microsoft Office – MS Word (access MS-word, screen layout, cursor, using the keyboard in MS-word, create new doc., open doc., text, selecting text and formatting text)
<b>Week 8</b>	<b>Mid-term Exam</b> + Microsoft Office – MS Word (MS-office bottom, text alignment, copy and paste, save text and doc., and print)
<b>Week 9</b>	Microsoft Office – MS Word (insert table, change table style, insert a text box, change style, insert the picture, insert shapes, insert a symbol, insert blank page and formatting page)
<b>Week 10</b>	Microsoft Office – MS Excel (Understand the use of spreadsheets and Excel, parts of the Excel window, Create and save a workbook file, Enter text, numbers, and dates into a worksheet)
<b>Week 11</b>	Microsoft Office – MS Excel (Insert, and remove columns and rows, insert formulas and functions, Insert, delete, move, and rename worksheets, Preview and print a workbook)
<b>Week 12</b>	Microsoft Office – MS-PowerPoint (Familiarize with the workspace, Name and save the presentation, add, rearrange, and delete slides, apply a new layout to a slide and Enter text on a slide)

<b>Week 13</b>	Microsoft Office – MS-PowerPoint (Adding Transition to the slides, using background (themes), Adding clip art, previewing your presentation, Print slides)
<b>Week 14</b>	Mini Project Presentation (Introduce mini project of PowerPoint + paper sheet containing some of the texts in Word)
<b>Week 15</b>	Introduction to the Internet (Define Network, define Internet, Internet services, Internet Terminology and searching the Web)
<b>Week 16</b>	<b>Introduction to a computer system</b> (definition, functionalities and types of computers)

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	1. Principles of Computer Science by Salem Press, 2016 2. Great Principles of Computing by Peter J. Denning	no
<b>Recommended Texts</b>	1. Elements of Information Theory, T. M. Cover and J. A. Thomas JOHN WILEY & SONS, INC., 1991.	no
<b>Websites</b>	<a href="https://edu.gcfglobal.org/en/computerbasics/understanding-operating-systems/1/">https://edu.gcfglobal.org/en/computerbasics/understanding-operating-systems/1/</a>	

### Grading Scheme

#### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Drawing & AutoCAD		Module Delivery
Module Type	Support		<input type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103015		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	Electrical Engineering	College	Engineering
Module Leader	Hussein Ali Lafta	e-mail	<a href="mailto:hussein.ali556@uobabylon.edu.iq">hussein.ali556@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Hussein Ali Lafta	e-mail	<a href="mailto:hussein.ali556@uobabylon.edu.iq">hussein.ali556@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Saad Saffah	e-mail	<a href="mailto:eng.saad.saffah@uobabylon.edu.iq">eng.saad.saffah@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ul style="list-style-type: none"> <li>a- This course covers the essential core topics for working with the AutoCAD software and To learn the language of global engineering by understanding the geometric shapes and analysis to view as well as the conclusion of the third and projected student learns also cutting process and understand the internal parts and the student learning to draw isometric shape with a dimensional.</li> <li>b- teaching strategy is to start with a few basic tools that enable the student to create and edit a simple drawing, and then continue to develop those tools and Drawing engineering operations such as the pentagon and hexagon and octagon ellipse.</li> <li>c- More advanced tools are introduced throughout the course, understanding the AutoCAD workspace and user interface, using basic drawing, editing, and viewing tools.</li> <li>d- Organizing drawing objects on layers, inserting reusable symbols (blocks).</li> <li>e- Adding text, hatching, and dimensions, preparing a layout to be plotted.</li> </ul>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ul style="list-style-type: none"> <li>A. Cognitive goals                             <ul style="list-style-type: none"> <li>1. Understand the syllabus and concept of AutoCAD and <b>Engineering Drawing</b>.</li> <li>2. Understand the rules and regulations for this type of course.</li> <li>3. student understands the principles of engineering drawing and how to benefit from it in daily life.</li> <li>4. Understand basics of engineering drawing using the computer.</li> <li>5. Read different technical books and lecture notes.</li> </ul> </li> <li>B. The skills goals special to the course.                             <ul style="list-style-type: none"> <li>1. Students should be able to Draw and organize objects, use advanced editing functions, and draw accurately using the User Coordinate System.</li> <li>2. Students should be able to Create and manage your layouts, outputs, printings, and use annotation techniques like markup tools, hatch and fill, multileader, and dimensioning.</li> <li>3. Students should be able Perform drawing management techniques, use blocks for efficiency, and control external reference and underlay files.</li> </ul> </li> </ul>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<ul style="list-style-type: none"> <li>1. Basic Concepts of engineering drawing and AutoCAD Start AutoCAD and start a drawing, Understand components of the initial AutoCAD screen, Invoke AutoCAD commands from the keyboard, menu, toolbar, shortcut menu, Tool Palettes, and Ribbon, Understand the functioning of dialog boxes in AutoCAD, Start a new drawing using the QNEW command and the Startup dialog box, Save the work using various file-saving commands, Close a drawing, Open an existing drawing, Understand the concept of Multiple Document Environment, Exit AutoCAD, Use various options of AutoCAD's help, Understand the use of Active Assistance, Learning Assistance, and other interactive help topics, Introduction to engineering drawing, learn about engineering drawing , how to use it, drawing board layout ( frame and table) and</li> </ul>

	<p>its uses as an engineering language in industry, dimensioning, symbols and terms used in drawing, proper use of drawing instruments, use of international metric system, names and dimensions of lines used in drawings. [18 hrs.].</p> <p>2. Drawing lines using the LINE command and its options, Understanding various coordinate systems used in AutoCAD, using the ERASE command to clear the drawing area, Understanding the two basic object selection methods: Window and Crossing, drawing circles using the options of the circle command, using the ZOOM and PAN display commands, set up units using the UNITS command, set up and determine limits for a given drawing, plot drawings using the basic plotting options, using the Options dialog box to specify settings, lettering and Numerals Arabic and Latin lettering and numerals, Engineering operations, Types of lines in engineering drawing and drawing of Geometrical Patterns Drawing various types of geometrical patterns (Tracery), various methods of drawing ellipses, various types of tangents. [18 hrs.]</p> <p>3. Drawing arcs using various options, draw rectangles, ellipses, and elliptical arcs, drawing polygons such as hexagons and pentagons, drawing polylines and donuts, drawing points and change point style and point size, drawing infinite lines and create simple text, moving the objects using the MOVE command and copy existing objects using the COPY command, Copy objects with base point using the COPYBASE command, using the OFFSET and BREAK commands, Fillet and chamfer objects using the FILLET and CHAMFER commands, cut and extend objects using the TRIM and EXTEND commands, stretch objects using the STRETCH command, create polar and rectangular arrays using the ARRAY command, using the ROTATE and MIRROR commands, scale objects using the SCALE command, lengthen objects such as line, arc, and spline using the LENGTHEN command, using the MEASURE and DIVIDE commands, Drawing of Sectional Views and Tangents Drawing according to scale, drawing various views of an actual object projections of all views necessary for a given object, projection of views using first and third angle projection methods, isometric Projections Freehand sketching, proper and reasonable proportions. [18 hrs.]</p>
--	--

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<ol style="list-style-type: none"> <li>1. Learning Technologies on Campus using Whiteboard and TV monitor.</li> <li>2. Hand out lecture notes.</li> <li>3. Video lectures on YouTube and google classroom.</li> </ol>

Student Workload (SWL) الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	90+6	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	6
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	54	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.6
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes				
	Assignments				
	<b>Lab.</b>	1	20% (20)	Continuous	
	Report	1	20% (20)	Continuous	
Summative assessment	Midterm Exam	4 hr	20% (20)	8	LO # 1-7
	Final Exam	3hr	40% (40)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	Mid-term Exam + ????

Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	Preparatory week before the final Exam

<b>Delivery Plan (Weekly Lab. Syllabus)</b>		
المنهاج الاسبوعي للمختبر		
	Material Covered	
	AutoCAD	Engineering Drawing
<b>Week 1</b>	introduction to AutoCAD	Basic Concepts Introduction to engineering drawing, learn about engineering drawing , how to use it, drawing board layout ( frame and table) and its uses as an engineering language in industry, dimensioning, symbols and terms used in drawing, proper use of drawing instruments, use of international metric system, names and dimensions of lines used in drawings.
<b>Week 2</b>	drawing lines and circles	
<b>Week 3</b>	drawing arcs and rectangles	Lettering and Numerals Arabic and Latin lettering and numerals.
<b>Week 4</b>	drawing ellipses and regular polygons	Engineering operations, Types of lines in engineering drawing and drawing of Geometrical Patterns Drawing various types of geometrical patterns (Tracery), various methods of drawing ellipses, various types of tangents.
<b>Week 5</b>	drawing infinite lines, point and straight lines	
<b>Week 6</b>	drawing polylines and donuts	
<b>Week 7</b>	working with object snaps	
<b>Week 8</b>	Mid-term Exam	Mid-term Exam
<b>Week 9</b>	moving, copying, offsetting and rotating sketched objects	Drawing of Sectional Views and Tangents Drawing according to scale, drawing various views of an actual object projections of all views necessary for a given object, projection of views using first and third angle projection methods.
<b>Week 10</b>	filleting, chamfering, trimming and extending the sketched objects	
<b>Week 11</b>	stretching, mirroring, breaking and joining the sketched objects	
<b>Week 12</b>	arraying, measuring and dividing the sketched objects	
<b>Week 13</b>	dimensioning in AutoCAD	Isometric Projections Freehand sketching, proper

<b>Week 14</b>	Creating Text and Hatching Drawings	and reasonable proportions.
<b>Week 15</b>	Drawing electrical circuit in AutoCAD	
<b>Week 16</b>	Preparatory week before the final Exam	

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	Text	Available in the Library?
<b>Required Texts</b>	1. الرسم الهندسي، تأليف (عبد الرسول الخفاف) الطبعة الثانية 1993، 2. R.P Hoelscher and C.H Springer "Engineering Drawing and Geometry ".2nd edition 3. Sham Tickoo - AutoCAD 2010_ a problem-solving approach & Alf Yarwood Introduction to AutoCAD 2011. 4. Munir Hamad - AutoCAD 2018 Beginning and Intermediate	No
<b>Recommended Texts</b>		No
<b>Websites</b>		

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Engineering Laboratories I		Module Delivery
Module Type	Related Learning Activity		<input type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103016		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	
Administering Department	Electrical Engineering	College	College of Engineering
Module Leader	Dr. Saad Saffah Hreshee	e-mail	<a href="mailto:eng.saad.saffah@uobabylon.edu.iq">eng.saad.saffah@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Intisar Hamid	e-mail	<a href="mailto:eng.intisar.hamid@uobabylon.edu.iq">eng.intisar.hamid@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Hilal Abdul-Hussain Abbood	e-mail	<a href="mailto:eng.hilala.abbood@uobabylon.edu.iq">eng.hilala.abbood@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None		Semester
Co-requisites module	Basics of Electrical Engineering I (UOBAB0103012)		Semester 1

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p>The module "Electrical Engineering Laboratories I" aims to provide students with a fundamental understanding of the principles, concepts, and applications of electrical engineering. The specific aims of this module are the following objectives are targeted:</p> <ol style="list-style-type: none"><li>8. Basic Electrical Measurements: Students will be introduced to different electrical measurement techniques and instruments, including voltmeters, ammeters, oscilloscopes, and multimeters. They will learn how to make accurate measurements of voltage, current, and resistance in electrical circuits.</li><li>9. Basic Electrical Measurements: Students will be introduced to different electrical measurement techniques and instruments, including voltmeters, ammeters, oscilloscopes, and multimeters. They will learn how to make accurate measurements of voltage, current, and resistance in electrical circuits.</li><li>10. Problem-Solving Skills: Through practical examples, assignments, and laboratory work, the module aims to develop students' problem-solving skills in electrical engineering. They will learn how to apply theoretical concepts to solve real-world electrical engineering problems.</li></ol> <p>Overall, the module "Electrical Engineering Laboratories I" aims to provide students with a solid foundation in electrical engineering applications, preparing them for more advanced topics and practical applications in the field.</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>Upon completion of the module "Basics of Electrical Engineering," students are expected to achieve the following learning outcomes:</p> <ol style="list-style-type: none"><li>8. Understanding of Electrical Principles: Students should demonstrate a solid understanding of the fundamental principles and concepts of electrical engineering, including Ohm's Law, Kirchhoff's Laws, network theorems, and basic circuit analysis techniques by applying it practically.</li><li>9. Ability to Make Electrical Measurements: Students should be able to use electrical measurement instruments, such as voltmeters, ammeters, and oscilloscopes, to make accurate measurements of voltage, current, and resistance in electrical circuits. They should understand measurement techniques and be capable of interpreting measurement results.</li><li>10. Awareness of Safety and Standards: Students should be aware of electrical safety practices and understand the importance of following safety guidelines in electrical engineering.</li><li>11. Problem-Solving Skills: Students should demonstrate the ability to apply their knowledge of electrical engineering principles to solve practical problems. They should be able to identify and analyze electrical engineering problems, develop appropriate solution strategies, and effectively communicate their solutions.</li><li>12. Teamwork and Communication: Students should have opportunities to work in teams and develop effective communication skills. They should be able to collaborate with others, share knowledge, and present their ideas and solutions clearly and concisely.</li></ol> <p>By achieving these learning outcomes, students will have a strong foundation in the basics of electrical engineering, enabling them to pursue further studies in the field or apply their knowledge in various engineering disciplines and industries.</p>

<b>Indicative Contents</b> المحتويات الإرشادية	<p><b>Part A - DC Circuit Theory</b></p> <p>Basic concepts and units, basic DC circuits Laws, [7 hrs].</p> <p>Current and voltage definitions, Current and voltage sources, [7 hrs].</p> <p>dependent and non-dependent Current and voltage sources [7 hrs].</p> <p>Passive circuit elements, Combining resistive elements in series and parallel, [7 hrs].</p> <p>Ohm's law, [5 hrs].</p> <p><b>Part B – DC Circuit Analysis</b></p> <p>Kirchhoff's laws, [7 hrs].</p> <p>Mesh and Nodal analysis, [7 hrs].</p> <p>Superposition theorem, Source transformation, [7 hrs].</p> <p>Thevenin and Norton analysis Methods, [7 hrs].</p> <p>Maximum power transfer, [7 hrs].</p> <p>Millman's theorem, reciprocity theorem, [7 hrs].</p>
---	--

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<p>The module "Basics of Electrical Engineering" can employ various learning and teaching strategies to enhance students' understanding and engagement. Here are some common strategies used in this module:</p> <ol style="list-style-type: none"> <li>11. Practical Examples and Problem-Solving: Instructors can use practical examples and problem-solving exercises to help students apply theoretical concepts to real-world situations. By presenting and solving problems related to electrical circuits, students can develop critical thinking and analytical skills.</li> <li>12. Laboratory Work: Laboratory sessions provide hands-on experience and reinforce theoretical concepts. Students can perform experiments and measurements using electrical components and instruments. This allows them to apply theoretical knowledge, gain practical skills, and understand the behavior of electrical systems in a controlled environment.</li> <li>13. Group Discussions and Collaborative Learning: Group discussions and collaborative learning activities encourage students to engage actively in the learning process. Students can work together to solve problems, analyze case studies, or discuss challenging concepts. This promotes peer learning, critical thinking, and communication skills.</li> <li>14. Tutorials and Workshops: Tutorials and workshops offer opportunities for students to seek additional help and clarification on specific topics. Instructors or teaching assistants can provide individual or small-group assistance, address students' questions, and guide them through problem-solving exercises.</li> <li>15. Multimedia and Interactive Tools: Multimedia resources, such as videos, animations,</li> </ol>

	<p>and interactive simulations, can be used to enhance understanding and engage students. These resources can provide visual representations of abstract concepts and allow students to interact with the content, fostering active learning.</p> <p>16. Guest Lectures and Industry Visits: Inviting guest speakers from industry or conducting visits to electrical engineering-related facilities can provide students with real-world perspectives and insights. Professionals can share their experiences, current trends, and practical applications, giving students a broader understanding of the field.</p> <p>17. Assessments and Feedback: Regular assessments, such as quizzes, assignments, and exams, can be used to evaluate students' understanding and progress. Constructive feedback helps students identify areas for improvement and reinforces their learning. Feedback can be provided through written comments, discussions, or one-on-one consultations.</p> <p>18. Online Resources and Platforms: Online resources, such as e-learning platforms, online forums, and educational websites, can support student learning outside the classroom. These resources can provide additional readings, practice exercises, and interactive modules to supplement classroom teaching.</p> <p>19. Self-directed Learning: Encouraging students to take ownership of their learning through self-directed study is important. Students can explore additional resources, conduct independent research, and deepen their understanding of specific topics. This cultivates lifelong learning skills and promotes curiosity in the field of electrical engineering.</p> <p>By combining these learning and teaching strategies, the module "Basics of Electrical Engineering" aims to create an interactive and engaging learning environment that caters to different learning styles, promotes critical thinking, and prepares students for further studies and professional practice in electrical engineering.</p>
--	--

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	47	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	3
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	28	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	1.867
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation					
تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	20% (10)	3, 6, 9, 12, 15	LO # 1,2,4,5,7,8,10,11, 13 and 14
	Report	15	20% (10)	Continuous	
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Understanding the operation of measurement devices
Week 2	Lab 2: Electrical Circuit Measurements
Week 3	Lab 3: Resistor Code
Week 4	Lab 4: Ohm's Law
Week 5	Lab 5: Kirchhoff's Laws
Week 6	Lab 6: Nodal Analysis
Week 7	Lab 7: Mesh Analysis
Week 8	<b>Mid-term Exam</b>
Week 9	Lab 8: Superposition Theorem
Week 10	Lab 9: Thevenin's Theorem
Week 11	Lab 10: Max. Power Transfer
Week 12	Lab 11: Millman's Theorem
Week 13	Lab 12: Substitution Theorem
Week 14	Lab 13: Reciprocity Theorem
Week 15	Lab 14: Compensation Theorem
Week 16	<b>Preparatory week before the final Exam</b>

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Fundamentals of Electric Circuits, 4 <sup>th</sup> edition, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Recommended Texts	Introduction to Circuit Analysis, 10 <sup>th</sup> edition, Boylestad .	Yes
Websites		

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	English Language I		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input checked="" type="checkbox"/> Seminar
Module Code	UOBAB 0103016		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	1
Administering Department	Electrical engineering	College	College of Engineering
Module Leader	Dr. Sarmad Khaleel Ibrahim	e-mail	<a href="mailto:Sarmad.ibrahim@uobabylon.edu.iq">Sarmad.ibrahim@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Hanaa Mohsin Ali	e-mail	<a href="mailto:Hanaa.ali@uobabylon.edu.iq">Hanaa.ali@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Hassen Jassim	e-mail	<a href="mailto:hassan.jasim@uobabylon.edu.iq">hassan.jasim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p>The main objectives of the course are:</p> <ol style="list-style-type: none"><li><b>1. Pronunciation and Phonetics:</b><ul style="list-style-type: none"><li>Learn the pronunciation of English sounds, including vowels, and consonants.</li></ul></li><li><b>2. Reading Comprehension:</b><ul style="list-style-type: none"><li>Improve reading skills to identify the main idea of a text.</li><li>Enhance scanning techniques to locate specific information in a text.</li><li>Develop inference skills to understand implied meanings and draw conclusions.</li></ul></li><li><b>3. Writing Skills:</b><ul style="list-style-type: none"><li>Develop writing skills for different purposes and audiences, including essays, reports, and letters.</li><li>Practice organizing ideas logically and coherently in written form.</li><li>Enhance grammar and vocabulary usage for effective written communication.</li></ul></li><li><b>4. Listening Comprehension:</b><ul style="list-style-type: none"><li>Enhance listening skills to understand spoken English in various contexts.</li><li>Practice listening for specific information and understanding implicit messages.</li></ul></li><li><b>5. Speaking Skills:</b><ul style="list-style-type: none"><li>Develop oral communication skills for general, social, and professional purposes.</li><li>Practice effective verbal communication strategies, such as turn-taking and maintaining a conversation.</li><li>Enhance fluency, accuracy, and pronunciation in spoken English.</li></ul></li><li><b>6. Vocabulary and Grammar:</b><ul style="list-style-type: none"><li>Expand vocabulary range through the study of word families, collocations, and idiomatic expressions.</li><li>Enhance understanding and application of English grammar rules and structures.</li><li>Practice using appropriate vocabulary and grammar in speaking and writing tasks.</li></ul></li></ol>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>A student who has successfully completed this course should be able to:</p> <ol style="list-style-type: none"><li><b>1. Grammar and Language Use:</b><ul style="list-style-type: none"><li>Demonstrate proficiency in producing and reviewing grammatical forms of English.</li><li>Apply the learned grammar rules and structures appropriately in various communicative contexts.</li><li>Use grammar accurately in class activities, homework assignments, reading texts, and writing tasks.</li></ul></li><li><b>2. Reading Comprehension:</b><ul style="list-style-type: none"><li>Read and comprehend university-level texts with improved understanding.</li><li>Expand their vocabulary through reading and engage with complex</li></ul></li></ol>

	<p>academic texts.</p> <ul style="list-style-type: none"> <li>• Apply reading strategies to extract information, infer meaning, and analyze content.</li> </ul> <p>3. Speaking Skills:</p> <ul style="list-style-type: none"> <li>• Demonstrate improved speaking ability in terms of fluency and comprehensibility.</li> <li>• Engage in effective communication using appropriate vocabulary, grammar, and pronunciation.</li> <li>• Express ideas, opinions, and arguments clearly and confidently in both formal and informal settings.</li> </ul> <p>4. Writing Skills:</p> <ul style="list-style-type: none"> <li>• Write a simple paragraph that includes a clear topic sentence, supporting details, and a concluding sentence.</li> <li>• Organize ideas coherently and logically in written assignments.</li> <li>• Apply appropriate vocabulary, grammar, and sentence structures to express ideas effectively.</li> </ul> <p>5. Oral Presentations:</p> <ul style="list-style-type: none"> <li>• Deliver an oral presentation in class using academic strategies.</li> <li>• Organize and structure the presentation with a clear introduction, body, and conclusion.</li> <li>• Employ appropriate verbal and non-verbal communication techniques to engage the audience.</li> </ul>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Indicative content includes the following:</p> <ol style="list-style-type: none"> <li>1- Grammar Skills: Parts of speech and Text Book.</li> <li>2- Reading Comprehension Skills: Articles and Text Book.</li> <li>3- Writing Skills: Brainstorming and Text Book.</li> <li>4- Listening Skills: Videos and Text Book.</li> <li>5- Individual and group oral presentations.</li> </ol>

<p style="text-align: center;"><b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم</p>	
<p><b>Strategies</b></p>	<ol style="list-style-type: none"> <li>1. Communicative Approach: Emphasize communication and interaction in English through activities such as role-plays, discussions, debates, and group work.</li> <li>2. Task-Based Learning: Design activities and tasks that simulate real-life situations, allowing students to apply language skills to achieve specific goals.</li> <li>3. Authentic Materials: Incorporate authentic materials such as newspaper articles, podcasts, videos, and excerpts from books to expose students to real-world language use.</li> <li>4. Language Practice: Provide ample opportunities for students to practice speaking and writing in English. Encourage pair work, group discussions, and presentations to promote fluency and build confidence.</li> </ol>

	<ol style="list-style-type: none"> <li>5. <b>Error Correction and Feedback:</b> Provide constructive feedback on students' language use, both oral and written, to help them improve their accuracy and fluency.</li> <li>6. <b>Vocabulary and Grammar Development:</b> Integrate explicit vocabulary and grammar instruction into lessons. Use techniques like contextualization, word families, and collocations to help students grasp new vocabulary. Break down complex grammar structures and provide ample practice opportunities for reinforcement.</li> <li>7. <b>Technology Integration:</b> Utilize technology tools and resources to enhance language learning. Incorporate online language-learning platforms, multimedia resources, language learning apps, and interactive websites to engage students and provide additional practice opportunities.</li> <li>8. <b>Cultural Awareness:</b> Integrate cultural elements into the curriculum to enhance students' understanding of the target language's cultural context. This can include discussing cultural practices, traditions, and perspectives, and exploring literature, films, and music from English-speaking countries.</li> <li>9. <b>Assessment and Reflection:</b> Implement a variety of assessment methods, including quizzes, exams, presentations, projects, and portfolios, to assess students' language proficiency.</li> </ol>
--	--

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	2.466
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

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

assessment	Final Exam	3hr	50% (50)	16 or 17	All
Total assessment			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	Material Covered
<b>Week 1</b>	Introductions and Review of Syllabus.
<b>Week 2</b>	Grammar Skills: Parts of speech: Noun, Pronoun, Verb. Unit 1,2 and 3 in Text Book
<b>Week 3</b>	Grammar Skills: Parts of speech: Adjective, Preposition, Conjunction. Unit 4 and 5 in Text Book
<b>Week 4</b>	Reading Comprehension Skills: Articles. Unit 6,7 and 8 in Text Book
<b>Week 5</b>	Grammar Skills: Present and Past, Simple and Progressive (Continuous) and Units 9, 10 and 11 in Text Book.
<b>Week 6</b>	Writing Skills: Brainstorming, Freewriting, Editing and Revising and Unit 12, 13 and 14 in Text Book.
<b>Week 7</b>	Individual and group oral presentations
<b>Week 8</b>	<b>Mid-term Exam</b>
<b>Week 9</b>	Grammar Skills: Noun, Pronoun, Verb. Parts of speech: Adjective, Preposition, Conjunction Reading Comprehension, Unit 1 and 2 in Text Book
<b>Week 10</b>	Grammar Skills: Where and when?, Articles, Listening skills. Unit 3. Present and Past, Simple, and Progressive (Continuous). Verb patterns, future forms. Unit 4 and 5.
<b>Week 11</b>	Reading Comprehension and Grammar skills: What... like?, Comparatives and superlatives. Synonyms and antonyms, Directions, Present Perfect and past, for, since, Adverbs, Short answers—units 6 and 7.
<b>Week 12</b>	Grammar Skills: Have(got) to, should/must Reading Comprehension and Time Clause, Going out Reading Comprehension, grammar skill, future, first condition. Units 8 and 9.
<b>Week 13</b>	Grammar Skills: verb forms2. Used to, -ed/ - ing adjectives, second conditions, PASSIVE, reading comprehension, Work-life balance Individual and group oral presentations. Reading activities are done individually, in pairs, and in groups. Units 10, 11, and 12.
<b>Week 14</b>	Writing Skills: Brainstorming, Freewriting, Editing and Revising. Units 13 and 14 in Text Book.
<b>Week 15</b>	Individual and group oral presentations

<b>Week 16</b>	<b>The preparatory week before the Final Exam</b>
----------------	---

<b>Delivery Plan (Weekly Lab. Syllabus)</b> المنهاج الاسبوعي للمختبر	
	<b>Material Covered</b>
<b>Week 1</b>	
<b>Week 2</b>	
<b>Week 3</b>	
<b>Week 4</b>	
<b>Week 5</b>	
<b>Week 6</b>	
<b>Week 7</b>	
<b>Week 8</b>	<b>Mid-term Exam</b>
<b>Week 9</b>	
<b>Week 10</b>	
<b>Week 11</b>	
<b>Week 12</b>	
<b>Week 13</b>	
<b>Week 14</b>	
<b>Week 15</b>	
<b>Week 16</b>	

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	<b>Text</b>	<b>Available in the Library?</b>
<b>Required Texts</b>	1- New Headway Plus (Beginner Student's Book) by John	yes

	and Liz Soars 2- New Headway Plus (Pre-Intermediate Student's Book English course ) by John and Liz Soars	
<b>Recommended Texts</b>	1- Fundamental of English Grammar by Betty S. Azar and Stacy A. Hagen 2- Fundamental of English Grammar, third edition by Betty Schramper Azar.	No
<b>Websites</b>	<a href="https://www.cambridgeenglish.org/learning-english">https://www.cambridgeenglish.org/learning-english</a> <a href="https://writingmentor.com">https://writingmentor.com</a> <a href="https://ed.ted.com">https://ed.ted.com</a>	

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Mathematics II</b>		Module Delivery
Module Type	Support		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	<b>UOBAB 0103021</b>		
ECTS Credits	5		
SWL (hr/sem)	<b>125</b>		
Module Level	1	Semester of Delivery	
Administering Department	ELEC	College	ENG
Module Leader	Ahmed Qasim Jumaah ALdhahab	e-mail	<a href="mailto:Ahmedalthahab82@uobabylon.edu.iq">Ahmedalthahab82@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Ahmed Qasim Jumaah ALdhahab	e-mail	<a href="mailto:Ahmedalthahab82@uobabylon.edu.iq">Ahmedalthahab82@uobabylon.edu.iq</a>
Peer Reviewer Name	Sameer Abdul Kadhim Alrufaiaat	e-mail	<a href="mailto:eng.samir.abdul@uobabylon.edu.iq">eng.samir.abdul@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	<b>Mathematics I (UOBAB 0103011)</b>	Semester	1
Co-requisites module	None	Semester	

## Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<p>8. Students are expected to learn how to do the following: Integration by Parts, Integrals Involving Trig Functions, Trig Substitutions, Integration using Partial Fractions, Integrals Involving Roots, Integrals Involving Quadratics, Integration Strategy, Improper Integrals, Comparison Test for Improper Integrals, and Approximating Definite Integrals.</p> <p>9. Knowing different types of numbers are very important. One of the most important one is the complex number.</p> <p>10. Solving Equations and Inequalities - Linear Equations, Quadratic Equations, Completing the Square, Quadratic Formula, Applications of Linear and Quadratic Equations, etc.</p> <p>11. Students are expected to learn how to deal with matrices in terms of finding the equality of Matrices, arithmetic operations: addition, subtraction, Multiplication (scalar and multi-matrices), Cofactor, adjoint of a square matrix, Transpose of Matrices, special matrices, computing Inverse square matrices.</p> <p>12. Hyperbolic functions: Derivatives and Integration. Application for Hyperbolic functions in Sag Analysis, Evaluating the values of Inverse hyperbolic functions, Definition, identities, domain, range, Graphs.</p> <p>13. Students are expected to learn how to deal with the vectors in terms of vector notation, scalar and vector quantities, vectors in space, scalar product of two vectors, cross product of two vectors, angle between two vectors.</p> <p>14. Finally, students are expected to learn how to deal with the parametric Equations and Polar Coordinates - Parametric Equations &amp; Curves, Calculus with Parametric Equations (Tangents, Areas, Arc Length and Surface Area), Polar Coordinates, Calculus with Polar Coordinates (Tangents, Areas, Arc Length and Surface Area).</p>
<p><b>Module Learning Outcomes</b></p>	<p>14. Read different technical books and lecture notes.</p> <p>15. Students should learn the principle of Mathematics II (Algebra and Calculus II)</p> <p>16. Understand the rules and regulations for this type of course.</p> <p>17. Solving and simplifying Equations and Functions.</p> <p>18. Understand the problem and turn it into real mathematical problem.</p> <p>19. Students should be able to solve practical problems.</p> <p>20. Students should be able to find the integral of the function by using different integration techniques.</p>

<p>مخرجات التعلم للمادة الدراسية</p>	<p>21. Students should be able to classify numbers and deal with real and complex numbers and apply all the arithmetic operations to all types of numbers.</p> <p>22. Student should be able to solve equations in different order.</p> <p>23. Students are expected to learn how to deal with matrices in terms of finding the equality of Matrices, arithmetic operations: addition, subtraction, Multiplication (scalar and multi-matrices), Cofactor, adjoint of a square matrix, Transpose of Matrices, special matrices, computing Inverse square matrices.</p> <p>24. Students are expected to deal with the hyperbolic functions. In this part, give the relationships between hyperbolic functions and some of the basic facts involving hyperbolic functions. The derivatives of each of the six hyperbolic functions are illustrated in this part.</p> <p>25. Students are expected to learn how to deal with the vectors in terms of vector notation, scalar and vector quantities, vectors in space, scalar product of two vectors, cross product of two vectors, angle between two vectors</p> <p>26. Students are expected to learn how to deal with the parametric Equations and Polar Coordinates - Parametric Equations &amp; Curves, Calculus with Parametric Equations (Tangents, Areas, Arc Length and Surface Area), Polar Coordinates, Calculus with Polar Coordinates (Tangents, Areas, Arc Length and Surface Area).</p> <p>27. Students should be able to search for topics online and make reports.</p>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><b>Chapter 1: Methods of Integration:</b> Integration by Part, finite integration by part, Trigonometric Substitution, Partial fraction factorization, Integration of rational Partial fractions, completing a square method, improper integrals, applications of proper and improper integrals in electrical circuits, applications of integrals on area calculation using integration methods. [16 hrs]</p> <p><b>Chapter 2: Complex Numbers:</b> Definition, properties, and arithmetic operations, evaluation in polar form (modules and argument), applications of complex numbers in electrical circuits: calculation of complex current, voltages and power. determinants, determinants notation, determinants of second and third order, properties of determinants. [8 hrs]</p> <p><b>Chapter 3: Solving Equations:</b> Definition Simultaneous equations in three unknowns using determinants, consistency test of a set of equations. [6 hrs]</p> <p><b>Chapter 4: Matrices:</b> notations, equality of Matrices, arithmetic operations: addition, subtraction, Multiplication (scalar and multi-matrices), Properties of matrices,</p>

	<p>Cofactor, adjoint of a square matrix, Transpose of Matrices, special matrices, computing Inverse square matrices. [8 hrs]</p> <p><b>Chapter 5: Hyperbolic functions:</b> Derivatives and Integration. Application for Hyperbolic functions in Sag Analysis. <b>Inverse Hyperbolic Function:</b> Evaluating the values of Inverse hyperbolic functions, Definition, identities, domain, range, Graphs. <b>Inverse Hyperbolic Function:</b> Derivatives, finite and infinite Integration, Application of Inverse hyperbolic functions in Electrical prospective. [8 hrs]</p> <p><b>Chapter 6: Vectors:</b> vector notation, scalar and vector quantities, vectors in space, scalar product of two vectors, cross product of two vectors, angle between two vectors. [8 hrs]</p> <p><b>Chapter 7: Polar Coordinates:</b> graphing polar coordinates, test of symmetry for polar graphs. Cardiographs, flower graphs with various number vertices, Equations relating polar and Cartesian coordinates, Calculation of length for a polar curve. [8 hrs]</p>
--	--

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<p>In this module "Mathematics I", various learning and teaching strategies will be implemented to enhance students' understanding and engagement. Some common strategies are listed below:</p> <ul style="list-style-type: none"> <li>➤ <b>Visualization:</b> Visualization is a useful technique to process or summarize the knowledge that has been instructed in class. When students receive the information through visual means, they are more able to retain both the previous learning and new information for a longer time. Visualization is also a helpful learning process for lower-attaining learners to receive the information in a simpler, clear and systematic way. Thus, an effective teacher would use visual tools such as flow charts, graphic organizers, concept maps, etc.</li> <li>➤ <b>Teamwork:</b> Dividing the class into groups to complete a task is a teaching strategy. It is recommended to encourage students of mixed abilities to work with one another. By doing so, those who have more knowledge of the subject can share their knowledge and help their peers understand the topic better.</li> <li>➤ <b>Inquiry-Based Teaching:</b> Encouraging students to ask a lot of questions is an effective teaching strategy that does not only motivate students to think more</li> </ul>

	<p>practically but also helps them to become independent learners. <b>Inquiry-Based learning</b> motivates students to ask questions and work with one another to solve any problem.</p> <ul style="list-style-type: none"> <li>➤ <b>Implementing Technology in the Classroom:</b> Using technology in the classroom is a valuable tool that prepares students to learn 21st-century skills. Use of PowerPoint presentations, videos, virtual classrooms, robots and augmented reality (AR) does not only add liveliness to the classroom but may also lead to a more inclusive and effective learning environment that improves inquisitiveness and collaboration between the students and allow educators to compile data on student performance.</li> <li>➤ <b>Assessments and Feedback:</b> Integrating formative assessment strategies in the classroom. Regular assessments, such as quizzes, assignments, and exams, can be used to evaluate students' understanding and progress. Constructive feedback helps students identify areas for improvement and reinforces their learning.</li> <li>➤ <b>Critical Thinking:</b> Advancing critical thinking skills, using graphic organizers to help students organize their thinking, is another way of learning strategies. Provide playful learning experiences that promote divergent thinking.</li> <li>➤ <b>Personalized learning or Self-Learning:</b> Since students are not exactly alike, <b>personalized learning</b> builds a learning experience that addresses the unique abilities of each student.</li> <li>➤ <b>Link mathematics to real-life problems:</b> A common thought that many math's students have is along the lines of "when is this theorem ever used in real life situations?". Whenever possible, use a relevant topical example where the theory taught was applied.</li> </ul> <p>Implementing these learning and teaching strategies in the module of "Mathematics" will help students to understand the module very well and faster. Hence, employing these techniques in module of "Mathematics" will led to accomplish the aim of the module faster.</p>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.13
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	125		

### Module Evaluation

تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	25% (25)	3, 5, 8, 12	LO # 7, 8, 10, and 12
	Assignments	2	5% (5)	13, 14	LO # 7 and 8, 10 and 11
	Projects / Lab.	NA	NA	NA	
	Report	1	10% (10)	15	LO # 7, 8, 9, 10, 11, 12, and 13
Summative assessment	Midterm Exam	2 hr	10% (10)	8 or 9	LO # 7, 8, 9, and 10
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	<b>Brief review:</b> Basic trigonometric function integration, Application of Integration.
Week 2	Methods of Integration: Integration by Part, finite integration by part, Trigonometric Substitution.
Week 3	<b>Methods of Integrations:</b> Partial fraction factorization, Integration of rational Partial fractions, completing a square method.
Week 4	<b>Methods of Integrations:</b> Improper integrals, Applications of proper and improper integrals in Electrical circuits, applications of integrals on area calculation using integration methods.
Week 5	<b>Complex Numbers:</b> Definition, Properties, and Arithmetic Operations.
Week 6	<b>Complex numbers:</b> Evaluation in polar form (modules and argument), applications of Complex numbers in Electrical circuits: calculation of Complex current, voltages and power. Determinants, determinants notation, determinants of second and third order, properties of determinants.
Week 7	<b>Solving Equations:</b> Simultaneous equations in three unknowns using determinants, consistency test of a set of equations.
Week 8	<b>Matrices:</b> notations, equality of Matrices, arithmetic operations: addition, subtraction, Multiplication (scalar and multi-matrices).

<b>Week 9</b>	<b>Mid Term Exam.</b> Properties of matrices, Cofactor, adjoint of a square matrix, Transpose of Matrices, special matrices, computing Inverse square matrices.
<b>Week 10</b>	<b>Hyperbolic functions:</b> Derivatives and Integration. Application for Hyperbolic functions in Sag Analysis.
<b>Week 11</b>	<b>Inverse Hyperbolic Function:</b> Evaluating the values of Inverse hyperbolic functions, Definition, identities, domain, range, Graphs.
<b>Week 12</b>	<b>Inverse Hyperbolic Function:</b> Derivatives, finite and infinite Integration, Application of Inverse hyperbolic functions in Electrical prospective.
<b>Week 13</b>	<b>Vectors:</b> vector notation, scalar and vector quantities, vectors in space, scalar product of two vectors, cross product of two vectors, angle between two vectors.
<b>Week 14</b>	<b>Polar Coordinates:</b> graphing polar coordinates, test of symmetry for polar graphs.
<b>Week 15</b>	<b>Polar Coordinates:</b> Cardiographs, flower graphs with various number vertices, Equations relating polar and Cartesian coordinates, Calculation of length for a polar curve.
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	3. Hass, Joel, Christopher Heil, Maurice D. Weir, and George B. Thomas, <i>Thomas' calculus</i> , Pearson, thirteen Edition. 4. Courant, Richard, and Fritz John, <i>Introduction to calculus and analysis I</i> , Springer Science & Business Media, 2012.	Yes
<b>Recommended Texts</b>	3. Stewart, James, Daniel K. Clegg, and Saleem Watson, <i>Calculus: early transcendentals</i> , Cengage Learning, 2020. 4. Jerrold Marsden and Alan Weinstein, <i>Calculus I</i> , Second Edition, Springer-Verlag New York Berlin Heidelberg	Yes
<b>Websites</b>	<a href="https://tutorial.math.lamar.edu/">https://tutorial.math.lamar.edu/</a>	

## Grading Scheme

### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Basics of Electrical Engineering II		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103022		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	2
Administering Department	Electrical Engineering	College	College of Engineering
Module Leader	Dr. Saad Saffah Hreshee	e-mail	Eng.saad.saffah@uobabylon.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Saad Saffah Hreshee	e-mail	Eng.saad.saffah@uobabylon.edu.iq
Peer Reviewer Name	Dr. Kasim Karamm Abdalla	e-mail	<a href="mailto:eng.kassim.kerem@uobabylon.edu.iq">eng.kassim.kerem@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Basics of Electrical Engineering I (UOBAB 0103012)	Semester	1
Co-requisites module	None	Semester	

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p>The module "Basics of Electrical Engineering II" aims to provide students with a comprehensive understanding of the principles, concepts, and applications specific to alternating current (AC) electrical systems. The specific aims of this module are the following objectives:</p> <ol style="list-style-type: none"><li>1. Introduction to AC Electrical Systems: The module aims to introduce students to AC electrical systems. Students will learn about the advantages of AC over DC, the basics of sinusoidal waveforms, and the concept of phasors.</li><li>2. AC Circuit Analysis: Students will develop skills in analyzing AC circuits, including passive circuit elements such as resistors, capacitors, and inductors. They will learn about impedance, reactance, and complex numbers in the context of AC circuits. The module aims to equip students with the ability to solve AC circuit problems using phasor analysis and complex algebra.</li><li>3. AC Power Analysis: The module aims to provide students with an understanding of power in AC circuits. Students will learn about active power, reactive power, and apparent power, as well as power factor and power factor correction techniques. The module will cover the analysis of power in single-phase and three-phase AC systems.</li><li>4. Laboratory Skills: The module includes laboratory sessions where students can apply theoretical concepts to practical situations. Students will gain hands-on experience in AC circuit analysis, power measurement, and the use of relevant laboratory instruments and equipment.</li></ol> <p>Overall, the module "Basics of Electrical Engineering II" aims to provide students with a strong foundation in the principles and applications of AC electrical systems. It equips them with the necessary knowledge and skills to analyze AC circuits, understand power generation. This knowledge will be valuable in various industries such as power systems, renewable energy, electrical equipment manufacturing, and automation.</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>Upon completion of the module "Basics of Electrical Engineering II" students are expected to achieve the following learning outcomes:</p> <ol style="list-style-type: none"><li>1. Understanding of AC Electrical Principles: Students should demonstrate a solid understanding of the principles and concepts specific to AC electrical systems, including sinusoidal waveforms, phasors, impedance, and reactance.</li><li>2. Competence in AC Circuit Analysis: Students should be able to analyze and solve AC circuits using phasor analysis and complex algebra. They should be able to calculate voltage, current, power, and other parameters in AC circuits accurately.</li><li>3. Knowledge of AC Power Analysis: Students should have a good understanding of power in AC circuits, including active power, reactive power, and apparent power. They should be able to calculate power factor and understand power factor correction techniques.</li><li>4. Laboratory Skills: Students should have developed practical skills through laboratory sessions. They should be able to apply theoretical concepts to practical situations, including AC circuit analysis, power measurement, and the use of laboratory instruments and equipment.</li></ol>

	<p>5. Critical Thinking and Problem-Solving Skills: Students should have developed critical thinking and problem-solving skills specific to AC electrical engineering. They should be able to analyze and solve complex AC electrical engineering problems, identify and evaluate different solution strategies, and make informed decisions.</p> <p>6. Communication and Presentation Skills: Students should be able to effectively communicate their ideas, solutions, and findings related to AC electrical engineering. They should be capable of presenting technical information clearly and concisely, both orally and in written form.</p> <p>By achieving these learning outcomes, students will have a strong foundation in AC electrical engineering principles and applications. They will be prepared to further their studies or apply their knowledge in various industries such as power systems, renewable energy, electrical equipment manufacturing, and automation, where AC electrical systems are prevalent.</p>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p><b>Part A - AC Circuit Theory</b></p> <p>Basic concepts of AC circuits, Current and voltage definitions, Passive circuit elements (resistance, capacitance, and inductance) , Capacitor, [11 hrs].</p> <p>Magnetic circuits, Electromagnetic induction and inductor, [11 hrs].</p> <p>Sinusoidal alternating waveforms, Root-mean-square (R.M.S.) and Average values , [11 hrs].</p> <p>Phasors and complex number representation, Phasor relationships for circuit elements, [11 hrs].</p> <p>Combining resistive, capacitive, and inductive elements in series and parallel, [11 hrs].</p> <p><b>Part B – AC Circuit Analysis</b></p> <p>Sinusoidal steady-state analysis, Kirchhoff's laws in the frequency domain, [10 hrs].</p> <p>Nodal and Mesh Analysis, [10 hrs].</p> <p>Superposition theorem, [10 hrs].</p> <p>Thévenin and Norton Equivalent circuits , [10 hrs].</p> <p>AC power analysis, active and reactive power, [10 hrs].</p> <p>The complex power and power triangle, [10 hrs].</p> <p>Resonance, [10 hrs].</p>

<p style="text-align: center;"><b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم</p>	
<p><b>Strategies</b></p>	<p>The module "Basics of Electrical Engineering" can employ various learning and teaching strategies to enhance students' understanding and engagement. Here are some common strategies used in this module:</p> <p>20. Lectures: Lectures are a primary teaching method in this module, where instructors deliver theoretical concepts, principles, and explanations. Lectures can include visual aids such as slides, diagrams, and animations to facilitate understanding. Instructors may also provide real-life examples and applications to make the content more</p>

relatable.

21. **Practical Examples and Problem-Solving:** Instructors can use practical examples and problem-solving exercises to help students apply theoretical concepts to real-world situations. By presenting and solving problems related to electrical circuits, students can develop critical thinking and analytical skills.
22. **Laboratory Work:** Laboratory sessions provide hands-on experience and reinforce theoretical concepts. Students can perform experiments and measurements using electrical components and instruments. This allows them to apply theoretical knowledge, gain practical skills, and understand the behavior of electrical systems in a controlled environment.
23. **Group Discussions and Collaborative Learning:** Group discussions and collaborative learning activities encourage students to engage actively in the learning process. Students can work together to solve problems, analyze case studies, or discuss challenging concepts. This promotes peer learning, critical thinking, and communication skills.
24. **Tutorials and Workshops:** Tutorials and workshops offer opportunities for students to seek additional help and clarification on specific topics. Instructors or teaching assistants can provide individual or small-group assistance, address students' questions, and guide them through problem-solving exercises.
25. **Multimedia and Interactive Tools:** Multimedia resources, such as videos, animations, and interactive simulations, can be used to enhance understanding and engage students. These resources can provide visual representations of abstract concepts and allow students to interact with the content, fostering active learning.
26. **Guest Lectures and Industry Visits:** Inviting guest speakers from industry or conducting visits to electrical engineering-related facilities can provide students with real-world perspectives and insights. Professionals can share their experiences, current trends, and practical applications, giving students a broader understanding of the field.
27. **Assessments and Feedback:** Regular assessments, such as quizzes, assignments, and exams, can be used to evaluate students' understanding and progress. Constructive feedback helps students identify areas for improvement and reinforces their learning. Feedback can be provided through written comments, discussions, or one-on-one consultations.
28. **Online Resources and Platforms:** Online resources, such as e-learning platforms, online forums, and educational websites, can support student learning outside the classroom. These resources can provide additional readings, practice exercises, and interactive modules to supplement classroom teaching.
29. **Self-directed Learning:** Encouraging students to take ownership of their learning through self-directed study is important. Students can explore additional resources, conduct independent research, and deepen their understanding of specific topics. This cultivates lifelong learning skills and promotes curiosity in the field of electrical

	<p>engineering.</p> <p>By combining these learning and teaching strategies, the module "Basics of Electrical Engineering" aims to create an interactive and engaging learning environment that caters to different learning styles, promotes critical thinking, and prepares students for further studies and professional practice in electrical engineering.</p>
--	--

Student Workload (SWL)			
الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.133
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	3	10% (10)	4, 9, 12	LO # 2,3,7,8,10 and 11
	<b>Assignments</b>	3	10% (10)	3, 8, 14	LO # 2, 7, and 13
	<b>Lab.</b>	1	10% (10)	Continuous	
	<b>Report</b>	1	10% (10)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	8	LO # 1-7
	<b>Final Exam</b>	3hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

## Delivery Plan (Weekly Syllabus)

### المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Capacitors
<b>Week 2</b>	Magnetic circuits
<b>Week 3</b>	Electromagnetic induction and inductor
<b>Week 4</b>	Sinusoidal alternating waveforms
<b>Week 5</b>	Root-mean-square (R.M.S.) and Average values
<b>Week 6</b>	Phasors and complex number representation
<b>Week 7</b>	Phasor relationships for circuit elements
<b>Week 8</b>	<b>Mid-term Exam</b> + Introduction to Sinusoidal steady-state analysis
<b>Week 9</b>	Sinusoidal steady-state analysis, Kirchhoff's laws in the frequency domain
<b>Week 10</b>	Sinusoidal steady-state analysis, Nodal and Mesh Analysis
<b>Week 11</b>	Sinusoidal steady-state analysis, Superposition theorem
<b>Week 12</b>	Sinusoidal steady-state analysis, Thévenin and Norton Equivalent circuits
<b>Week 13</b>	AC power analysis, active and reactive power
<b>Week 14</b>	The complex power and power triangle
<b>Week 15</b>	Resonance
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

## Learning and Teaching Resources

### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Fundamentals of Electric Circuits, 4 <sup>th</sup> edition, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes

<b>Recommended Texts</b>	Introduction to Circuit Analysis, 10 <sup>th</sup> edition, Boylestad .	Yes
<b>Websites</b>		

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Digital Techniques		Module Delivery
Module Type	Core learning activity		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103023		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	2
Administering Department	Electrical Engineering	College	Engineering collage
Module Leader	Qais Kareem Omran	e-mail	<a href="mailto:eng.qais.karem@uobabylon.edu.iq">eng.qais.karem@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Professor	Module Leader's Qualification	PhD
Module Tutor	Dr. Qais Kareem Omran	e-mail	<a href="mailto:eng.qais.karem@uobabylon.edu.iq">eng.qais.karem@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Saad Saffah	e-mail	<a href="mailto:eng.saad.saffah@uobabylon.edu.iq">eng.saad.saffah@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p>The aims of this modules</p> <ol style="list-style-type: none"> <li>a) Distinguish between digital and analog system.</li> <li>b) Acquire knowledge about decimal and binary number systems and the conversion between each other in addition to binary arithmetic.</li> <li>c) Learn about the Hexadecimal, Octal and Binary coded decimal (BCD).</li> <li>d) Understand basic concepts of logic operations and Boolean algebra laws and its theorems.</li> <li>e) Able to simplify Boolean expressions with methods of Sums-of-Products (SOP) and Product-of-sums (POS) forms.</li> <li>f) Convert between Standard SOP and POS.</li> <li>g) Construct Karnaugh map and how to minimize it.</li> <li>h) Understand the basics of Adders, Comparator, Decoders, Encoders, multiplexer and Demultiplexer.</li> <li>i) Learn about Latches and Flip-Flops and their functionalities.</li> <li>j) Understand and design counters (synchronous and asynchronous) and shift registers.</li> </ol>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>On completion of this module students are expected to:</p> <ol style="list-style-type: none"> <li>1: Students should be able to understand the basics of digital and analog system.</li> <li>2: Students should be able to comprehend the number systems and be able to deal with Binary, Hexadecimal, Octal and Binary coded decimal.</li> <li>3: Students should be able to solve problems about number base conversion and arithmetic operation in different system of numbers.</li> <li>4: Student are expected to learn the basic concepts, operation, and truth tables of the digital logic gates.</li> <li>5: Students are expected to learn the basic definitions, basic theorem, rules, and properties of Boolean algebra and how to perform simplification of Boolean expressions with the help of rules of Boolean algebra.</li> <li>6: Students are expected to learn how to deal with Sum of Products form (SOP) and Product of Sum form (POS).</li> <li>7: Students are expected to learn how to deal with Karnaugh mapping techniques and its applications for simplification of Boolean expression.</li> <li>8: Students are expected to learn the basics of adders, Adders, Comparator, Decoders, Encoders, multiplexer, Demultiplexer, Latches, Flip-Flops, counters and shift registers.</li> <li>9. Students should be able to search for topics online and make reports.</li> </ol>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><b>PART (1):</b> Introduction to Digital and Analogue systems, Digital</p>

	<p>representation, Advantages of digital, Digital waveforms, Decimal and binary number systems, Binary to Decimal Conversion and vice versa, Binary Arithmetic, Hexadecimal Numbers, Octal Numbers, Binary Coded Decimal (BCD) [ 10 hrs.]</p> <p><b>PART (2):</b> Basic logic operations, Basic logic gates, Logic circuit diagrams, Laws and theorems of Boolean Algebra, DeMorgan’s Theorem, Boolean expression reduction, Truth table, Sums-of-products (SOP) and Product-of-sums (POS) and their standard forms, Conversion of SOP to POS and vice versa, Construction of a truth table from SOP and POS forms and vice versa [ 12 hrs.]</p> <p><b>PART (3):</b> Karnaugh Maps, variables in Karnaugh Maps (3 and 4 variables), cell adjacency in Karnaugh Maps, Mapping truth table into Karnaugh Map, Mapping SOP and POS forms into Karnaugh Map, Finding the minimum SOP and POS forms using Karnaugh Map [12 hrs.]</p> <p><b>PART (4):</b> Binary arithmetic operation, Half and Full adder, Parallel binary adders, Ripple Carry adder, Comparators, Decoders, Encoders, Multiplexers and Demultiplexers [8 hrs.]</p> <p><b>PART (5):</b> Introduction to Latches and Flip-flops, the logic circuit and operation of Set Reset Latch (SR Latch), The logic circuit and operation of Data Latch (D Latch), The logic circuit and operation of Jack Kilby Latch (JK Latch), The gated latches, Latches applications, Edge triggered Flip-flops and their types, Flip-flops applications, Introduction to Counters and shift registers. Introduction to the types of Counters and shift registers [15hrs.]</p>
--	---

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

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	93	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	6
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.8
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	10% (10)	5 , 10	LO # 3 and 4, 7 and 8
	<b>Assignments</b>	2	10% (10)	6 , 12	LO # 4 and 5, 9 and 10
	<b>Lab.</b>	2	20% (20)	Continuous	
	<b>Report</b>				
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	8	LO # 1-8
	<b>Final Exam</b>	3hr	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	Material Covered
<b>Week 1</b>	Brief review: The basic concepts of digital techniques, the difference between analog and digital signals, the advantages of digital systems, the digital systems applications, and the basic definitions of the digital techniques.
<b>Week 2</b>	System of numbers: decimal, binary, octal, and hexadecimal, numbers base conversion and arithmetic operation in different system of numbers.
<b>Week 3</b>	Number base conversion and arithmetic operation in different system of numbers. The concepts of complements, Binary codes, binary coded decimal (BCD).
<b>Week 4</b>	Binary arithmetic: addition subtraction, multiplication, and division.
<b>Week 5</b>	The basic concepts, operation, and truth tables of the digital logic gates and the pulse

	operation of logic gates.
<b>Week 6</b>	The basic definitions, basic theorem, rules, and properties of Boolean algebra.
<b>Week 7</b>	The simplification of Boolean expressions with the help of rules of Boolean algebra (part 1)
<b>Week 8</b>	Mid Term Examination + The simplification of Boolean expressions with the help of rules of Boolean algebra (Part 2 and Demorgan's theorems).
<b>Week 9</b>	Introduction to the Sum of Products form (SOP) and Product of Sum form (POS).
<b>Week 10</b>	The basic concepts of Karnaugh mapping techniques.
<b>Week 11</b>	The applications of Karnaugh mapping techniques for simplification of Boolean expression.
<b>Week 12</b>	Basic adders (Half and full adders), parallel binary adders and comparator.
<b>Week 13</b>	The basic concepts of Decoders, Encoders, multiplexer, and Demultiplexer.
<b>Week 14</b>	The basic concepts of Latches and Flip-Flops
<b>Week 15</b>	The basic concepts of Counters and shift registers.
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	Basic introduction
<b>Week 2</b>	The basic concepts and operation of the digital logic gates (part1)
<b>Week 3</b>	The basic concepts and operation of the digital logic gates (part2)
<b>Week 4</b>	The basic concepts of truth tables
<b>Week 5</b>	The basic concepts of Binary arithmetic
<b>Week 6</b>	The rules of Boolean algebra
<b>Week 7</b>	Demorgan's theorems
<b>Week 8</b>	<b>Mid-term Exam</b> + The basic concepts of Sum of Products form (SOP)
<b>Week 9</b>	The basic concepts of Product of Sum form (POS)
<b>Week 10</b>	The basic concepts of Karnaugh mapping techniques (part1)
<b>Week 11</b>	The basic concepts of Karnaugh mapping techniques (part2)
<b>Week 12</b>	The basic concepts of Half and full adders.
<b>Week 13</b>	The basic concepts of Decoders, Encoders, multiplexer, and Demultiplexer
<b>Week 14</b>	The basic concepts of Flip-Flops

<b>Week 15</b>	The basic concepts of Counters and shift registers
<b>Week 16</b>	Preparatory week before the final Exam

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	Text	Available in the Library?
<b>Required Texts</b>	1- Digital Fundamentals, 9th edition, Thomas L. Floyd.	Yes
<b>Recommended Texts</b>	1-Introduction to Logic Design, 3rd Edition, Alan B. Marcovitz.	No
<b>Websites</b>		

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Principles of Computers II		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103024		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	
Administering Department	Electrical engineering	College	College of Engineering
Module Leader	Dr. Hanaa Mohsin Ali	e-mail	<a href="mailto:hanaa.ali@uobabylon.edu.iq">hanaa.ali@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Hanaa Mohsin Ali	e-mail	<a href="mailto:Hanaa.ali@uobabylon.edu.iq">Hanaa.ali@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Kasim Karamm Abdalla	e-mail	<a href="mailto:eng.kassim.kerem@uobabylon.edu.iq">eng.kassim.kerem@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<p>This course provides an in-depth analysis of the fundamental principles of computer science that focus on problem-solving methods. The exposition of these principles is fully reinforced by many practical problems that illustrate the concepts discussed.</p> <ol style="list-style-type: none"> <li>13. The skills goals are special to the course.</li> <li>14. Students should be able to understand the analysis of computer science and problem-solving methods successfully.</li> <li>15. Students should be able to solve practical problems.</li> <li>16. Students should be able to understand and use different types of problem-solving techniques such as Algorithms and flowcharts.</li> <li>17. Students should be able to search topics online and make reports. Study how can employ problem-solving techniques to sort out real-time problems.</li> <li>18. Define and describe algorithms.</li> <li>19. Define and describe flowcharts.</li> <li>20. Define and describe Pseudocode.</li> <li>21. Practical examples for applying problem-solving methods in different fields such as engineering.</li> <li>22. Studying and understanding programming languages.</li> <li>23. Understanding visual basics as a high-level programming language.</li> <li>24. Understand the visual basics of window structures and contents.</li> <li>25. Understand read and write constants and variables</li> <li>26. Built a system using visual basics.</li> <li>27. Understand the loop and if statement</li> </ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. applying problem-solving methods in different fields such as engineering.</li> <li>2. Studying and understanding programming languages.</li> <li>3. Understanding visual basics as a high-level programming language.</li> <li>4. Understand the visual basics structures and contents.</li> <li>5. read and write constants and variables in visual basic</li> <li>6. Built a system using visual basics.</li> <li>7. Understand the loop and if statements.</li> </ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p><b>Part 1:</b> Study how can employ problem-solving techniques to sort out real-time problems. Define and describe algorithms. Define and describe flowcharts. Define and describe Pseudocode. Practical examples for applying problem-solving methods in different fields such as engineering. Studying and</p>

	<p>understanding programming languages. Understanding visual basics as a high-level programming language [20 hrs.].</p> <p><b>Part 2:</b> Understand the visual basics of window structures and contents. Understand read and write constants and variables. Built a system using visual basics. Understand the loop and if statement [17 hrs.].</p>
--	--

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	4. Learning Technologies on Campus using Whiteboard and TV monitor. 5. Hand out lecture notes. 6. Video lectures on YouTube and google classroom.

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	2.466
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	3	10% (10)	5, 7 and 15	LO # 1, 2 and 3
	<b>Assignments</b>	3	10% (10)	5, 7 and 15	LO # 1, 2 and 3
	<b>Projects/Lab</b>	3	20% (10)	Continuous	
	<b>Report</b>				
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hrs.	10% (10)	8	LO # 1-7
	<b>Final Exam</b>	3hr	50% (50)	16 or 17	All

Total assessment	100% (100 Marks)		
------------------	------------------	--	--

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	<b>Material Covered</b>
<b>Week 1</b>	<b>Introduction to computer programming</b> (definition, functionalities)
<b>Week 2</b>	<b>Problem-solving and information theory</b>
<b>Week 3</b>	<b>Operating system – MS-DOS system</b> (log in, type commands, error-command, read directory and display directory contents)
<b>Week 4</b>	Problem-solving methods
<b>Week 5</b>	Algorithms and their characteristics and rules
<b>Week 6</b>	flowcharts and their characteristics and rules
<b>Week 7</b>	Pseudocode and their characteristics and rules
<b>Week 8</b>	<b>Mid-term Exam</b> + examples about apply the problem-solving methods in mathematical fields
<b>Week 9</b>	Applying problem-solving methods in engineering fields
<b>Week 10</b>	Examples about flowcharting
<b>Week 11</b>	Example about algorithms
<b>Week 12</b>	Transfer an algorithm to a flowchart and verse versa
<b>Week 13</b>	Compare the algorithm and flowchart, which one is better for problem-solving
<b>Week 14</b>	Applying advanced examples using problem-solving techniques
<b>Week 15</b>	Transfer the algorithm into the program and transfer the flowchart into the program.
<b>Week 16</b>	<b>A preparatory week before the Final Exam</b>

<b>Delivery Plan (Weekly Lab. Syllabus)</b> المنهاج الاسبوعي للمختبر	
	<b>Material Covered</b>
<b>Week 1</b>	Introduction of visual basic
<b>Week 2</b>	Understanding the visual basic structure
<b>Week 3</b>	Read and write functions in coding
<b>Week 4</b>	Variables and constants
<b>Week 5</b>	Great blocks for simple program

Week 6	Solve mathematical examples using visual basics
Week 7	Build a simple interface in visual basic
Week 8	<b>Mid-term Exam</b>
Week 9	Understand the counter
Week 10	Applying 'for loop statements
Week 11	Applying the 'while statement'
Week 12	Applying the 'if statement'
Week 13	Solve some advanced problems using for loop and if statement
Week 14	Practice different types of engineering and math example
Week 15	Revision
Week 16	Final exam

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	1- Programming and Problem Solving: An Introduction to Computer Science by David A. Freitag (Author) 2- Visual Basic in easy steps, 6th edition: Updated for Visual Basic 2019 Kindle Edition by Mike McGrath	no
<b>Recommended Texts</b>	1- Algorithmic Problem Solving, 7 October 2011 by Roland Backhouse (Author)	no
<b>Websites</b>	<a href="https://www.edrawsoft.com/explain-algorithm-flowchart.html">https://www.edrawsoft.com/explain-algorithm-flowchart.html</a>	

### Grading Scheme

#### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Principles of Mechanical Engineering</b>		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB0103025		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGI	Semester of Delivery	
Administering Department	Electrical Engineering	College	Engineering College
Module Leader	Mr. mohammed Yousif Jabbar	e-mail	<a href="mailto:eng.mohammed.yousif@uobabylon.edu.iq">eng.mohammed.yousif@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Professor	Module Leader's Qualification	PhD
Module Tutor	Mr. mohammed Yousif Jabbar	e-mail	<a href="mailto:eng.mohammed.yousif@uobabylon.edu.iq">eng.mohammed.yousif@uobabylon.edu.iq</a>
Peer Reviewer Name	N.A	e-mail	N.A.
Scientific Committee Approval Date	1/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1- To learn the basic quantities and idealizations of mechanics.</li> <li>2- To learn expressing forces and position in Cartesian vector form and explaining how to determine the vector's magnitude and direction.</li> <li>3- To learn the concept of the free-body diagram for a particle and rigid body and equilibrium problems.</li> <li>4- To learn finding moments, couples, and resultants.</li> <li>5- To analyze the forces in the truss, frames, and machines.</li> <li>6- To learn finding the centroid of the 1D, 2D, and 3D figures and bodies.</li> <li>7- To learn the concept of dry friction and how to analyze the equilibrium of rigid bodies subjected to this force such as wedges, screw, and belts.</li> <li>8- To learn determining the moment of inertia for different 2D shapes.</li> </ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Students would have the ability to analyze forces, moments and resultants in 2D and 3D structures.</li> <li>2. Students would have the ability to draw the free body diagram of any structure.</li> <li>3. Students intended to have the ability of analyzing the forces in the trusses and frames.</li> <li>4. Learning how to find the centroid of different shapes and volumes.</li> <li>5. Learning the types of friction and its applications in the mechanical engineering field.</li> <li>6. Learning how to find the moment of inertia of different shapes.</li> </ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>1-Basic Concepts, Scalars and Vectors Newton's Laws, Units, and Law of Gravitation [4 hrs]</p> <p>2-Force, TWO-DIMENSIONAL FORCE SYSTEMS, Rectangular Components, Moment, Couple, and Resultants [6 hrs]</p> <p>3-THREE-DIMENSIONAL FORCE SYSTEMS, Rectangular Components, Moment and Couple, and Resultants [8 hrs]</p> <p>4-EQUILIBRIUM IN TWO DIMENSIONS, System Isolation and the Free-Body Diagram, Equilibrium Conditions, EQUILIBRIUM IN THREE DIMENSIONS, and Equilibrium Conditions [8 hrs]</p> <p>5-Plane Trusses, Method of Joints, Method of Sections, and Frames and Machines [10 hrs]</p> <p>6-CENTERS OF MASS AND CENTROIDS, Center of Mass, Centroids of Lines,</p>

	<p>Areas, and Volumes Composite Bodies and Figures, and Approximations [8 hrs]</p> <p>7-FRICTIONAL PHENOMENA, Types of Friction, Dry Friction, and APPLICATIONS OF FRICTION IN MACHINES, Wedges, Screws, and Flexible Belts [8 hrs]</p> <p>8-AREA MOMENTS OF INERTIA, Definitions, and Composite Areas [5 hrs]</p>
--	--

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

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

### Student Workload (SWL)

#### الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	93	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	6.2
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.8
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

### Module Evaluation

#### تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	10% (10)	5, 10	LO # 1, 2, 3, and 4
	<b>Assignments</b>	2	10% (10)	5, 12	LO # 1, 2, 3 and 5
	<b>workshop</b>	1	10%(10)	continuous	
	<b>Report</b>	1	10% (10)	13	LO # 1-5
<b>Summative</b>	<b>Midterm Exam</b>	2 hrs	10% (10)	10	LO # 1-4

assessment	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	Material Covered
<b>Week 1</b>	Basic Concepts Scalars and Vectors Newton's Laws Units Law of Gravitation
<b>Week 2</b>	Force TWO-DIMENSIONAL FORCE SYSTEMS Rectangular Components Moment Couple Resultants
<b>Week 3</b>	THREE-DIMENSIONAL FORCE SYSTEMS Rectangular Components Moment and Couple Resultants
<b>Week 4</b>	EQUILIBRIUM IN TWO DIMENSIONS System Isolation and the Free-Body Diagram Equilibrium Conditions
<b>Week 5</b>	EQUILIBRIUM IN THREE DIMENSIONS Equilibrium Conditions
<b>Week 6</b>	Plane Trusses Method of Joints
<b>Week 7</b>	Plane Trusses Method of Sections
<b>Week 8</b>	Frames and Machines
<b>Week 9</b>	FRictional PHENOMENA Types of Friction Dry Friction
<b>Week 10</b>	<b>Midterm Exam.</b> Dry Friction
<b>Week 11</b>	APPLICATIONS OF FRICTION IN MACHINES (Wedges and Screws)
<b>Week 12</b>	APPLICATIONS OF FRICTION IN MACHINES (Flexible Belts)
<b>Week 13</b>	CENTERS OF MASS AND CENTROIDS Center of Mass Centroids of Lines, Areas, and Volumes
<b>Week 14</b>	CENTROIDS of Composite Bodies and Figures; Approximations
<b>Week 15</b>	Definitions of AREA MOMENTS OF INERTIA and AREA MOMENTS OF INERTIA of Composite Areas

<b>Week 16</b>	<b>Preparatory week before the final Exam</b>
----------------	---

<b>Workshop</b>	<b>Operations</b>
<b>First</b>	<b>Familiarization with workshops and safety measured</b>
<b>Second</b>	<b>Welding</b>
<b>Third</b>	<b>Machining (milling and surfacing)</b>
<b>Fourth</b>	<b>Filing</b>
<b>Fifth</b>	<b>Turnings</b>
<b>six</b>	<b>Casting</b>

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	<b>Text</b>	<b>Available in the Library?</b>
<b>Required Texts</b>	ENGINEERING MECHANICS-STATICS by J . L . MERIAM and L . G . KRAIGE.	Yes
<b>Recommended Texts</b>	ENGINEERING MECHANICS-STATICS by R. C. Hibbeler	No
<b>Websites</b>		

<b>Grading Scheme</b> مخطط الدرجات
---------------------------------------

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Engineering Laboratories II		Module Delivery
Module Type	Core		<input type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103026		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	
Administering Department	Electrical Engineering	College	College of Engineering
Module Leader	Dr. Saad Saffah Hreshee	e-mail	<a href="mailto:eng.saad.saffah@uobabylon.edu.iq">eng.saad.saffah@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Intisar Hamid	e-mail	<a href="mailto:eng.intisar.hamid@uobabylon.edu.iq">eng.intisar.hamid@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Hilal Abdul-Hussain Abbood	e-mail	<a href="mailto:eng.hilala.abbood@uobabylon.edu.iq">eng.hilala.abbood@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electrical Engineering Laboratories I (UOBAB 0103016)	Semester	1
Co-requisites module	Basics of Electrical Engineering II (UOBAB 0103022)	Semester	2

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<b>Module Aims</b> أهداف المادة الدراسية	<ol style="list-style-type: none"> <li>1. The module " Electrical Engineering Laboratories II" aims to provide students with a comprehensive understanding of the principles, concepts, and applications specific to alternating current (AC) electrical systems. The specific aims of this module are the following objectives:</li> <li>2. Laboratory Skills: The module includes laboratory sessions where students can apply theoretical concepts to practical situations. Students will gain hands-on experience in AC circuit analysis, power measurement, and the use of relevant laboratory instruments and equipment.</li> <li>3. Overall, the module " Electrical Engineering Laboratories II" aims to provide students with a strong foundation in the principles and applications of AC electrical systems. It equips them with the necessary knowledge and skills to analyze AC circuits, understand power generation. This knowledge will be valuable in various industries such as power systems, renewable energy, electrical equipment manufacturing, and automation.</li> </ol>
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<p>Upon completion of the module " Electrical Engineering Laboratories II" students are expected to achieve the following learning outcomes:</p> <ol style="list-style-type: none"> <li>7. Understanding of AC Electrical Principles: Students should demonstrate a solid understanding of the principles and concepts specific to AC electrical systems, including sinusoidal waveforms, phasors, impedance, and reactance by applying it practically.</li> <li>8. Competence in AC Circuit Analysis: Students should be able to analyze and solve AC circuits using phasor analysis and complex algebra. They should be able to calculate voltage, current, power, and other parameters in AC circuits accurately.</li> <li>9. Laboratory Skills: Students should have developed practical skills through laboratory sessions. They should be able to apply theoretical concepts to practical situations, including AC circuit analysis, power measurement, and the use of laboratory instruments and equipment.</li> <li>10. Critical Thinking and Problem-Solving Skills: Students should have developed critical thinking and problem-solving skills specific to AC electrical engineering. They should be able to analyze and solve complex AC electrical engineering problems, identify and evaluate different solution strategies, and make informed decisions.</li> <li>11. Communication and Presentation Skills: Students should be able to effectively communicate their ideas, solutions, and findings related to AC electrical engineering. They should be capable of presenting technical information clearly and concisely, both orally and in written form.</li> </ol>
<b>Indicative Contents</b> المحتويات الإرشادية	<p><b>Part A - AC Circuit Theory</b></p> <p>Basic concepts of AC circuits, Current and voltage definitions, Passive circuit elements (resistance, capacitance, and inductance) , Capacitor, [6 hrs].</p> <p>Magnetic circuits, Electromagnetic induction and inductor, [6 hrs].</p> <p>Sinusoidal alternating waveforms, Root-mean-square (R.M.S.) and Average values , [6 hrs].</p> <p>Phasors and complex number representation, Phasor relationships for circuit elements, [7 hrs].</p>

	<p>Combining resistive, capacitive, and inductive elements in series and parallel, [7 hrs].</p> <p><b>Part B – AC Circuit Analysis</b></p> <p>Sinusoidal steady-state analysis, Kirchhoff's laws in the frequency domain, [6 hrs].</p> <p>Nodal and Mesh Analysis, [6 hrs].</p> <p>Superposition theorem, [6 hrs].</p> <p>Thévenin and Norton Equivalent circuits, [6 hrs].</p> <p>AC power analysis, active and reactive power, [6 hrs].</p> <p>The complex power and power triangle, [6 hrs].</p> <p>Resonance, [7 hrs].</p>
--	--

<b>Learning and Teaching Strategies</b> <b>استراتيجيات التعلم والتعليم</b>	
<b>Strategies</b>	<p>The module "Basics of Electrical Engineering" can employ various learning and teaching strategies to enhance students' understanding and engagement. Here are some common strategies used in this module:</p> <ol style="list-style-type: none"> <li>30. Practical Examples and Problem-Solving: Instructors can use practical examples and problem-solving exercises to help students apply theoretical concepts to real-world situations. By presenting and solving problems related to electrical circuits, students can develop critical thinking and analytical skills.</li> <li>31. Laboratory Work: Laboratory sessions provide hands-on experience and reinforce theoretical concepts. Students can perform experiments and measurements using electrical components and instruments. This allows them to apply theoretical knowledge, gain practical skills, and understand the behavior of electrical systems in a controlled environment.</li> <li>32. Group Discussions and Collaborative Learning: Group discussions and collaborative learning activities encourage students to engage actively in the learning process. Students can work together to solve problems, analyze case studies, or discuss challenging concepts. This promotes peer learning, critical thinking, and communication skills.</li> <li>33. Tutorials and Workshops: Tutorials and workshops offer opportunities for students to seek additional help and clarification on specific topics. Instructors or teaching assistants can provide individual or small-group assistance, address students' questions, and guide them through problem-solving exercises.</li> <li>34. Multimedia and Interactive Tools: Multimedia resources, such as videos, animations, and interactive simulations, can be used to enhance understanding and engage students. These resources can provide visual representations of abstract concepts and allow students to interact with the content, fostering active learning.</li> <li>35. Guest Lectures and Industry Visits: Inviting guest speakers from industry or conducting visits to electrical engineering-related facilities can provide students with real-world</li> </ol>

	<p>perspectives and insights. Professionals can share their experiences, current trends, and practical applications, giving students a broader understanding of the field.</p> <p>36. Assessments and Feedback: Regular assessments, such as quizzes, assignments, and exams, can be used to evaluate students' understanding and progress. Constructive feedback helps students identify areas for improvement and reinforces their learning. Feedback can be provided through written comments, discussions, or one-on-one consultations.</p> <p>37. Online Resources and Platforms: Online resources, such as e-learning platforms, online forums, and educational websites, can support student learning outside the classroom. These resources can provide additional readings, practice exercises, and interactive modules to supplement classroom teaching.</p> <p>38. Self-directed Learning: Encouraging students to take ownership of their learning through self-directed study is important. Students can explore additional resources, conduct independent research, and deepen their understanding of specific topics. This cultivates lifelong learning skills and promotes curiosity in the field of electrical engineering.</p>
--	--

<b>Student Workload (SWL)</b>			
الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	47	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	3
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	28	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	1.867
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	75		

<b>Module Evaluation</b>					
تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	5	20% (10)	3, 6, 9, 12, 15	LO # 1,2,4,5,7,8,10,11, 13 and 14
	<b>Report</b>	15	20% (10)	Continuous	
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	8	LO # 1-7
	<b>Final Exam</b>	2hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	Measurements of AC signal
<b>Week 2</b>	Phasor Diagram for RC series
<b>Week 3</b>	Phasor Diagram for RC parallel
<b>Week 4</b>	Phasor Diagram for RL series
<b>Week 5</b>	Phasor Diagram for RL parallel
<b>Week 6</b>	Phasor Diagram for RLC series
<b>Week 7</b>	Phasor Diagram for RLC parallel
<b>Week 8</b>	<b>Mid-term Exam</b>
<b>Week 9</b>	AC Kirchhoff's Laws
<b>Week 10</b>	AC Nodal Analysis
<b>Week 11</b>	AC Mesh Analysis
<b>Week 12</b>	AC Superposition Theorem
<b>Week 13</b>	AC Thevenin's Theorem
<b>Week 14</b>	AC Max Power Transfer
<b>Week 15</b>	<b>Preparatory week before the final Exam</b>
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Fundamentals of Electric Circuits, 4 <sup>th</sup> edition, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
<b>Recommended Texts</b>	Introduction to Circuit Analysis, 10 <sup>th</sup> edition, Boylestad .	Yes
<b>Websites</b>		

## Grading Scheme

### مخطط الدرجات

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

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

## نموذج وصف الوحدة

### نموذج وصف المادة الدراسية

معلومات الوحدة			
معلومات المادة الدراسية			
عنوان الوحدة	<b>حرية وديمقراطية</b>		
نوع الوحدة	<b>B</b>		
رمز الوحدة	<b>UOBAB 0103046</b>		
ECTS انتماتات	<b>2</b>		
SWL (ساعة / SEM)	<b>50</b>		
تسليم الوحدة			
<input checked="" type="checkbox"/> نظريه <input type="checkbox"/> قراءة <input type="checkbox"/> المختبر <input checked="" type="checkbox"/> تعليمي <input type="checkbox"/> عملي <input type="checkbox"/> الحلقة الدراسية			
4	الفصل الدراسي للتسليم	2	مستوى الوحدة
	كلية الهندسة	قسم الهندسة الكهربائية	الإدارة الإدارية
	الكلية	رباب ناجي عبد	قائد الوحدة
	البريد الإلكتروني <a href="mailto:rabababd565@gmail.com">rabababd565@gmail.com</a>	مدرس مساعد	لقب قائد الوحدة
ماجستير	مؤهلات قائد الوحدة	رباب ناجي عبد	مدرس الوحدة
	البريد الإلكتروني rabababd565@gmail.com	اسم المراجع النظير	تاريخ اعتماد اللجنة العلمية
	البريد الإلكتروني	رقم الإصدار	2023/6/1
1.0	رقم الإصدار	2023/6/1	تاريخ اعتماد اللجنة العلمية

العلاقة مع الوحدات الأخرى			
العلاقة مع المواد الدراسية الأخرى			
	الفصل الدراسي		وحدة المتطلبات الأساسية
	الفصل الدراسي		وحدة المتطلبات المشتركة

## أهداف الوحدة ونتائج التعلم والمحتويات الإرشادية

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<ol style="list-style-type: none"><li>1. تطوير مهارات حل المشكلات وفهم مابنص عليه الدستور والقانون .</li><li>2. لفهم حقوق الانسان بشكل واضح .</li><li>3. يتناول هذا المساق المفهوم الأساسي لحقوق الانسان .</li><li>4. هذا هو الموضوع الأساسي لحقوق الانسان والديمقراطية .</li><li>5. لفهم القوانين وكيفية استثمارها</li></ol>	<p>أهداف المادة الدراسية</p>
<ol style="list-style-type: none"><li>7. التعرف على كيفية على حقوق الخاصة .</li><li>8. لخص المقصود بحقوق الانسان .</li><li>9. مناقشة انواع حقوق الانسان .</li><li>10. وصف انواع حقوق الانسان</li><li>11. حدد قانون حقوق الانسان</li><li>12. التعرف على كيفية معرفة حقوق الانسان .</li><li>13. ناقش الوسائل القانونية لحماية حقوق الانسان .</li><li>14. ناقش الوسائل القضائية لحماية حقوق الانسان .</li><li>15. اشرح جرائم حزب البعث المنحل .</li><li>16. تحديد علاقة حقوق الانسان والديمقراطية .</li></ol>	<p>مخرجات التعلم للوحدة</p> <p>مخرجات التعلم للمادة الدراسية</p>
<p>يتضمن المحتوى الإرشادي ما يلي.</p> <p><b>الجزء أ - حقوق الانسان</b></p> <p>مفهوم حقوق الانسان _ تعريف الحق - عناصر الحق او اركان الحق انواع الحقوق التي يحميها القانون - تصنيف انواع حقوق الانسان . [ساعتان ]</p> <p>مفهوم حقوق الانسان وفق الاعلان العالمي لحقوق الانسان والمواطن الفرنسي سنة 1798 .(ساعة واحدة )</p> <p>حقوق الانسان والمواطن العراقي وفق دستور جمهورية العراق لسنة 2005 ، الحق في الحياة ، الحق في الكرامة والحرية ، الحق في الكرامة الشخصية ، الحق في الخصوصية ، الحق في الجنسية .(ساعتان )</p> <p>وسائل حماية حقوق الانسان يمكن معرفتها عبر الوسائل القانونية لحماية حقوق الانسان المتمثلة ب الدستور والتشريع العادي الذي يمثل على سبيل المثال قانون العقوبات ، قانون اصول المحاكمات الجزائية .(ساعتان )</p> <p>ضمانات حقوق الانسان ، رقابة السلطة القضائية على السلطة التشريعية ، رقابة السلطة القضائية على السلطة على اعمال السلطة التنفيذية. (ساعة واحدة )</p> <p>الوسائل السياسية لحقوق الانسان ، على الصعيد الداخلي المتمثلة ب الاحزاب السياسية ومنظمات المجتمع المدني ، الرأي العام ، على الصعيد الدولي الاقليمي ، والمنظمات الغير الحكومية . (ساعة واحدة ) .</p>	<p>المحتويات الإرشادية</p>

<p>حق المشاركة في ادارة الشؤون العامة ، الحقوق العامة تنقسم الى حق التوظيف حق المطالبة السلطات العامة ، حق المساواة ، والحقوق السياسية المتمثلة بـ حق الانتخاب ، حق الترشح (ساعة واحدة )</p> <p>جرائم التصفية ، تصفية رجال الدين ، تصفية المعارضين ، المقابر الجماعية والاباء الجماعية ، وجرائم الحروب الداخلية والخارجية (ساعتان ).</p> <p><b>الجزء ب / الديمقراطية</b></p> <p>تعريف الديمقراطية اصطلاحاً ، تاريخ الديمقراطية ، الحرية والديمقراطية ، خصائص الديمقراطية المتمثلة بالدستور القانون حرية التعبير عن الرأي ، حرية تكوين الاحزاب السياسية ، استقلال السلطة القضائية .(ساعتان )</p> <p>اركان الديمقراطية المتمثلة بـ الانتخابات ، التسامح السياسي ، سيادة القانون ، حرية التعبير ، المساواة والشفافية ، اللامركزية ، المجتمع المدني (ساعة واحدة ).</p> <p>انواع الديمقراطية المتمثلة بـ الديمقراطية الرئاسية ، الديمقراطية البرلمانية ، الاستبدادية ،التشاركية ، التداولية ، الدستورية الليبرالية ، الشمولية .(ساعة واحدة )</p> <p>اهداف الديمقراطية / حماية الحقوق ، المساواة ، الحرية ، حكم الشعب بنفسه ، محاسن الديمقراطية مساوى الديمقراطية . (ساعة واحدة )</p>	
---	--

<b>استراتيجيات التعلم والتعليم</b> <b>استراتيجيات التعلم والتعليم</b>	
<p>يكون الطالب قادراً على تطوير مهارات حل المشكلات وفهم ماينص عليه الدستور والقانون .لفهم حقوق الانسان بشكل واضح .يتناول هذا المساق المفهوم الأساسي لحقوق الانسان . هذا هو الموضوع الأساسي لحقوق الانسان والديمقراطية . لفهم القوانين وكيفية استثماره</p>	<b>استراتيجيات</b>

**عبء عمل الطالب (SWL)**

الحمل الدراسي للطلاب			
2	SWL منظم (ح / ث) الحمل الدراسي المنتظم للطلاب أسبوعيا	33	SWL منظم (h / sem) الحمل الدراسي المنتظم للطلاب خلال الفصل
1.1	SWL غير منظم (ح / ث) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	17	SWL غير منظم (h / sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل
		50	إجمالي (SWL h / sem) الحمل الدراسي الكلي للطلاب خلال الفصل

تقييم الوحدة تقييم المادة الدراسية					
نتائج التعلم ذات الصلة	الأسبوع المستحق	الوزن (بالعلامات)	الوقت/الرقم		
LO # All	4,9, 12	10% (10)	3	مسابقات	التقييم التكويني
LO # 3, 4, 6 and 9	2,7, 10	10% (10)	3	تعيينات	
	Continuous	10% (10)	1	المشاريع	
LO # All	13	10% (10)	1	تقرير	
LO # 1-9	8	10% (10)	2 hr	الامتحان النصفى	التقييم الختامي
All	16	50% (50)	3 hr	الامتحان النهائي	
		100% (100 Marks)		التقييم الإجمالي	

خطة التسليم (المنهج الأسبوعي) المنهاج الاسبوعي النظري	
المواد المغطاة	
مقدمة – حقوق الانسان	الأسبوع 1
تعريف حقوق الانسان	الأسبوع 2
أنواع حقوق الانسان	الأسبوع 3
وسائل حماية حقوق الانسان	الأسبوع 4
الوسائل القانونية لحماية حقوق الانسان	الأسبوع 5
الوسائل القضائية لحقوق الانسان	الأسبوع 6
تصنيف حقوق الانسان	الأسبوع 7
جرائم حزب البعث المنحل + الامتحان النصفى	الأسبوع 8
جرائم التصفية	الأسبوع 9
جرائم الإبادة الجماعية	اسبوع 10

اسبوع 11	جرائم الحروب الداخلية والخارجية
اسبوع 12	تعريف الديمقراطية
اسبوع 13	الحقوق والديمقراطية
اسبوع 14	اركان الديمقراطية وأهدافها
اسبوع 15	محاسن و مساوى الديمقراطية
اسبوع 16	الأسبوع التحضيري قبل الامتحان النهائي

### خطة التسليم (منهج المختبر الأسبوعي)

#### المنهاج الاسبوعي للمختبر

الأسبوع	المواد المغطاة	لايوجد
الأسبوع 1	_____	
الأسبوع 2	_____	

### مصادر التعلم والتعليم

#### مصادر التعلم والتدريس

متوفر في المكتبة؟	نص	
نعم	مصادر حقوق الانسان من دستور وقانون	النصوص المطلوبة
نعم	مصادر حقوق الانسان من دستور وقانون	النصوص الموصى بها
	مواقع الانترنت	المواقع الإلكترونية

### مخطط الدرجات

#### مخطط الدرجات

مجموعة	درجة	التقدير	العلامات (%)	تعريف
مجموعة النجاح (100 - 50)	أ - ممتاز	معدل	100 - 90	أداء متميز
	ب - جيد جدا	جيد جدا	89 - 80	فوق المتوسط مع بعض الأخطاء
	ج - جيد	جيد	79 - 70	عمل سليم مع أخطاء ملحوظة
	د - مرضية	متوسط	69 - 60	عادل ولكن مع أوجه قصور كبيرة
	هـ - كافية	مقبول	59 - 50	العمل يفي بالحد الأدنى من المعايير
فشل المجموعة (49 - 0)	FX - فشل	راسب (قيد المعالجة)	(49-45)	مطلوب المزيد من العمل ولكن الائتمان الممنوح
	F - فشل	راسب	(44-0)	كمية كبيرة من العمل المطلوب

**ملاحظة:** سيتم تقريب العلامات التي تزيد المنازل العشرية عن 0.5 أو تقل عن العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال ، سيتم تقريب علامة 54.5 إلى 55 ، بينما سيتم تقريب علامة 54.4 إلى 54. لدى الجامعة سياسة عدم التفاضل عن "فشل المرور الوشيك" ، لذا فإن التعديل الوحيد للعلامات الممنوحة بواسطة العلامة (العلامات) الأصلية سيكون التقريب التلقائي الموضح أعلاه.

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Mathematics III</b>		Module Delivery
Module Type	S		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	<b>UOBAB 0103031</b>		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	Semester of Delivery	3
Administering Department	Electrical engineering	College	College of Engineering
Module Leader	Murad Obaid Abed	e-mail	<a href="mailto:Eng.marad.obaid@uobabylon.edu.iq">Eng.marad.obaid@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	M.Sc.
Module Tutor	Murad Obaid Abed	e-mail	<a href="mailto:Eng.marad.obaid@uobabylon.edu.iq">Eng.marad.obaid@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Saad Saffah	e-mail	<a href="mailto:eng.saad.saffah@uobabylon.edu.iq">eng.saad.saffah@uobabylon.edu.iq</a>
Scientific Committee Approval Date	1/6/2023	Version Number	1

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	<b>UOBAB 0103021</b>		Semester 2
Co-requisites module	N/A		Semester N/A

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<p>1-Solute the problems of all systems and electrical and electronics circuits which related with the other materials. 2-Training to think about solution of problems of sequences and do the convergence and divergence tests for sequences. 3- Train students to think about solution of problems of series One of the most important. 4- Know the types of series then calculate the total summation to the series, and know the types of special power series. 5- Know the partial differentiations and solute exercises related to functions of two or more variable then make the students know styles of solution of partial and directional derivatives. 6- Know the ordinary differential equations subject which is considered as a tool to the electrical circuits and network develop their skills to find out solutions of the first, second and higher order differential equations. 7- Know the vectors subject which is considered as a toll to the other subjects such as electrical fields, develop the skills to find out solutions of equations of lines and planes. 8- Know the product of three or more vectors then training to think about solution of problems of vector functions and motions .</p>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<p>A. Cognitive goals A1. Students should learn the principle of Mathematics III. A2. Understand the rules and regulations for this type of course. A3. Solving and simplifying Equations and series &amp; sequences. A4. Read and Writing Equations for all the subjects of this semester. A5. Understand the problem and turn it into real mathematical problem. A6. Read different technical books and lecture notes.</p> <p>B. The skills goals special to the course. B1. Students able to solve the problems about all chapters successfully. B2. Students able to solve practical problems. B3. Students should be able to find the sum, converge, diverge for sequences and series and know the special types of it. B4: Student should be able to know information s about partial derivatives and how to solve problems. B5: Student able to solve different types of ordinary differential equations and how to deal with vectors and when he use it. B6. Students should be able to search for topics online and make reports.</p>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p><b>Part 1:</b> Sequences and series. [16 hrs.] <b>Part 2:</b> Partial derivative. [12 hrs.] <b>Part3:</b> Vectors. [12 Hrs. ] <b>Part 4:</b> Differential equation. [20 hrs. ]</p>

--	--

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

<b>Strategies</b>	<ol style="list-style-type: none"> <li>1. Learning Technologies on Campus using Whiteboard and TV monitor.</li> <li>2. Hand out lecture notes.</li> <li>3. Video lectures on YouTube and google classroom.</li> </ol>
-------------------	---

### Student Workload (SWL)

#### الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	2.466
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

### Module Evaluation

#### تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	3	10% (10)	5,9,13	LO #1-4, 5-8, and 9-12
	<b>Assignments</b>	3	10% (10)	4,8, 12	LO # 1-3, 5-7 and 8-11
	<b>Report</b>	1	10% (10)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hrs	10% (10)	8	LO # 1-7
	<b>Final Exam</b>	3hrs	60% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

## Delivery Plan (Weekly Syllabus)

### المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Sequences and series:-infinite series,Convergence &divergence,limits of sequences.
<b>Week 2</b>	Geometric series, integral, comparison, root& ratio test
<b>Week 3</b>	Power series,Taylor & Maclaurins series
<b>Week 4</b>	Vectors: unit vector & midpoint of line segment, dot& cross product, orthogonal vectors, lines& planes in space, distance from a point to plane
<b>Week 5</b>	Vectors; equation for a line in space, lines of intersection, distance from a point to a plane, angle between planes, ripple scalar
<b>Week 6</b>	Velocity & acceleration, unit tangent vector-curvature&normal vectors. Principal unit normal vector, rule of curvature
<b>Week 7</b>	Partial derivatives: mixed derivative theorems, partial derivative of higher order, chain rule.
<b>Week 8</b>	Mid exam
<b>Week 9</b>	Implisit differentiation, directional derivative, gradient vector
<b>Week 10</b>	Properties of directional derivative, gradient and tangent to level curve, algebraic rules of gradient
<b>Week 11</b>	Tangent plane, normal line, extreme values and saddle points
<b>Week 12</b>	Differential equation: define, degree, order of de. solution of 1st d.e, separable 1st d.e, special type of separation
<b>Week 13</b>	Homogeneous function, homogeneous equation, &how to solve it, reducible to homogeneous, linear 1st order d.e
<b>Week 14</b>	Exact, separable and linear d.e
<b>Week 15</b>	Variation of parameters, undetermined coefficients, high order d.e, homogenous high order d.e
<b>Week 16</b>	Preparatory week before the final Exam

## Delivery Plan (Weekly Lab. Syllabus)

### المنهاج الاسبوعي للمختبر

	Material Covered
--	------------------

Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	Mid-term Exam
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	Final Revision

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-Advanced Engineering Mathematics: K , A , Stroud	No
Recommended Texts	1-Hass, Joel, Christopher Heil, Maurice D. Weir, and George B. Thomas, <i>Thomas' calculus</i> , Pearson, thirteen Edition.	yes
Websites		

### Grading Scheme

مخطط الدرجات

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

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Networks		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103032		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	
Administering Department	Electrical engineering	College	College of Engineering
Module Leader	Mustafa Rashid Ismael	e-mail	<a href="mailto:eng.mustafa.rashid@uobabylon.edu.iq">eng.mustafa.rashid@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Mustafa Rashid Ismael	e-mail	<a href="mailto:eng.mustafa.rashid@uobabylon.edu.iq">eng.mustafa.rashid@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Sarmad Khaleel Ibrahim	e-mail	<a href="mailto:sarmad.ibrahim@uobabylon.edu.iq">sarmad.ibrahim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOBAB 0103022		Semester 2
Co-requisites module	None		Semester

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<p><b>Students should learn the followings:</b></p> <ul style="list-style-type: none"> <li>• RL, RC, and RLC transient circuits: Their voltage and current response with time and how to analyze different RL, RC, and RLC circuits in both series and parallel connections.</li> <li>• Poly-phase Circuits: Single wire system, three phase system, types of power in single and three phase systems.</li> <li>• Magnetic Coupling: Coefficient of coupling, equivalent circuits, linear and ideal transformer.</li> <li>• Two-port Networks: representing the two-port networks in Z, Y, h, g, and ABCD-parameters.</li> <li>• Filters: All types of filters, passive filters, active filters, Butterworth filters, and Chebyshev filters.</li> </ul>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<p>Upon completion of the module "Electrical Networks", students are expected to achieve preliminary knowledge in:</p> <ol style="list-style-type: none"> <li>1) RL, RC, and RLC circuits with DC input source, and hence they can understand their responses in different Ac input sources, such as sine waves, square waves and others.</li> <li>2) Single and three phase systems and how to analyze different types of 3-phase system connections, such as YY, YΔ, ΔΔ, and ΔY-connections, calculation of the four types of supplied and dissipated powers (active, reactive, apparent, and complex powers).</li> <li>3) Magnetic coupling for both aiding and opposing types and they will be able to represent the magnetic coupling circuits in their equivalent circuits.</li> <li>4) Basics of One-port and two-port networks and they will be able to represent and analyze any circuit in Z, Y, h, g, and ABCD-parameters. They can convert the circuit representation from one to any other parameter.</li> <li>5) All filter types, such as low-pass, high-pass, band-pass, and band-stop filters and they will be able to design all filters in both passive and active versions.</li> </ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<ol style="list-style-type: none"> <li>1. Natural Response of RL and RC circuits [5 hrs].</li> <li>2. Step Response of RL and RC circuits [5 hrs].</li> <li>3. Natural Response of Series and Parallel RLC Circuits [5 hrs].</li> <li>4. Step Response of Series and Parallel RLC Circuits [5 hrs].</li> <li>5. Balanced Wye-Wye Connection and Balanced Wye-Delta Connection [5 hrs].</li> <li>6. Balanced Delta-Delta Connection and Balanced Delta-Wye Connection, Power in three phases [5 hrs].</li> <li>7. Mutual Inductance, Energy in a Coupled Circuit [5 hrs].</li> <li>8. Linear Transformers, Ideal Transformers [5 hrs].</li> <li>9. Frequency Response, Passive Filters [6 hrs].</li> <li>10. Active Filters [6 hrs].</li> <li>11. Butterworth Filters [5 hrs].</li> <li>12. High Q Circuits [5 hrs].</li> <li>13. Impedance Parameters, Admittance Parameters [5 hrs].</li> </ol>

14. Hybrid Parameters, Transmission Parameters [5 hrs].

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

#### Strategies

- 1) Review the fundamentals: Start by revisiting the basics of electrical circuits, including Ohm's Law, Kirchhoff's Laws, and circuit analysis techniques. Ensure you have a solid foundation before diving into more complex topics.
- 2) Understand the theory: Take the time to grasp the underlying theory and principles behind electrical networks. Understand concepts such as resistance, capacitance, inductance, impedance, and frequency response. Use textbooks, lecture notes, and online resources to enhance your understanding.
- 3) Practice problem-solving: Electrical Networks courses often involve a significant amount of problem-solving. Work through as many practice problems as you can to reinforce your understanding. Start with simple exercises and gradually progress to more challenging ones. Practice is crucial for developing problem-solving skills.
- 4) Work in study groups: Collaborating with classmates in study groups can be highly beneficial. Discussing concepts, solving problems together, and explaining ideas to each other can deepen your understanding. It also provides an opportunity to learn from your peers and clarify any confusion you might have.
- 5) Use visual aids: Electrical circuits are often represented graphically. Utilize circuit diagrams, circuit simulation software, and visual aids like graphs and charts to visualize and understand circuit behavior. This can help you analyze circuits more effectively.
- 6) Seek additional resources: If you're struggling with a particular topic, don't hesitate to seek additional resources beyond your course materials. Look for online tutorials, video lectures, or supplementary textbooks that provide alternative explanations or examples. Sometimes, a different perspective can help clarify complex concepts.
- 7) Work through examples in textbooks: Textbooks usually provide a variety of example problems with step-by-step solutions. Work through these examples to familiarize yourself with different types of circuit analyses and solution techniques. This will improve your problem-solving skills and expose you to a wider range of scenarios.
- 8) Seek clarification from your instructor: If you have questions or need clarification, don't hesitate to reach out to your instructor or teaching assistant. They are there to help you understand the material better. Ask for additional explanations, examples, or recommended resources to supplement your learning.
- 9) Build practical circuits: Consider experimenting with physical circuits or using circuit simulation software to gain hands-on experience. Building and analyzing real or simulated circuits can enhance your understanding of how theoretical concepts translate into practical applications.
- 10) Review and revisit: Regularly review previously covered topics to reinforce your understanding and ensure that the material stays fresh in your mind. Electrical Networks is a cumulative subject, and concepts from earlier units often build the foundation for later ones.

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	78	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	5
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.8
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	3	10% (10)	2, 5, 10	LO # 1, 3- 4, and 6- 9
	<b>Assignments</b>	4	10% (10)	4, 6, 9, 12	LO # 2-3, 4- 5, 7-8 and 10- 11
	<b>Projects</b>	1	10% (10)	Continuous	
	<b>Report</b>	1	10% (10)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2hr	10% (10)	8	LO # 1-7
	<b>Final Exam</b>	3hr	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	<b>Material Covered</b>
<b>Week 1</b>	Transient analysis of RL and RC circuits.
<b>Week 2</b>	Transient analysis of series RLC circuits.
<b>Week 3</b>	Transient analysis of parallel RLC circuits.
<b>Week 4</b>	Three phase balance system, star, and delta connections.
<b>Week 5</b>	Unbalance system.
<b>Week 6</b>	Power in three phase circuits.

<b>Week 7</b>	<b>Mid-term Exam</b> + Magnetic coupling, coefficient of coupling.
<b>Week 8</b>	Linear transformers
<b>Week 9</b>	Ideal transformers.
<b>Week 10</b>	Passive filters.
<b>Week 11</b>	Active filters.
<b>Week 12</b>	Higher order and Butterworth filters.
<b>Week 13</b>	Impedance and admittance parameters.
<b>Week 14</b>	Hybrid and transmission parameters.
<b>Week 15</b>	Relationships Between Parameters.
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	
<b>Week 2</b>	
<b>Week 3</b>	
<b>Week 4</b>	
<b>Week 5</b>	
<b>Week 6</b>	
<b>Week 7</b>	
<b>Week 8</b>	<b>Mid-term Exam</b>
<b>Week 9</b>	
<b>Week 10</b>	
<b>Week 11</b>	
<b>Week 12</b>	
<b>Week 13</b>	
<b>Week 14</b>	
<b>Week 15</b>	
<b>Week 16</b>	

## Learning and Teaching Resources

### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	Electric Circuits by Nilsson and Riedel (Ninth Edition)	Yes
<b>Recommended Texts</b>	Fundamentals of Electric Circuits by Charles K. Alexander (Fourth Edition)	No
<b>Websites</b>		

## Grading Scheme

### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electronics I		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103033		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	3
Administering Department	Electrical engineering	College	College of Engineering
Module Leader	Dr. Hilal Al-Libawy	e-mail	<a href="mailto:eng.hilal_Al-Libawy@uobabylon.edu.iq">eng.hilal_Al-Libawy@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Hilal Al-Libawy	e-mail	<a href="mailto:eng.hilal_Al-Libawy@uobabylon.edu.iq">eng.hilal_Al-Libawy@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Hassan Jasim	e-mail	<a href="mailto:hassan.jasim@uobabylon.edu.iq">hassan.jasim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1- Understand the structure, symbols, and terminal identification of BJTs.</li> <li>2- Grasp the operating principles and different modes of operation of BJTs.</li> <li>3- Learn various biasing techniques for BJTs and their impact on circuit performance.</li> <li>4- Analyze the current-voltage characteristics of BJTs and their applications.</li> <li>5- Gain proficiency in using the small-signal model to analyze BJT circuits.</li> <li>6- Explore different amplifier configurations using BJTs, such as common emitter, common base, and common collector.</li> <li>7- Examine the switching characteristics of BJTs and their application as electronic switches.</li> <li>8- Familiarize yourself with the practical applications of BJTs, including amplifiers, oscillators, and switching circuits.</li> <li>9- Develop the skills to analyze, design, and troubleshoot BJT circuits.</li> </ol>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>A student who has successfully completed this course should be able to:</p> <ol style="list-style-type: none"> <li>1. Introduction to Bipolar Junction Transistors (BJTs):             <ol style="list-style-type: none"> <li>a. BJT structure and symbols</li> <li>b. Types of BJTs: NPN and PNP transistors</li> <li>c. Terminal identification: emitter, base, and collector</li> </ol> </li> <li>2. BJT Operating Principles:             <ol style="list-style-type: none"> <li>a. BJT modes of operation: active, saturation, and cutoff</li> <li>b. BJT biasing: fixed bias, emitter bias, and voltage divider bias</li> <li>c. BJT current-voltage characteristics</li> </ol> </li> <li>3. BJT Small-Signal Model: Common emitter (CE), common base (CB), and common collector (CC) configurations</li> <li>4. BJT Amplifier Configurations:             <ol style="list-style-type: none"> <li>a. Common emitter (CE) amplifier</li> <li>b. Common base (CB) amplifier</li> <li>c. Common collector (CC) amplifier</li> </ol> </li> <li>5. BJT Switching Characteristics: BJT as a switch, switching times: storage time, rise time, fall time</li> <li>6. BJT Applications:             <ol style="list-style-type: none"> <li>a. Amplifiers: audio amplifiers, RF amplifiers</li> <li>b. Oscillators: RC-phase shift oscillator, Hartley oscillator</li> <li>c. Switching circuits: digital logic gates, electronic relays</li> </ol> </li> </ol>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part 1: Introduction and Operating Principles [21 hrs]</u></p> <ul style="list-style-type: none"> <li>• BJT structure, symbols, and terminal identification</li> <li>• NPN and PNP transistor types</li> </ul>

	<ul style="list-style-type: none"> <li>• BJT modes of operation: active, saturation, and cutoff</li> <li>• Biasing techniques: fixed bias, emitter bias, voltage divider bias</li> <li>• BJT current-voltage characteristics and the Early effect</li> </ul> <p><u>Part 2: Small-Signal Model and Amplifier Configurations [15 hrs]</u></p> <ul style="list-style-type: none"> <li>• Introduction to the small-signal model</li> <li>• Small-signal parameters: re- model</li> <li>• Analysis of common emitter (CE), common base (CB), and common collector (CC) amplifier configurations</li> <li>• Voltage gain, input/output impedance considerations in amplifier circuits</li> </ul> <p><u>Part 3: Switching Characteristics and Applications [9 hrs]</u></p> <ul style="list-style-type: none"> <li>• BJT switching characteristics: storage time, rise time, fall time</li> <li>• Practical applications of BJTs in amplifiers, oscillators, and switching circuits</li> </ul>
--	--

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<ol style="list-style-type: none"> <li>1. Learning Technologies on Campus using Whiteboard and TV monitor.</li> <li>2. Hand out lecture notes.</li> <li>3. Video lectures on YouTube and google classroom.</li> </ol>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	93	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	6
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.8
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

<b>Module Evaluation</b> تقييم المادة الدراسية				
	<b>Time/Nu</b>	<b>Weight (Marks)</b>	<b>Week Due</b>	<b>Relevant Learning</b>

		Number	Percentage	Weeks	Outcome
Formative assessment	Quizzes	3	10% (10)	5, 9,13	LO # 1-4, 5-8, and 9-12
	Assignments	3	5% (5)	4,8, 12	LO # 1-3, 5-7 and 8-11
	Projects / Lab.	1	20% (20)	13	
	Report	1	5% (5)	13	Continuous
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to BJTs: BJT structure and symbols Terminal identification: emitter, base, and collector. NPN and PNP transistor types
Week 2	BJT Operating Principles: BJT modes of operation: active, saturation, and cutoff
Week 3	Biasing techniques: fixed bias, emitter bias
Week 4	voltage divider bias
Week 5	Small-Signal Model and Analysis
Week 6	re model
Week 7	CE amplifier configuration analysis
Week 8	<b>Mid-term Exam+ exam answers tutorial</b>
Week 9	Voltage gain, input/output impedance calculations
Week 10	CB amplifier configuration analysis
Week 11	CC amplifier configuration analysis
Week 12	BJT as a switch: on-state and off-state behavior
Week 13	Switching times: storage time, rise time, fall time
Week 14	BJT Amplifier Design and Analysis,
Week 15	Multi-stage amplifier design
Week 16	<b>Preparatory week before the final Exam</b>

<b>Delivery Plan (Weekly Lab. Syllabus)</b> المنهاج الاسبوعي للمختبر	
	<b>Material Covered</b>
<b>Week 1</b>	Introduction
<b>Week 2</b>	Rectifiers/ half wave rectifier
<b>Week 3</b>	Rectifiers/ full wave rectifier
<b>Week 4</b>	Voltage multiplier – Part I
<b>Week 5</b>	Voltage multiplier – Part II
<b>Week 6</b>	Voltage clipper
<b>Week 7</b>	More time to practice previous experiments
<b>Week 8</b>	<b>Mid-term Exam</b>
<b>Week 9</b>	Voltage clamper
<b>Week 10</b>	Low pass
<b>Week 11</b>	Band pass filters –Part II
<b>Week 12</b>	Band pass filters –Part II
<b>Week 13</b>	High pass filters
<b>Week 14</b>	Linear wave shaper
<b>Week 15</b>	More time to practice previous experiments
<b>Week 16</b>	Final Revision

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	<b>Text</b>	<b>Available in the Library?</b>
<b>Required Texts</b>	3- <b>Electronic Devices and Circuit Theory</b> 11th Edition by Robert Boylestad (Author), Louis Nashelsky (Author) 4- <b>Microelectronic Circuits (The Oxford Series in Electrical and Computer Engineering)</b> 8th Edition by Adel S. Sedra (Author), Kenneth C. (KC) Smith (Author), Tony Chan Carusone (Author), Vincent Gaudet (Author)	No
<b>Recommended Texts</b>	1- <b>Electronic Devices, Global Edition</b> 10th Edition by Thomas L. Floyd (Author)	No
<b>Websites</b>	<a href="https://www.youtube.com/@HilalHussain">https://www.youtube.com/@HilalHussain</a>	

## Grading Scheme

### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Machines I		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103034		
ECTS Credits	6		
SWL (hr/sem)	93		
Module Level	2	Semester of Delivery	3
Administering Department	Electrical Engineering	College	Engineering
Module Leader	Dr. Riyadh Toman Thahab	e-mail	<a href="mailto:eng.riath.toman@uobabylon.edu.iq">eng.riath.toman@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Riyadh Toman Thahab	e-mail	<a href="mailto:eng.riath.toman@uobabylon.edu.iq">eng.riath.toman@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Sarmad Khaleel	e-mail	<a href="mailto:sarmad.ibrahim@uobabylon.edu.iq">sarmad.ibrahim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	N/A	Semester	N/A
Co-requisites module	N/A	Semester	N/A

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Provide students with magnetic circuit analysis related to the machine theory.</li> <li>2. Provide students with an in-depth knowledge concerning DC Machines construction and principles of operation.</li> <li>3. Supplement information on generating and motoring actions of DC Machines.</li> <li>4. Provide students with information on steady state operation of DC machines whether generating or motoring.</li> <li>5. Study electrical and mechanical characteristics of different types of DC Machines.</li> <li>6. Study power flows and efficiency calculations of DC machines.</li> <li>7. To provide practical insight of theoretical materials through a set of related experiments.</li> </ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Students are able to provide a description of each type of DC machines and be able to understand the principles of operation.</li> <li>2. Gain the skills to compare between different types of DC machines and have the ability to determine a particular type for a specific application.</li> <li>3. Students are able to explain the characteristics of machines whether it is a motor or a generator.</li> <li>4. Students have the skills to analyze steady state models of DC generators and motors.</li> <li>5. Students have the knowledge to design the required ratings of a generator or motor and able be to fully understand losses in various parts of the machine.</li> <li>6. Students have the ability to set up practical circuit to obtain characteristics of DC machines practically.</li> <li>7. Students will have the ability to explain and justify any discrepancies between practical results and theoretical ones.</li> </ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<ol style="list-style-type: none"> <li>1. Magnetic circuits. (3 hrs.)</li> <li>2. Basic architecture of DC machines. (6 hrs.)</li> <li>3. Armature Windings. (3hrs.)</li> <li>4. Steady state analysis of DC generators. (18 hrs.)</li> <li>5. Steady state analysis of DC motors. (15 hrs.)</li> </ol>

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

<p><b>Strategies</b></p>	<ol style="list-style-type: none"> <li>1. Learning Technologies on Campus using Whiteboard and TV monitor.</li> </ol>
--------------------------	---

2. Hand out lecture notes.
3. Video lectures on YouTube and google classroom.

### Student Workload (SWL)

#### الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	93	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	6
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.8
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

### Module Evaluation

#### تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	4	10% (10)	3,6,9 & 12	LO # 1-2, 4-5, 6-8 and 9-11
	<b>Assignments</b>	3	5% (5)	4,10 & 11	LO # 1-3, 5-9, and 10
	<b>Projects / Lab.</b>	1	20% (20)	Continuous	
	<b>Report</b>	1	5% (5)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr.	10% (10)	8	LO # 1-7
	<b>Final Exam</b>	3 hrs.	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Review of magnetic circuits, magnetic quantities.
<b>Week 2</b>	Magnetic cores, reluctance calculations, with airgaps, determination of required excitation, solenoids, magnetic circuit, examples.
<b>Week 3</b>	Introduction to rotating machines, principle of operation for rotating machines, basic construction of DC machines, familiarization with DC machine parts.

<b>Week 4</b>	Induced EMF in DC machine, function of commutator, armature winding, and types of armature windings.
<b>Week 5</b>	MMF distribution, calculations of MMF per pole, armature reaction, commutation, compensation windings and inter-poles.
<b>Week 6</b>	Introduction to DC generators, general equation of induced EMF, types of DC generators according to excitation,
<b>Week 7</b>	Characteristics of DC generators (open circuit and load characteristics) for each type of DC generator (shunt, series, compound and separately excited).
<b>Week 8</b>	<b>Two hour midterm test.</b> Parallel operation of DC generators, conditions for parallel operation.
<b>Week 9</b>	Load current sharing in parallel connection. Introduction to power flow in DC generators, type of losses and efficiency calculations for DC generator.
<b>Week 10</b>	Introduction to DC motors, principle of operation, back EMF, general equation of induced torque, types of DC motors.
<b>Week 11</b>	Characteristics of DC motors, speed vs. armature current and torque vs. armature current. Part 1
<b>Week 12</b>	Characteristics of DC motors, speed vs. armature current and torque vs. armature current. Part 2
<b>Week 13</b>	Power flow in DC machines, efficiency calculations and losses.
<b>Week 14</b>	Voltage control and field control methods.
<b>Week 15</b>	Speed control of DC motor, the need for speed control system, armature control.
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	<b>Material Covered</b>
<b>Week 1</b>	Familiarization with lab equipment and safety precautions/measures.
<b>Week 2</b>	Magnetization characteristic of DC shunt generator
<b>Week 3</b>	Load test on DC shunt generator.
<b>Week 4</b>	Load test on DC series generator

Week 5	Load test on DC compound generator
Week 6	Field test on dc series generator.
Week 7	Load test on DC shunt motor
Week 8	<b>Mid-term Exam/Theoretical + practical parts</b>
Week 9	Speed control of dc shunt motor
Week 10	Swinburne's test of dc shunt motor
Week 11	Hopkinson's test on dc shunt machines
Week 12	Brake test on a dc shunt motor
Week 13	Brake test on dc compound motor
Week 14	Magnetization characteristic of dc shunt generator by using digital simulation.
Week 15	Review for final Exam
Week 16	<b>End of Semester Exam/ Theoretical + practical parts</b>

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<i>Electric Machinery Fundamentals, Fifth edition, 2012 by Stephen J. Chapman.</i>	Yes
Recommended Texts	1. <i>Electrical Machinery, 2003 6th Edition by Fitzgerald, Kingsley, and Umans.</i>	No
Websites		

### Grading Scheme

#### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer Programming		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103035		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	Semester of Delivery	3
Administering Department	Electrical Engineering	College	Engineering
Module Leader	Dr. Wasan Al Masoody	e-mail	<a href="mailto:eng.wasan.hashim.lec@uobabylon.edu.iq">eng.wasan.hashim.lec@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Wasan Al Masoody	e-mail	<a href="mailto:eng.wasan.hashim.lec@uobabylon.edu.iq">eng.wasan.hashim.lec@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Ahmed Abdulkadhim Hamad	e-mail	<a href="mailto:eng.ahmed.ak@uobabylon.edu.iq">eng.ahmed.ak@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p>a- This course provides the fundamental concepts of the Matlab programming language.</p> <p>b- Each theoretical lecture in this course is followed by a practical one which gives the students rigid information about the topic in that lecture.</p> <p>c- The course begins with the basic concepts such as variables and mathematical/ logical relations.</p> <p>d- It also gives enough information on manipulating and modifying arrays and strings up to building simple and advance programs.</p> <p>e- Many tutorials are given to the students inside the lab to strength their knowledge within this field.</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>A. Cognitive goals</p> <p>A1. Students should be able to Understand the basics of Matlab programming</p> <p>A2. Acquire enough knowledge for the variables and Mathematical/Logical relations.</p> <p>A3. Building simple and advanced programs using Matlab.</p> <p>A4. Acquire the knowledge to manipulate and modify the arrays and strings.</p> <p>A5. Building programs for text editing processes.</p> <p>A6. Get benefit of using the Matlab language to simulate their projects during their 4<sup>th</sup> year study.</p> <p>B. The skills goals special to the course.</p> <p>B1. The course will enable the students to gain preliminary knowledge in OOP using Matlab with enough understanding to program engineering problems using Matlab.</p> <p>B2. Enable students to build simple up to advance programs.</p> <p>B3. Enable students to react with the visual interface of the Matlab</p> <p>B4. Enable students to get benefit of using Matlab efficiently in their future learning.</p>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>1. INTRODUCTION TO Matlab, Starting a MATLAB Session, Arithmetic in Matlab, Vectors and Matrices, Vectors. Matrices, Relational operators,</p>

	<p>Strings [8 hrs.].</p> <ol style="list-style-type: none"> <li>2. Control Flow Statements, The for loop, The while loop, The if statement, The switch statement [8 hrs.].</li> <li>3. Functions, Constructing matrices, Scalar functions, The find function [8 hrs.].</li> <li>4. User-Defined Functions, Inline function, Function files [8 hrs.].</li> <li>5. MATLAB Graphics, Basic Graphics, Plotting Many Lines, Adding Plots [8 hrs.].</li> <li>6. Plotting Matrices, Subplots, Three-Dimensional Plots, Axes, Labels [8 hrs.].</li> <li>7. What Is GUIDE?, Starting GUIDE, The Layout Editor, GUIDE Templates [8 hrs.].</li> <li>8. Running a GUI, Programming the GUI M-file, Designing the GUI, Open a New GUI in the Layout Editor [8 hrs.].</li> <li>9. Add the Components, Align the Components, Setting Properties for GUI Components, Name Property, Title Property, String Property for Push Buttons and Static Text, String Property for Pop-up Menus [8 hrs.].</li> <li>10. Callback Properties, The Tag Property, Creating the GUI M-File, Sharing Data Between Callbacks Adding Code to the Opening Function, The Opening Function, Adding the Code [8 hrs.].</li> </ol>
--	--

<p style="text-align: center;"><b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم</p>	
<b>Strategies</b>	<p>Type The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p> <p>The students will also get access to:</p> <ol style="list-style-type: none"> <li>1. Learning Technologies on Campus using Whiteboard and TV monitor.</li> <li>2. Hand out lecture notes.</li> <li>3. Video lectures on YouTube and google classroom.</li> </ol>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	2.466
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	10% (10)	5 , 10	LO # 2- 4, and 6- 9
	<b>Assignments</b>	2	5% (5)	6 , 12	LO # 2- 5, and 10 -11
	<b>Projects / Lab.</b>	1	20% (20)	Continuous	
	<b>Report</b>	1	5% (5)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	8	LO # 1-7
	<b>Final Exam</b>	3hr	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	Material Covered
<b>Week 1</b>	Introduction to Matlab, Starting a MATLAB Session, Arithmetic in Matlab, Vectors and Matrices, Vectors. Matrices, Relational operators, Strings.
<b>Week 2</b>	Control Flow Statements, The for loop, The while loop, The if statement, The switch statement.
<b>Week 3</b>	Functions, Constructing matrices, Scalar functions, The find function.
<b>Week 4</b>	User-Defined Functions, Inline function, Function files.
<b>Week 5</b>	MATLAB Graphics, Basic Graphics, Plotting Many Lines, Adding Plots.

<b>Week 6</b>	Plotting Matrices, Subplots, Three-Dimensional Plots, Axes, Labels.
<b>Week 7</b>	<b>Mid-term Exam</b> + Introduction to GUI.
<b>Week 8</b>	What Is GUIDE?, Starting GUIDE, The Layout Editor, GUIDE Templates.
<b>Week 9</b>	Running a GUI, Programming the GUI M-file, Designing the GUI, Open a New GUI in the Layout Editor.
<b>Week 10</b>	Add the Components, Align the Components, Setting Properties for GUI Components, Name Property, Title Property, String Property for Push Buttons and Static Text, String Property for Pop-up Menus.
<b>Week 11</b>	Callback Properties, The Tag Property, Creating the GUI M-File, Sharing Data Between Callbacks Adding Code to the Opening Function, The Opening Function, Adding the Code.
<b>Week 12</b>	Adding Code to the Callbacks, Push Button Callbacks, Pop-up Menu Callback.
<b>Week 13</b>	Using the Object Browser to Identify Callbacks, Saving and Running a GUI.
<b>Week 14</b>	Creating Menus — The Menu Editor, Defining Menus for the Menu Bar, Creating a Menu, Specifying Menu Properties, Adding Items to a Menu, Laying Out Three Menus, Menu Callbacks, Functions Generated in the GUI M-file.
<b>Week 15</b>	Syntax of the Callback Subfunction, Defining Context Menus, Creating the Parent Menu, Adding Items to the Context Menu, Associating the Context Menu with an Object.
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

	<b>Material Covered</b>
<b>Week 1</b>	Introduction to Matlab, Starting a MATLAB Session, Arithmetic in Matlab, Vectors and Matrices, Vectors. Matrices, Relational operators, Strings. (Practical Learning in the Lab ).
<b>Week 2</b>	Control Flow Statements, The for loop, The while loop, The if statement, The switch statement. (Practical Learning in the Lab ).
<b>Week 3</b>	Functions, Constructing matrices, Scalar functions, The find function. (Practical Learning in the Lab ).
<b>Week 4</b>	User-Defined Functions, Inline function, Function files. (Practical Learning in the Lab ).
<b>Week 5</b>	MATLAB Graphics, Basic Graphics, Plotting Many Lines, Adding Plots. (Practical Learning in the Lab ).
<b>Week 6</b>	Plotting Matrices, Subplots, Three-Dimensional Plots, Axes, Labels. (Practical Learning in the Lab ).
<b>Week 7</b>	What Is GUIDE?, Starting GUIDE, The Layout Editor, GUIDE Templates. (Practical Learning in the Lab ).
<b>Week 8</b>	<b>Mid-term Exam</b>

<b>Week 9</b>	Running a GUI, Programming the GUI M-file, Designing the GUI, Open a New GUI in the Layout Editor. (Practical Learning in the Lab ).
<b>Week 10</b>	Add the Components, Align the Components, Setting Properties for GUI Components, Name Property, Title Property, String Property for Push Buttons and Static Text, String Property for Pop-up Menus. (Practical Learning in the Lab ).
<b>Week 11</b>	Callback Properties, The Tag Property, Creating the GUI M-File, Sharing Data Between Callbacks Adding Code to the Opening Function, The Opening Function, Adding the Code. (Practical Learning in the Lab ).
<b>Week 12</b>	Adding Code to the Callbacks, Push Button Callbacks, Pop-up Menu Callback. (Practical Learning in the Lab ).
<b>Week 13</b>	Using the Object Browser to Identify Callbacks, Saving and Running a GUI. (Practical Learning in the Lab ).
<b>Week 14</b>	Using the Object Browser to Identify Callbacks, Saving and Running a GUI. (Practical Learning in the Lab ).
<b>Week 15</b>	Creating Menus — The Menu Editor, Defining Menus for the Menu Bar, Creating a Menu, Specifying Menu Properties, Adding Items to a Menu, Laying Out Three Menus, Menu Callbacks, Functions Generated in the GUI M-file. (Practical Learning in the Lab ).
<b>Week 16</b>	Syntax of the Callback Subfunction, Defining Context Menus, Creating the Parent Menu, Adding Items to the Context Menu, Associating the Context Menu with an Object. (Practical Learning in the Lab ).

<b>Learning and Teaching Resources</b>		
مصادر التعلم والتدريس		
	Text	Available in the Library?
<b>Required Texts</b>	Desmond J. Higham and Nicholas J. Higham, MATLAB Guide, SIAM ,2000. MathWorks, MATLAB® Creating Graphical User Interfaces, Mathworks, 2013.	Yes
<b>Recommended Texts</b>	MathWorks, MATLAB® The Language of Technical Computing, Mathworks, 2004. Ed Overman, AMATLABTutorial, The Ohio State University.	No
<b>Websites</b>	All Internet Websites	

## Grading Scheme

### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	English Language II		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input checked="" type="checkbox"/> Seminar
Module Code	UOBAB 0103036		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	Semester of Delivery	3
Administering Department	Electrical Engineering	College	Engineering
Module Leader	Dr. Riyadh Toman Thahab Dr. Wasan Al Masoody	e-mail	<a href="mailto:eng.riath.toman@uobabylon.edu.iq">eng.riath.toman@uobabylon.edu.iq</a> <a href="mailto:eng.wasan.hashim.lec@uobabylon.edu.iq">eng.wasan.hashim.lec@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Wasan Al Masoody	e-mail	<a href="mailto:eng.wasan.hashim.lec@uobabylon.edu.iq">eng.wasan.hashim.lec@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Sarmad Khaleel	e-mail	<a href="mailto:sarmad.ibrahim@uobabylon.edu.iq">sarmad.ibrahim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOBAB 0103016		Semester 1
Co-requisites module	N/A		Semester N/A

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p>a- Develop the English language knowledge and skills.</p> <p>b-Increase knowledge about different topics including grammar, vocabulary, reading, and writing.</p> <p>c- Prepare students to use English for their professional studies in the university and consequently for their professional needs in real life and work.</p> <p>d- Give the students the opportunity to speak on general topics, to communicate in many environments and to understand texts on science, history, business and finance in the English-speaking world.</p> <p>e- Strength student knowledge within this field.</p> <p>f- Increase the students' ability in technical terminology in engineering and in particular electrical engineering.</p> <p>g- Define research ethics and emphasize the importance of citing paper, paraphrasing and citation, ---- ect.</p> <p>h- Give students a broad experience of how to deal with job interviews and how to express their ideas and thoughts to potential employers. Also preparing a technical C.V.</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Develop a wide range of skills that include:             <ol style="list-style-type: none"> <li>a- Language Development, which involves grammar and extensive vocabulary learning.</li> <li>b- Writing skills, which have a specific focus on literacy and short essays, notes.</li> <li>c- Reading, which involves study of instructional engineering-related texts of topical relevance.</li> <li>d- Listening, which includes comprehension of gist and detailed information.</li> <li>e- Communication skills, which cover communication situations.</li> </ol> </li> <li>2. Students are able to pronounce, read and write. They acquire their knowledge of fundamental grammatical structures and functions (e.g. sentence types, tenses, voice, parts of speech, word order, expressing possibility, obligation, necessity, prohibition, criticism; expressing preferences, making assumptions; asking for/ refusing/giving permission; making offers, suggestions, etc.) .</li> <li>3. Acquire fundamental vocabulary to fulfill the above mentioned functions in roles, topics and discussions.</li> <li>4. Students should be able to convey ideas and thoughts on different topics (people, jobs, places to visit, festivals/celebrations, disasters/accidents, eating habits, sports/hobbies, environment, education, entertainment, transport, etc.).</li> </ol>

	<ol style="list-style-type: none"> <li>5. Students are able to understand spoken language.</li> <li>6. They are expected to learn to produce written texts of various types.</li> <li>7. Students will be able to write research papers or project reports considering full implementation of research ethics and avoiding plagiarism.</li> <li>8. Students should be able to write a full professional C.V.</li> </ol>
<b>Indicative Contents</b> المحتويات الإرشادية	<ol style="list-style-type: none"> <li>1- Grammar Skills: Tenses used in the English language. (5 hrs.)</li> <li>2- Reading Comprehension Skills: Articles related to electrical engineering or general topics. (5 hrs.)</li> <li>3- Writing Skills: Comprehension for a scientific subject. (5 hrs.)</li> <li>4- Listening Skills: Videos and you tubes. (5 hrs.)</li> <li>5- Seminars that include individual presentations. (5 hrs.)</li> <li>6- Paraphrasing and citation. (5 hrs.)</li> <li>7- Curriculum Vitae writing. (7 hrs.)</li> </ol>

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

<b>Strategies</b>	<ol style="list-style-type: none"> <li>1. Learning Technologies on Campus using Whiteboard and TV monitor.</li> <li>2. Hand out lecture notes.</li> <li>3. Video lectures on YouTube and google classroom.</li> </ol>
-------------------	---

### Student Workload (SWL)

#### الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	2.46
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

### Module Evaluation

#### تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	20% (10)	3,5 & 10	LO # 1-3 ,4-6, 7-8
	Assignments	2	10% (10)	6 , 12	LO # 4 and 5, 10 and 11

	<b>Projects / Lab.</b>	-----	-----	---	-----
	<b>Report/CV writing</b>	1	10% (10)	13	LO#7
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	8	LO # 1-5
	<b>Final Exam</b>	3hr	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

	<b>Material Covered</b>
<b>Week 1</b>	Introduction of the students to the world of English language. The content of this lecture is based on preliminary review of grammars which involve tenses and extensive vocabulary learning.
<b>Week 2</b>	Learning the Quantifiers, what the quantifiers are, and giving some examples related to this topic. Learning the propositions, what the propositions are, and giving some examples related to them.
<b>Week 3</b>	Asking questions, learning students how to prepare and ask questions. Introducing parallel structure, and show the strategy of making parallel structure, which includes comprehension examples detailed information.
<b>Week 4</b>	Learning the Compound Nouns. What the compound nouns are. Understand and recognize the compound nouns, their structure, compositions, and usage. It will be covered with some examples.
<b>Week 5</b>	Learning the Phrasal Verbs. What the phrasal verbs are. Study their structures and usages. Access the most important types of the phrasal verbs, which includes comprehension examples and detailed information.
<b>Week 6</b>	Learning Idioms. Giving idioms meanings. Study their structures and usages. Understanding and recognizing the most popular idioms and common idioms in the English language.
<b>Week 7</b>	<b>Mid-term Exam.</b> Extensive review on English tenses in use.
<b>Week 8</b>	Spoken English and Informal Language
<b>Week 9</b>	Narrative tenses in past simple, past continuous and past perfect. Passive and active.
<b>Week 10</b>	Questions and negative
<b>Week 11</b>	Future forms, going to, shall, will,--ect.
<b>Week 12</b>	Expressions of quantity, a few, a little, plenty of, hardly any, --ect.

<b>Week 13</b>	Modals and related verbs, able to, manage to, bound to, supposed to, and allowed to.
<b>Week 14</b>	Relative clauses, that, who, what, whose, which. Ethics of research, definition of plagiarism.
<b>Week 15</b>	<b>Writing a good C.V., preparation for job interview.</b>
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	
<b>Week 2</b>	
<b>Week 3</b>	
<b>Week 4</b>	
<b>Week 5</b>	
<b>Week 6</b>	
<b>Week 7</b>	
<b>Week 8</b>	<b>Mid-term Exam</b>
<b>Week 9</b>	
<b>Week 10</b>	
<b>Week 11</b>	
<b>Week 12</b>	
<b>Week 13</b>	
<b>Week 14</b>	
<b>Week 15</b>	
<b>Week 16</b>	

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	5- New Headway Plus (Intermediate Book) by John and Liz Soars	Yes

	6- New Headway Plus (Upper-Intermediate Student's Book English course ) by John and Liz Soars	
<b>Recommended Texts</b>	1. Fundamental of English Grammar by Betty S. Azar and Stacy A. Hagen	No
<b>Websites</b>	<a href="https://learnenglish.britishcouncil.org">https://learnenglish.britishcouncil.org</a>	

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Mathematics IV</b>		Module Delivery
Module Type	S		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103041		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	Semester of Delivery	4
Administering Department	Electrical Engineering	College	College of Engineering
Module Leader	Murad Obaid Abed	e-mail	Eng.marad.obaid@uobabylon.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	M.Sc.
Module Tutor	Murad Obaid Abed Murad Obaid Abed	e-mail	<a href="mailto:eng.marad.obaid@uobabylon.edu.iq">eng.marad.obaid@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Kasim Karamm	e-mail	<a href="mailto:eng.kassim.kerem@uobabylon.edu.iq">eng.kassim.kerem@uobabylon.edu.iq</a>
Scientific Committee Approval Date	1/6/2023	Version Number	1

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	<b>UOBAB 0103031</b>		Semester 4
Co-requisites module			Semester

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. know the engineering transformation subject which is considered as a tools to solute and simulate many systems in control and communications such as Laplace transform and Fourier transform .</li> <li>2. know the engineering transformation subject which is considered as a tools to solute and simulate many systems in control and communications such as Laplace transform and Fourier transform .</li> <li>3. Make the students know the main properties which are used in these transformations .</li> <li>4. know the multiple integrals subject which is related to the integral subject which is studied in the 1st stage</li> <li>5. Solve exercises related to areas and volumes using multiple integrals ,and know the double integrals in polar coordinates .</li> <li>6. Evaluate the volume with triple integrals .</li> <li>7. know the matrices subject which is considered as an extension to the matrices subject which is studied in the 1st stage ..</li> <li>8. Develop the skills to find out solutions of the systems using the matrices and how to find the rank of the matrix.</li> </ol>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>.</p> <p>A. Cognitive goals</p> <p>A1. Students should learn the principle of engineering Mathematics.</p> <p>A2. Understand the rules and regulations for this type of course.</p> <p>A3. Solving and simplifying Equations by use Laplace transform..</p> <p>A4. Read and Writing Equations for all the subjects of this semester.</p> <p>A5. Understand the problem and turn it into real mathematical problem.</p> <p>A6. Read different technical books and lecture notes.</p> <p>B. The skills outcome from the course.</p> <p>B1. Students able to solve the problems about all chapters successfully.</p> <p>B2. Students able to solve practical problems.</p> <p>B3. Students should be able to find the Laplace transform for the function.</p> <p>B4: Student should be able to analyze the function by using Fourier series.</p> <p>B5: Student able to solve different types of systems of equations by using matrices.</p> <p>B6. Students should be able to use multi- integral to solve problems.</p>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>Part1: Laplace Transform. (10 hrs.)</p> <p>Part 2: Fourier series. (10 hrs.)</p> <p>Part3: Multiple Integral. (10 hrs.)</p> <p>Part 4: Matrices. (7 hrs.)</p>

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

<b>Strategies</b>	<ol style="list-style-type: none"> <li>1. Learning Technologies on Campus using Whiteboard and TV monitor.</li> <li>2. Hand out lecture notes.</li> <li>3. Video lectures on YouTube and google classroom.</li> </ol>
-------------------	---

## Student Workload (SWL)

### الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	2.46
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

## Module Evaluation

### تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	3	10% (10)	5,9,13	LO #1-4, 5-8, and 9-12
	<b>Assignments</b>	3	10% (10)	4,8, 12	LO # 1-3, 4-7 and 8-12
	<b>Report</b>	1	10% (10)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hrs	10% (10)	8	LO # 1-7
	<b>Final Exam</b>	3hrs	60% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

## Delivery Plan (Weekly Syllabus)

### المنهاج الاسبوعي النظري

Material Covered	
<b>Week 1</b>	Laplace transform unit step function.t for some functions

<b>Week 2</b>	I.t for some functions & inverse Laplace transform
<b>Week 3</b>	Evaluation of integral, I.t of periodic function
<b>Week 4</b>	Evaluation of integral, I.t of periodic function & partial fraction.
<b>Week 5</b>	Solution of differential equation using I.t, convolution
<b>Week 6</b>	Fourier series: Background, principle of harmonics.
<b>Week 7</b>	Introduction to Fourier series.
<b>Week 8</b>	<b>Mid exam.</b> Fourier series for periodic function.
<b>Week 9</b>	Odd & even function, Sine and cosine series
<b>Week 10</b>	Complex notation for Fourier series
<b>Week 11</b>	Matrices: linearity dependent & linearity independent vectors, --linearity dependent & linearity independent function
<b>Week 12</b>	Gauss elimination method, Eigen vector & Eigen value
<b>Week 13</b>	matrix inverse-rank
<b>Week 14</b>	Multiple integral: double integral over rectangular region, double integral over nonrectangular region, triple integral
<b>Week 15</b>	Evaluation of limits for integral, Area & cubic region
<b>Week 16</b>	Preparatory week before the final Exam

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	
<b>Week 2</b>	
<b>Week 3</b>	
<b>Week 4</b>	
<b>Week 5</b>	
<b>Week 6</b>	
<b>Week 7</b>	
<b>Week 8</b>	<b>Mid-term Exam</b>
<b>Week 9</b>	

Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	Final Revision

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1-Advanced Engineering Mathematics: K , A , Stroud	No
Recommended Texts	1-Hass, Joel, Christopher Heil, Maurice D. Weir, and George B. Thomas, <i>Thomas' calculus</i> , Pearson, thirteen Edition.	yes
Websites		

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electromagnetic Fields		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103042		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	Semester of Delivery	
Administering Department	Electrical Engineering	College	College of Engineering
Module Leader	Dr. Mohammed Taih Gatte	e-mail	mohammed.taih@uobabylon.edu.iq
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Mohammed Taih Gatte	e-mail	<a href="mailto:mohammed.taih@uobabylon.edu.iq">mohammed.taih@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Saad Saffah	e-mail	<a href="mailto:eng.saad.saffah@uobabylon.edu.iq">eng.saad.saffah@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	N/A		Semester
Co-requisites module	N/A		Semester

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Introduce the fundamental principles of electromagnetism, including electric fields, magnetic fields, and electromagnetic waves.</li> <li>2. Provide students with the knowledge and skills necessary to understand and apply these principles in engineering and physics.</li> <li>3. Develop students' problem-solving skills in electromagnetics.</li> <li>4. Prepare students for further study in electromagnetics and related fields.</li> </ol>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. At the end of electromagnetic fields module the students will be able to:</li> <li>2. Understand the fundamental principles of electromagnetism, including electric fields, magnetic fields, and electromagnetic waves.</li> <li>3. Apply these principles to solve engineering and physics problems.</li> <li>4. Develop strong problem-solving skills in electromagnetics.</li> <li>5. Be prepared for further study in electromagnetics and related fields.</li> <li>6. Specifically, students will be able to:</li> <li>7. Define electric and magnetic fields and describe their properties.</li> <li>8. Calculate the electric and magnetic fields produced by point charges, line charges, and surface charges.</li> <li>9. Use Maxwell's equations to describe the electric and magnetic fields.</li> <li>10. Calculate the forces and torques exerted on electric and magnetic charges by electric and magnetic fields.</li> </ol>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<ol style="list-style-type: none"> <li>4. Introduction to Electromagnetics and Electromagnetic spectrum, and preview of Vector analysis, Cartesian coordinates, Cylindrical and Spherical coordinate systems, differential and Integral elements (3hr)</li> <li>5. Electrostatics: The study of electric charges at rest. Topics may include Coulomb's law, electric field intensity (3hr)</li> <li>6. Electric flux, electric flux density, Gauss's law, divergence, and divergence theorem (3hr)</li> <li>7. Electric potential, gradient, and dipole (3hr)</li> <li>8. Conductors &amp; dielectric, energy gap, conductivity, current, current density and boundary conditions (3hr)</li> <li>9. Capacitance, Poisson and Laplace equations, solution of one variable (3hr)</li> <li>10. Magnetostatics: The steady Magnetic Fields produced by moving charges, Biot-Savart law, magnetic field, curl, Stokes theorems magnetic potential, Ampère's law, and Faraday's law (3hr)</li> <li>11. Maxwell's equations: A set of four equations that describe the behavior of electric and magnetic fields, (3hr)</li> <li>12. Electromotive force (EMF), Faraday's law of EM induction, Lenz's law, self-inductance, Induced electric fields and Maxwell's displacement current (3hr)</li> <li>13. EM Waves and Waveguides, properties of EM waves (wavelength, frequency, velocity, etc.). Reflection, refraction, and transmission of EM waves. Wave polarization and the polarization of light (3hr)</li> </ol>

	<p>14. Antennas and Radiating Systems: antenna principles and radiation patterns. some types of antennas (dipole, loop, Yagi-Uda, etc.). Antenna arrays and their characteristics. Antenna gain, directivity, and efficiency. Radio wave propagation and link budget analysis (3hr)</p> <p>15. Electromagnetic (EM) Interference and Compatibility, EMI sources and types. EMI coupling mechanisms (conduction, radiation, etc.). EMI mitigation techniques and shielding methods. (3hr)</p> <p>16. Applications of EM Fields: EM field simulation and modeling techniques. EM sensors and their applications. EM imaging techniques (MRI, NMR, etc.). EM compatibility in electronic systems. EM fields in wireless communication systems (1hr)</p>
--	--

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

<b>Strategies</b>	<p>7. Learning Technologies on Campus using Whiteboard and TV monitor.</p> <p>8. Hand out lecture notes.</p> <p>9. Video lectures on YouTube and google classroom.</p>
-------------------	--

### Student Workload (SWL)

#### الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	2.466
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

### Module Evaluation

#### تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	3	10% (10)	6 , 10 and 15	LO # 1-3, 4-6 & 7-9
	<b>Assignments</b>	3	10% (10)	6 , 10 and 15	LO # 1-3, 4-6 & 7-9
	<b>Projects</b>	3	15% (10)	Continuous	
	<b>Report</b>	1	5% (10)	14	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	9	LO # 1-8
	<b>Final Exam</b>	3hr	50% (50)	16 or 17	All

Total assessment	100% (100 Marks)		
------------------	------------------	--	--

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	<b>Material Covered</b>
<b>Week 1</b>	Vector algebra, Cartesian coordinates, Dot and Cross product, Cylindrical and Spherical coordinate systems, differential and Integral elements
<b>Week 2</b>	Coulombs law and Electric Field Intensity, Charge distribution, Line, Surface and Volume charge distributions, Fields of infinite line charge and infinite sheet charge.
<b>Week 3</b>	Electric flux , Electric flux density, Gauss's Law, Divergence, Maxwell 's first equation, The vector operator , Gauss's Divergence theorem
<b>Week 4</b>	Energy and Potential , Definition of potential, Gradient, equipotential, and Dipole
<b>Week 5</b>	Conductors & dielectric, energy gap, conductivity, current, current density and boundary conditions
<b>Week 6</b>	Capacitance, Poisson and Laplace equations, solution of one variable
<b>Week 7</b>	Magnetostatics: The steady Magnetic Fields produced by moving charges, Biot-Savart law, magnetic field, Ampère's law, curl, stocks theorems magnetic potential
<b>Week 8</b>	Maxwell's equations: A set of four equations that describe the behavior of electric and magnetic fields, force and torque on closed circuit, force on moving charge
<b>Week 9</b>	<b>Mid-term Exam +</b> Time varying fields, Faraday law, displacement current
<b>Week 10</b>	Electromotive force (EMF) and Faraday's law of electromagnetic induction Lenz's law and the concept of self-inductance Induced electric fields and Maxwell's displacement current
<b>Week 11</b>	Electromagnetic Waves and Waveguides, properties of electromagnetic waves (wavelength, frequency, velocity, etc.). Reflection, refraction, and transmission of electromagnetic waves. Wave polarization and the polarization of light
<b>Week 12</b>	Antennas and Radiating Systems: Basic antenna principles and radiation patterns. Different types of antennas (dipole, loop, Yagi-Uda, etc.). Antenna arrays and their characteristics. Antenna gain, directivity, and efficiency. Radio wave propagation and link budget analysis
<b>Week 13</b>	Electromagnetic Interference and Compatibility, Sources and types of electromagnetic interference (EMI). EMI coupling mechanisms (conduction, radiation, etc.). EMI mitigation techniques and shielding methods
<b>Week 14</b>	Applications of Electromagnetic Fields: Electromagnetic field simulation and modeling techniques. Electromagnetic sensors and their applications. Electromagnetic imaging techniques (MRI, NMR, etc.). Electromagnetic compatibility in electronic systems. Electromagnetic fields in wireless communication systems

<b>Week 15</b>	Applications of Electromagnetic Fields: Electromagnetic field simulation and modeling techniques. Electromagnetic sensors and their applications. Electromagnetic imaging techniques (MRI, NMR, etc.). Electromagnetic compatibility in electronic systems. Electromagnetic fields in wireless communication systems
<b>Week 16</b>	<b>A preparatory week before the Final Exam</b>

<b>Delivery Plan (Weekly Lab. Syllabus)</b> المنهاج الاسبوعي للمختبر	
	Material Covered
<b>Week 1</b>	
<b>Week 2</b>	
<b>Week 3</b>	
<b>Week 4</b>	
<b>Week 5</b>	
<b>Week 6</b>	
<b>Week 7</b>	
<b>Week 8</b>	<b>Mid-term Exam</b>
<b>Week 9</b>	
<b>Week 10</b>	
<b>Week 11</b>	
<b>Week 12</b>	
<b>Week 13</b>	
<b>Week 14</b>	
<b>Week 15</b>	
<b>Week 16</b>	

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	Text	Available in the Library?
<b>Required Texts</b>	1. "Engineering Electromagnetics" by William H. Hayt Jr. and	Yes

	John A. Buck. This is a widely used textbook that provides a comprehensive introduction to electromagnetic theory and its applications. It covers both fundamental concepts and advanced topics.	
<b>Recommended Texts</b>	<ol style="list-style-type: none"> <li>"Electromagnetic Fields and Waves" by Paul Lorrain, Dale R. Corson, and François Lorrain. This textbook provides a thorough introduction to electromagnetic theory and covers a variety of applications. It includes practical examples and exercises to enhance understanding.</li> <li>"Field and Wave Electromagnetics" by David K. Cheng. This book provides a comprehensive treatment of electromagnetic theory, including both classical and modern applications. It covers topics such as transmission lines, waveguides, and antennas.</li> </ol>	Yes
<b>Websites</b>		

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Electronics II</b>		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	<b>UOBAB 0103043</b>		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	4
Administering Department	Electrical engineering	College	College of Engineering
Module Leader	Dr. Hilal Al-Libawy	e-mail	Eng.hilal_Al-Libawy@uobabylon.edu.iq
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Hilal Al-Libawy	e-mail	<a href="mailto:eng.hilal_Al-Libawy@uobabylon.edu.iq">eng.hilal_Al-Libawy@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Osama Qasim	e-mail	<a href="mailto:eng.osama.qasim@uobabylon.edu.iq">eng.osama.qasim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	<b>UOBAB 0103033</b>	Semester	3
Co-requisites module	None	Semester	

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>10- Provide a comprehensive understanding of the principles and operation of Field-Effect Transistors (FETs).</li> <li>11- Familiarize students with the different types of FETs, including Junction Field-Effect Transistors (JFETs) and Metal-Oxide-Semiconductor Field-Effect Transistors (MOSFETs).</li> <li>12- Introduce students to the advantages and applications of FETs in various electronic circuits.</li> <li>13- Develop the ability to analyze and interpret FET characteristics, including current-voltage relationships and transfer characteristics.</li> <li>14- Explore biasing techniques for FETs and understand their impact on circuit operation and performance.</li> <li>15- Provide practical exposure to FET amplifiers, including common-source, common-drain, and common-gate configurations.</li> <li>16- Demonstrate the applications of FETs in amplifiers, switches.</li> <li>17- Familiarize students with FET fabrication processes and technology trends.</li> <li>18- Develop problem-solving skills in FET circuit analysis and design.</li> <li>19- Enhance students' ability to evaluate FET performance parameters such as gain, impedance.</li> <li>20- Promote hands-on experience with FET circuits through laboratory sessions and projects.</li> <li>21- Lay a foundation for further study and research in advanced FET technologies, such as CMOS.</li> </ol>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>Students should be able</p> <ol style="list-style-type: none"> <li>1- Become familiar with the construction and operating characteristics of Junction Field Effect (JFET), Metal-Oxide Semiconductor FET (MOSFET), and Metal-Semiconductor FET (MESFET) transistors.</li> <li>2- Be able to sketch the transfer characteristics from the drain characteristics of a JFET, MOSFET, and MESFET transistor.</li> <li>3- Understand the vast amount of information provided on the specification sheet for each type of FET.</li> <li>4- Be aware of the differences between the dc analysis of the various types of FETs.</li> <li>5- The course will enable the students to gain preliminary knowledge in .....</li> <li>6- Relate knowledge about semiconductor devices to typical implementations;</li> <li>7- Perform Analysis at AC of Amplifiers based on FETs using small signal models; and</li> <li>8- Analyze and design amplifier.</li> </ol>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part 1: Introduction and Basics [15 hrs]</u></p>

	<ul style="list-style-type: none"> <li>• Overview of semiconductor devices and a comparison between FETs and BJTs.</li> <li>• Understanding the structure, operation, and characteristics of FETs.</li> <li>• Introduction to different types of FETs: JFETs and MOSFETs.</li> </ul> <p><u>Part 2: FET Analysis and Applications [15 hrs]</u></p> <ul style="list-style-type: none"> <li>• Analysis and biasing techniques for JFETs and MOSFETs.</li> <li>• Small-signal modeling and analysis of JFET and MOSFET circuits.</li> <li>• Exploration of various FET amplifier configurations and their applications.</li> </ul> <p><u>Part 3: Advanced Topics and Applications [27 hrs]</u></p> <ul style="list-style-type: none"> <li>• Enhancement techniques for MOSFETs and their impact on circuit performance.</li> <li>• Design considerations for FET amplifiers, including gain, impedance.</li> <li>• Applications of FETs in oscillators, digital logic circuits, and voltage regulators.</li> <li>• Overview of FET fabrication processes and technology trends, including an introduction to advanced FET technologies like CMOS.</li> </ul>
--	--

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<ol style="list-style-type: none"> <li>1. Learning Technologies on Campus using Whiteboard and TV monitor.</li> <li>2. Hand out lecture notes.</li> <li>3. Video lectures on YouTube and google classroom.</li> </ol>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	93	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	6.2
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.8
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

<b>Module Evaluation</b> تقييم المادة الدراسية				
	<b>Time/Nu</b>	<b>Weight (Marks)</b>	<b>Week Due</b>	<b>Relevant Learning</b>

		Number	Weight	Frequency	Outcome
Formative assessment	Quizzes	3	10% (10)	5, 9,13	LO # 1-4, 5-8, and 9-12
	Assignments	3	5% (5)	4,8, 12	LO # 1-3, 5-7 and 8-11
	Projects / Lab.	1	20% (20)	Continuous	
	Report	1	5% (5)	13	Continuous
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	16 or 17	All
Total assessment			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	Material Covered
<b>Week 1</b>	INTRODUCTION : Field-Effect Transistors and Junction Field-Effect Transistors JFET
<b>Week 2</b>	FET Basics: Structure and operation of FETs, Types of FETs: Junction Field-Effect Transistor (JFET) and Metal-Oxide-Semiconductor Field-Effect Transistor (MOSFET)
<b>Week 3</b>	JFET Analysis and Applications : JFET biasing techniques: fixed bias,self-bias
<b>Week 4</b>	JFET biasing techniques: voltage-divider bias, and current-source bias
<b>Week 5</b>	MOSFET Analysis and Applications: MOSFET structure: enhancement-mode and depletion-mode MOSFETs
<b>Week 6</b>	MOSFET biasing techniques: self-bias, voltage-divider bias, and current-source bias
<b>Week 7</b>	MOSFET Enhancement Techniques: MOSFET operation in saturation, and cutoff regions MOSFET load-line analysis
<b>Week 8</b>	<b>Mid-term Exam – exam answers tutorial.</b> JFET small-signal model and analysis.
<b>Week 9</b>	JFET amplifier configurations: common-source, common-drain, and common-gate
<b>Week 10</b>	JFET applications: amplifiers, switches, and voltage-controlled resistors
<b>Week 11</b>	MOSFET small-signal model and analysis :MOSFET amplifier configurations: common-source, common-drain, and common-gate
<b>Week 12</b>	MOSFET applications: amplifiers, switches, and digital circuits
<b>Week 13</b>	FET Amplifiers: Common-source, common-drain, and common-gate amplifier analysis and design
<b>Week 14</b>	Gain, input/output impedance calculations
<b>Week 15</b>	FET multistage amplifier
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

<b>Delivery Plan (Weekly Lab. Syllabus)</b> المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Bipolar Junction Transistor (BJT) AS Amplifier -1
Week 2	Bipolar Junction Transistor (BJT) AS Amplifier -2
Week 3	Bipolar Junction Transistor (BJT) AS Switch
Week 4	Binary Number Representation and the Basic Logic Gates
Week 5	Digital-To-Analog Converter R/2R ladder
Week 6	Digital-To-Analog Converter (Weighted Resistor Networks)
Week 7	More time to practice previous experiments
Week 8	<b>Mid-term Exam</b>
Week 9	Astable Multivibrator
Week 10	Bistable Multivibrator
Week 11	Monostable Multivibrator
Week 12	Design and Analysis of Flip-Flops
Week 13	Design and Analysis of Registers
Week 14	Design and implementation of multiplexers
Week 15	Design and implementation of demultiplexers
Week 16	Final Revision

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	Text	Available in the Library?
<b>Required Texts</b>	7- <b>Electronic Devices and Circuit Theory</b> 11th Edition by Robert Boylestad (Author), Louis Nashelsky (Author) 8- <b>Microelectronic Circuits (The Oxford Series in Electrical and Computer Engineering)</b> 8th Edition by Adel S. Sedra (Author), Kenneth C. (KC) Smith (Author), Tony Chan Carusone (Author), Vincent Gaudet (Author)	No
<b>Recommended Texts</b>	2- <b>Electronic Devices, Global Edition</b> 10th Edition by Thomas L. Floyd (Author)	No
<b>Websites</b>	<a href="https://www.youtube.com/@HilalHussain">https://www.youtube.com/@HilalHussain</a>	

## Grading Scheme

### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Electrical Machines II</b>		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103044		
ECTS Credits	6		
SWL (hr/sem)	93		
Module Level	2	Semester of Delivery	4
Administering Department	Electrical Engineering	College	Engineering
Module Leader	Dr. Riyadh Toman Thahab	e-mail	<a href="mailto:eng.riath.toman@uobabylon.edu.iq">eng.riath.toman@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Riyadh Toman Thahab	e-mail	<a href="mailto:eng.riath.toman@uobabylon.edu.iq">eng.riath.toman@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Sarmad Khaleel	e-mail	<a href="mailto:sarmad.ibrahim@uobabylon.edu.iq">sarmad.ibrahim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOBAB 0103034		Semester 3
Co-requisites module	N/A		Semester N/A

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>8. Provide students with knowledge with some practical issues in DC motors, these include starting and breaking and solutions.</li> <li>9. Provide students with an in-depth knowledge concerning electrical transformers construction and principles of operation.</li> <li>10. Supplement information on transformers applications in power systems.</li> <li>11. Provide students with information on transformers equivalent circuits.</li> <li>12. Study testing procedures for electric transformers.</li> <li>13. Familiarize students with calculations of equivalent circuit parameters.</li> <li>14. Study power flows, losses and efficiency calculations.</li> <li>15. Provide knowledge on how to build three phase transformer bank. To provide practical insight of theoretical materials through a set of related experiments.</li> </ol>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>8. Students are able to design and analyze starting and breaking systems of DC motors.</li> <li>9. Students are able to provide a description of transformer operation and all relevant governing equations.</li> <li>10. Gain the skills to carry out calculations such as voltage regulation and efficiency using equivalent circuit parameters.</li> <li>11. Students are able to carry out testing procedures which enable them to assess efficiency without loading the transformer.</li> <li>12. Students have the skills to calculate and evaluate voltage drops in distribution systems according to voltage regulation of a transformer.</li> <li>13. Students have the ability to set up practical circuit to study transformer behavior .</li> <li>14. Students have the ability to find parameters of equivalent circuit for transformers.</li> <li>15. Students will have the ability to explain and justify any discrepancies between practical results and theoretical ones.</li> </ol>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<ol style="list-style-type: none"> <li>1. Starting and breaking of DC motors. (3 hrs.)</li> <li>2. Magnetic flux in AC circuits and static induced EMF. (7hrs.)</li> <li>3. Single phase transformer. (28 hrs.)</li> <li>4. Three phase transformer. (10 hrs.)</li> <li>5. Special types of transformer. ( 9hrs.)</li> </ol>

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

<b>Strategies</b>	<ol style="list-style-type: none"> <li>2. Learning Technologies on Campus using Whiteboard and TV monitor.</li> <li>2. Hand out lecture notes.</li> <li>3. Video lectures on YouTube and google classroom.</li> </ol>
-------------------	---

## Student Workload (SWL)

### الحمل الدراسي للطلاب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطلاب خلال الفصل	93	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطلاب أسبوعياً	6.2
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطلاب خلال الفصل	57	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطلاب أسبوعياً	3.8
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطلاب خلال الفصل	150		

## Module Evaluation

### تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	4	10% (10)	3,6,9 & 12	LO # 1,2 and 3-4 & 5-8
	<b>Assignments</b>	3	5% (5)	4,10 & 11	LO # 1-2,3-5 & 6-8
	<b>Projects / Lab.</b>	1	20% (20)	Continuous	
	<b>Report</b>	1	5% (5)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hrs.	10% (10)	8	LO # 1-7
	<b>Final Exam</b>	3 hrs.	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

## Delivery Plan (Weekly Syllabus)

### المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Starting and breaking of DC motors.
<b>Week 2</b>	Transformer type and construction.
<b>Week 3</b>	Transformer core types, Faraday's and Lenz's law, General EMF equation of transformers,

	voltage ratios, KVA ratings and window and area of core related to KVA.
<b>Week 4</b>	Ideal transformer, polarity, impedance transfer, voltage and current ratios in ideal electrical transformers.
<b>Week 5</b>	Practical transformers, leakage flux, primary and secondary winding resistances, referred impedance from one side to the other in practical transformers, transformers equivalent circuits.
<b>Week 6</b>	Exact and approximate equivalent circuits, transformers behavior at no-load conditions, phasor diagram at no load, no load current components. Load conditions, R, RL loading. Phasor diagrams for load conditions. Governing equations of transformer at load conditions.
<b>Week 7</b>	Open and short circuit tests. Equivalent circuit parameters calculations from open and short circuit tests. Efficiency calculations (indirect method). Voltage regulation calculations.
<b>Week 8</b>	<b>Midterm Exam.</b> Type of losses in transformers.
<b>Week 9</b>	All day efficiency and maximum efficiency of transformer. Efficiency vs. loading conditions of transformers. Parallel operation of transformer, conditions for parallel connection and load sharing conditions.
<b>Week 10</b>	Introduction to three phase transformers, types of core structure and winding configuration of transformers.
<b>Week 11</b>	Connection of three phase transformers, one unit three phase transformer and transformer bank.
<b>Week 12</b>	Transformer bank (continued). Phasor groups, zig-zag transformer connections. Examples of three phase transformer.
<b>Week 13</b>	Introduction to auto-transformers, types of auto-transformers, power rating and voltage ratios of auto-transformers.
<b>Week 14</b>	Three phase transformer efficiency and losses calculations Part 1.
<b>Week 15</b>	Open and short circuit tests on three phase transformer.
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Familiarization with lab equipment and safety precautions/measures.
Week 2	Speed control of DC shunt motor (Armature and field control)
Week 3	Determination of Transformer turn ratio.
Week 4	The polarity check of single phase transformer
Week 5	The Open circuit test.
Week 6	The short Circuit test
Week 7	Load test of a transformer /Pure Resistive case
Week 8	<b>Mid-term Exam/Theoretical + practical parts</b>
Week 9	Load test of a transformer /RL case
Week 10	Parallel operation of two single phase transformers under R Load
Week 11	Parallel operation of two single phase transformers under RL Load
Week 12	The load test is performed on a single-phase transformer using simulation (MATLAB & Simulink).
Week 13	Back to back test on transformer Part 1
Week 14	Back to back test on transformer Part 2
Week 15	Review for final Exam
Week 16	<b>End of Semester Exam/ Theoretical + practical parts</b>

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electric Machinery Fundamentals, Fifth edition, 2012 by Stephen J. Chapman.	Yes
Recommended Texts	Electrical Machinery, 2003 6th Edition by Fitzgerald, Kingsley, and Umans.	No
Websites		

### Grading Scheme

مخطط الدرجات

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

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer and Microprocessor Programming		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103045		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	2	Semester of Delivery	4
Administering Department	Electrical Engineering	College	Engineering
Module Leader	Dr. Wasan Al Masoody, Hussein Ali Lafta	e-mail	<a href="mailto:eng.wasan.hashim.lec@uobabylon.edu.iq">eng.wasan.hashim.lec@uobabylon.edu.iq</a> <a href="mailto:hussein.ali556@uobabylon.edu.iq">hussein.ali556@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Wasan Al Masoody, Hussein Ali Lafta	e-mail	<a href="mailto:eng.wasan.hashim.lec@uobabylon.edu.iq">eng.wasan.hashim.lec@uobabylon.edu.iq</a> <a href="mailto:hussein.ali556@uobabylon.edu.iq">hussein.ali556@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Saad Saffah	e-mail	<a href="mailto:eng.saad.saffah@uobabylon.edu.iq">eng.saad.saffah@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	N/A		Semester
Co-requisites module	N/A		Semester

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p>a-This course provides the fundamental concepts of the C# programming language and Knowledge of Microprocessors and Microcontroller.</p> <p>b-Each theoretical lecture in this course is followed by a practical one which gives the students rigid information about the topic in that lecture and Solve real world problems in an efficient manner.</p> <p>c-The course begins with the basic concepts such as variables and mathematical/ logical relations also emphasis on architecture.</p> <p>d- It also gives enough information on manipulating and modifying arrays and strings up to building simple and advance programs, Know the various functional units of 8051 microcontroller and 8085 microprocessors.</p> <p>e-Many tutorials are given to the students inside the lab to strength their knowledge within this field, understand assembly language program by using 8051 and 8085 Instruction sets and addressing modes.</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>A. Cognitive goals</p> <p>A1. Understand the syllabus and concept of microprocessor and microcontroller and able to Understand the basics of C# programming.</p> <p>A2. Understand the rules and regulations for this type of course.</p> <p>A3. student understands the principles of microprocessor and microcontroller and how to benefit from it in daily life and Acquire enough knowledge for the variables and Mathematical/Logical relations.</p> <p>A4. Understand the architecture and functional block of 8051microcontroller 8085 microprocessor and Building simple and advanced programs using C#.</p> <p>A5. Read different technical books and lecture notes.</p> <p>A6. student understands the assembly language programming–Timer Counter Programming – Serial Communication Programming- Interrupt Programming and Building programs for text editing processes.</p> <p>B. The skills goals special to the course.</p> <p>B1. The course will enable the students to gain preliminary knowledge in Visual Studio Environment and learns the specified systems for operating and programming of the microcontroller and microprocessor .</p> <p>B2. Enable students to build simple up to advance programs.</p> <p>B3. Enable students to react with visual studio environment and abilities to learn how electronic circuits that convert from digital to analog and vice versa work.</p>

## Indicative Contents

### المحتويات الإرشادية

17. Introduction to Computing, Numbering and coding, Digital primer, Inside the computer + Introduction, what is the .Net Framework, Applications You Can Write with C#, Variables and Expressions, Variables [8 hrs.].
18. Microcontrollers and embedded processors, Overview of the 8051 family, Overview of the AVR family, Overview of the PIC family + Writing Your First Program (Hello World), Example 2 Working with Variable Types: Mathematical and Logical Operators, Example 3: The mathematical operations #, Assignment Operators, Operator Precedence. [8 hrs.]
19. Architecture of the 8085 Microprocessor Introduction, Block Diagram of the 8085 Microprocessor, Pin Diagram of 8085 Microprocessor+ Flow Control, Boolean Logic, Example 4: Enter the following code and observe its output#, The IF Statement, Example 5 Enter the following code to test the IF statement. [8 hrs.]
20. Instruction Set and Addressing Modes of 8085, Addressing Modes, Instruction Set, Instruction and Data Formats, Symbols and Abbreviations, 8085 Instructions+ The switch Statement, Example 6 The How to Use switch case statement#, Looping, do Loops, Example 7: Use the do while loop to calculate a bank [8 hrs.]
21. Assembly – Language Programs of the 8085, Machine Language, Assembly Language, High-Level Language, Stack, Subroutines, Time-Delay Loops, Assembly-Language Programs + while Loops, Example 8: The while Loop [8 hrs.]
22. Microcontrollers Architecture, CPUs use registers to store data temporarily, Use of registers in 8051 with simple instructions such as MOV and ADD, Inside the 8051, Registers, Assembling and running an 8051 program, Steps to Create a Program, ROM, Data Types and Directives, RAM Memory Space Allocation+ for Loops, Example 9: Using for Loop statement in conjunction with while statement#, Interrupting Loops [8 hrs.]
23. CALL Instruction and Stack in 8051, Stack and Bank1 Conflict, BRANCH, CALL, AND TIME DELAY LOOP IN 8051, Nested Loop, 8051 conditional jump instructions, Unconditional Jumps, Calculating Short Jump Address, TIME DELAY FOR VARIOUS 8051 CHIPS + Arrays, Declaring Arrays, Example 10: Declaring and retrieving an array. [8 hrs.]
24. 8051 I/O PORT, Port 0, Port 1, Port 2, Port 4, I/O Ports and Bit Addressability, Instructions for Reading an Input Port, Instructions Reading a latch (Read-Modify-Write) + foreach Loops, Multidimensional Arrays . [6 hrs.]
25. 8. 8051 ADDRESSING MODES, ACCESSING MEMORY, SFR Registers and Their Addresses, Bit addressable, Stack and Direct Addressing Mode, Register Indirect Addressing Mode, Indexed Addressing Mode and On-chip ROM Access, EXTRA 128 BYTE ON-CHIP RAM IN 8052, ARITHMETIC INSTRUCTIONS + Arrays of Arrays, Declaring Array of Arrays, Initializing the Array of Arrays, Applications to Array of Arrays [8 hrs.]
26. LOGIC AND COMPARE INSTRUCTIONS, Single-bit Operations with CY, BCD AND ASCII APPLICATION PROGRAMS, Checksum Byte in ROM, BASICS OF SERIAL COMMUNICATION+ String Manipulation, Understanding the String, initializing a

	String, the meaning of String Manipulation . [7 hrs.]
--	---

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	1. Learning Technologies on Campus using Whiteboard and TV monitor. 2. Hand out lecture notes. 3. Video lectures on YouTube and google classroom.

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	123	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	8.2
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.133
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	200		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	10% (10)	5 , 10	LO # 1-5 and 6-9
	<b>Assignments</b>	2	5% (5)	6 , 12	LO # 1-4, and 5-9
	<b>Projects / Lab.</b>	1	20% (20)	Continuous	
	<b>Report</b>	1	5% (5)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	8	LO # 1-7
	<b>Final Exam</b>	3hr	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
---	--

	<b>Material Covered</b>
<b>Week 1</b>	Introduction, what is the .Net Framework, Applications You Can Write with C#, Variables and Expressions, Variables + INTRODUCTION TO COMPUTING.
<b>Week 2</b>	Writing Your First Program (Hello World), Example 2 Working with Variable Types: Mathematical and Logical Operators, Example 3: The mathematical operations #, Assignment Operators, Operator Precedence+ MICROCONTROLLERS FEATURE.
<b>Week 3</b>	Flow Control, Boolean Logic, Example 4: Enter the following code and observe its output#, The IF Statement, Example 5 Enter the following code to test the IF statement + Architecture of 8085 microprocessor.
<b>Week 4</b>	The switch Statement, Example 6 The How to Use switch case statement#, Looping, do Loops, Example 7: Use the do while loop to calculate a bank + 8085 instruction set and assembly language programming, data transfer and arithmetic operations.
<b>Week 5</b>	while Loops, Example 8: The while Loop+ Logical and Rotate group.
<b>Week 6</b>	for Loops, Example 9: Using for Loop statement in conjunction with while statement#, Interrupting Loops+ Stack, Branch, I/O and machine control group.
<b>Week 7</b>	<b>Mid-term Exam</b>
<b>Week 8</b>	Arrays, Declaring Arrays, Example 10: Declaring and retrieving an array+ I/O and memory interface
<b>Week 9</b>	foreach Loops, Multidimensional Arrays+ Microcontrollers architecture assembly language programming.
<b>Week 10</b>	Arrays of Arrays, Declaring Array of Arrays, Initializing the Array of Arrays, Applications to Array of Arrays+ Assembly language programming.
<b>Week 11</b>	String Manipulation, Understanding the String, initializing a String, the meaning of String Manipulation+ Addressing modes and arithmetic instructions and programs.
<b>Week 12</b>	Basic Sting Instructions, ToCharArray (), Length, ToUpper (), ToLower () +LOGIC INSTRUCTIONS AND PROGRAMS.
<b>Week 13</b>	TrimStart(),.Trim(),.Trim(trimChars)+ I/O PORT PROGRAMMING.
<b>Week 14</b>	TrimEnd(),.PadLeft(),.PadRight(),.PadX)+ Serial Communication.
<b>Week 15</b>	<b>Example 11: Manipulating strings and string arrays+ Interrupts Programming.</b>
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### **Delivery Plan (Weekly Lab. Syllabus)**

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	INTRODUCTION TO MICROCONTROLLER PIC-16F877A-KIT+ Introduction to C# software, what is the .Net Framework, Applications of C#
Week 2	Reading a switch and outputting to a LED+ Write with C#, Variables and Expressions, Variables
Week 3	Blink Eight LEDs in Sequence+ Writing Your First Program (Hello World), Example 2 Working with Variable Types: Mathematical and Logical Operators, Example 3
Week 4	display the numbers through single7-segment display+ The mathematical operations #, Assignment Operators, Operator Precedence
Week 5	display the numbers through four 7-segment display+ Flow Control, Boolean Logic, Example 4: Enter the following code and observe its output#
Week 6	display the numbers 0-999 Counter through LCD display + The IF Statement, Example 5 Enter the following code to test the IF statement
Week 7	display the numbers through LCD display by using keypad+ The switch Statement, Example 6 The How to Use switch case statement#
Week 8	<b>Mid-term Exam</b> , Printing a message and display it through LCD display+ Looping,
Week 9	Do Loops, Example 7: Use the do while loop to calculate a bank
Week 10	read an analog voltage display it through LCD display+ while Loops, Example 8: The while Loop
Week 11	Design digital clock and display time through LCD display+ for Loops, Example 9: Using for Loop statement in conjunction with while statement
Week 12	Design frequency counter and display through LCD display+ Interrupting Loops
Week 13	design PWM control on LED and display through LCD display+ Arrays, Declaring Arrays, Example 10: Declaring and retrieving an array
Week 14	Design stepper motor control+ foreach Loops, Multidimensional Arrays
Week 15	Basic EEPROM byte operations+ Multidimensional Arrays
Week 16	<b>Final Exam</b>

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	<ol style="list-style-type: none"> <li>1. Karli Watson et. al., <i>Beginning Visual C# 2010</i>, Wiley Publishing, Inc., 2010.</li> <li>2. Adam Freeman, <i>Introducing Visual C# 2010</i>, Adam Freeman, 2010,</li> </ol>	Yes
<b>Recommended Texts</b>	<ol style="list-style-type: none"> <li>1. John Paul Mueller, <i>Learn Microsoft® Visual C#® 2010</i>, O'Reilly Media, Inc., 2011.</li> <li>2. Scott Dorman, <i>Sams Teach Yourself Visual C# 2010 in 24 Hours</i>, Pearson Education, 2010.</li> <li>3. Allen Jones and Adam Freeman, <i>Visual C# 2010 Recipes A</i></li> </ol>	No

	<p><i>Problem-Solution Approach</i>, Allen Jones and Adam Freeman.</p> <p>4. <i>Microprocessors and Microcontrollers Architecture, Programming and System Design 8085, 8086, 8051, 8096</i> by <i>Krishna Kant</i>.</p> <p>5. <i>Microprocessors and Microcontrollers</i> by <i>A. Nagoorkani</i>.</p>	
<b>Websites</b>		

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Analysis I	Module Delivery	
Module Type	S	<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	UOBAB 0103051		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	Five
Administering Department	Electrical engineering	College	College of Engineering
Module Leader	Dr. Haider Jabber Abd	e-mail	<a href="mailto:eng.haider.jabber@uobabylon.edu.iq">eng.haider.jabber@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Haider Jabber Abd	e-mail	<a href="mailto:eng.haider.jabber@uobabylon.edu.iq">eng.haider.jabber@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Osama Qasim Jumah Al-Thahab	e-mail	<a href="mailto:eng.osama.qasim@uobabylon.edu.iq">eng.osama.qasim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p>The main objectives of this course can be summarized as follows:</p> <ol style="list-style-type: none"><li>1. Introduces the mathematical description and representation of both continuous-time and discrete-time signals and systems</li><li>2. Study the Fourier series which allows engineers to analyze periodic signals in the frequency domain.</li><li>3. Decomposing a periodic signal into a series of sinusoidal components, engineers can determine the frequency content and amplitude of each component.</li><li>4. Understanding the concept of harmonics in electrical engineering. By studying the Fourier series, engineers can identify and analyze harmonics in electrical systems, such as power systems.</li><li>5. Investigate Applications of Fourier series in electrical engineering</li><li>6. Study the concept of the Fourier transform which allows engineers to analyze signals and systems in the frequency domain</li><li>7. Understanding types of standard functions which are used in the signal analysis</li><li>8. Study the Fourier transform properties</li><li>9. Estimate the inverse of Fourier transform</li><li>10. Investigate Applications of Fourier Transforms in electrical engineering</li><li>11. Introduces the mathematical description of the Z-transform</li><li>12. Study the discrete-time signals</li><li>13. Understanding the Z-transform properties</li><li>14. Estimate the inverse of Z-transform</li><li>15. Investigate the Applications of Z transform in digital systems</li></ol>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>From the module "<b>Engineering Analysis I</b>", students are expected to obtain the following outcomes:</p> <ol style="list-style-type: none"><li>1. Students learn about the presentation periodic functions, signal analysis, circuit analysis, electromagnetic field analysis, digital signal processing, and communication system</li><li>2. Fourier transform provides valuable tools and insights for analyzing signals, understanding frequency behaviour</li><li>3. Z-transform provides students with a solid foundation in analyzing and designing discrete-time systems</li><li>4. Develops the fundamental for linear time-invariant (LTI) systems</li></ol>

<b>Indicative Contents</b> المحتويات الإرشادية	<b>Part 1: Fourier Series Fundamentals</b> Introduction to Trigonometric Fourier Series, Periodic and Non Periodic Function, Harmonics, Orthogonal Functions , Fourier Series and Fourier Coefficient, Half-Range Expansions , Even and Odd Functions, Complex Fourier series Application of Fourier Series in electrical circuit. ( 15 hrs)
	<b>Part 2 Fourier Transforms</b> Definition of Fourier transform, Fourier Integral and Complex Fourier Integrals, Discrete and Fast Fourier Transforms, invers Fourier transform, Fourier transforms properties. ( 22 hrs)
	<b>Part 3 Z-Transforms</b> Definition of Z-Transform , Sequences and Discrete Time Signals, Properties of Z-transform, Methods of Inverse of Z-Transform, Solution of Linear Constant Coefficient Difference Equations , Application of Z-transform, Difference equation & Impulse Response, System stability and transfer function , Impulse & Step Responses ( 25 hrs)

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	10. Learning Technologies on Campus using Whiteboard and TV monitor. 11. Hand out lecture notes. Video lectures on YouTube and google classroom

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.13
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 , 10	LO # 3 and 4, 8 and 9
	Assignments	2	10% (10)	6 , 12	LO # 4 and 5, 10 and 11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	Continuous
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16 or 17	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Trigonometric Fourier Series, Periodic and Non Periodic Function, Harmonics, Orthogonal Functions , Fourier Series and Fourier Coefficient.
Week 2	Half-Range Expansions , Even and Odd Functions
Week 3	Complex Fourier series Application of Fourier Series in electrical circuit.
Week 4	Definition of Fourier transform, Fourier Integral and Complex Fourier Integrals.
Week 5	Discrete and Fast Fourier Transforms, invers Fourier transform +Quiz
Week 6	Fourier transforms properties +Assign.
Week 7	Mid-term Exam + introduction for the application of MATLAB in signals
Week 8	Definition of Z-Transform , Sequences and Discrete Time Signals.
Week 9	Properties of Z-transform.
Week 10	Methods of Inverse of Z-Transform +Quiz
Week 11	Application of Z-transform
Week 12	Solution of Linear Constant Coefficient Difference Equations +Assign.
Week 13	Difference equation & Impulse Response. +Report
Week 14	System stability and transfer function
Week 15	Impulse & Step Responses
Week 16	Preparatory week before the final Exam

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	Mid-term Exam
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	1. Advance Engineering Mathematics – WILEY-2005	Yes
<b>Recommended Texts</b>	1. 2003_Signals.and.Systems.with.MATLAB - Steven T. Karris. 2. Advance Engineering Mathematics- K.A.Stroud,Fourth Edition 2003. 3. Advanced Mathematics for Engineering and Science C F Chan Man Fong, D De Kee, Tulane University, USA, P N Kaloni	Yes

	University of Windsor, Canada, 2007	
<b>Websites</b>		

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Electronics III</b>		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103052		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGIII	Semester of Delivery	Five
Administering Department	Electrical Engineering	College	Engineering College
Module Leader	Osama Qasim Jumah Al-Thahab	e-mail	<a href="mailto:Eng.osama.qasim@uobabylon.edu.iq">Eng.osama.qasim@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Osama Qasim Jumah Al-Thahab	e-mail	<a href="mailto:Eng.osama.qasim@uobabylon.edu.iq">Eng.osama.qasim@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Hassan Jassim	e-mail	<a href="mailto:hassan.jasim@uobabylon.edu.iq">hassan.jasim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. The students are learn to identify the features of frequency response, with Low frequency response study of both BJTs and JFETs.</li> <li>2. Studying the frequency response of various types of amplifiers, and Identify the frequency response of the amplifier, as it aims to identify the idea of frequency response.</li> <li>3. Identify the frequency response of the multistage amplifier at low and high frequencies, in addition to, the response of the FET at high and low frequencies.</li> <li>4. Getting to know the feedback amplifier, and learn about the idea and types of feedback amplifier with their effect and analysis.</li> <li>5. Stability study for all types of amplifier, and considering into account the response of the feedback amplifier.</li> <li>6. Identify the high power amplifier, type A, type B, and type AB. In addition to Learn about the push-pull amplifier.</li> </ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. To give a broad understanding of electronic circuits devices.</li> <li>2. The understanding of low frequency and high frequency response is taking into account.</li> <li>3. Discuss the effect of outside capacitors and inside capacitors for different electronic circuits.</li> <li>4. Derive equations describing operation of the concept of feedback amplifier and its response.</li> <li>5. Discuss the effect of different F.B component on the amplitude, input resistance and output resistance of different types of F.B amplifier.</li> <li>6. Analysis the effect of Feedback circuits that as one and two poles by computing the overshoot in time and frequency response.</li> <li>7. Deriving the equations for the distortion of power amplifier types, and calculating the distortion factor for two and four order nonlinear equation.</li> </ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p><b>1- Frequency response characteristics</b> (9 Hrs)</p> <p>Frequency small signal models of JFETs, and BJTs, frequency response of various amplifier configurations.</p> <p><b>Lab:</b> Operational Amplifier, Low and High -pass filter design.</p> <p><b>2- Frequency response characteristics</b> (12 Hrs)</p>

	Hrs)
	Frequency response concepts, transistor at high frequency, multistage at low & high frequency, FET amplifier at low & high frequency.
	<b>Lab:</b> Band-pass and Band-reject filter design.
	<b>3- Feedback Amplifier</b> (12
	Hrs)
Feedback concepts, types, effects & topologies, feedback analysis, voltage series, voltage shunt, current series, and current shunt.	
<b>Lab:</b> Oscillators, Waveform generator, Precision conversion.	
<b>4- F.B Time and Frequency response</b> (12	
Hrs)	
F.B stability & response of feedback amplifier.	
<b>Lab:</b> Half and Full wave Rectifier	
<b>5- Power Amplifier</b> (12	
Hrs)	
Class A, class B, class AB and push-pull amplifier	
<b>Lab:</b> Multistage transistor amplifier, Class B Amp., and Digital circuit.	

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<p>This section discusses the effective learning and teaching strategies to improve the learning, skills and outcomes of third class students of electrical engineering during the studying of Electronic III.</p> <ol style="list-style-type: none"> <li>1- Provide course information in a simple and understandable manner by using the blackboard, digital screen and computer.</li> <li>2- The use of conditioning, conjugation and meaning to increase comprehension of the study material.</li> <li>3- Encourage students to think critically and motivate them to research and explore.</li> <li>4- Providing special exams to measure students' level of</li> </ol>

	<p>understanding.</p> <p>5- Encouraging students to cooperate and teamwork.</p> <p>6- Using pictures, charts and illustrations to clarify concepts and information and facilitate understanding.</p> <p>7- Paying attention to the individual talents and interests of students and allowing them to learn according to their individual learning style.</p> <p>8- Teach the student how become a Self-learning student to make them able to solve different questions.</p> <p>9- Students are assigned a project to produce a product or solve a specific problem.</p> <p>10- Digital learning: it uses technology and multimedia to facilitate the learning process and motivate students.</p> <p>These strategies will help students in understanding the module (Electronics III) very well and faster.</p>
--	---

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	93	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	10% (10)	5 , 10	LO # 3 and 6
	<b>Assignments</b>	2	10% (10)	6 , 12	LO # 3 and 6
	<b>Lab.</b>	1	10% (10)	Continuous	

	<b>Report</b>	1	10% (10)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	11	LO # 2-6
	<b>Final Exam</b>	3hr	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Frequency small signal models of JFETs, and BJTs
<b>Week 2</b>	Analysis of various amplifier configurations
<b>Week 3</b>	Frequency response concepts Transistor at low frequency
<b>Week 4</b>	Transistor at high frequency
<b>Week 5</b>	Multistage low and high frequency +Quiz
<b>Week 6</b>	FET amplifier at low & high frequency. + Assign.
<b>Week 7</b>	Bode Plot
<b>Week 8</b>	Feedback concepts, types, effects & topologies
<b>Week 9</b>	Feedback analysis, voltage series, voltage shunt
<b>Week 10</b>	Current series, and current shunt F.B +Quiz
<b>Week 11</b>	<b>Mid Term Exam.</b> Frequency response concepts Transistor at low frequency, Feedback concepts, types, effects & topologies and Feedback analysis Test.
<b>Week 12</b>	F.B stability + Assign.
<b>Week 13</b>	Response of feedback amplifier + Report
<b>Week 14</b>	Power Amp, Distortion Factor analysis
<b>Week 15</b>	Class A, class B
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	Introduction to Operational Amplifier

Week 2	The Operational Amplifier
Week 3	Low-pass filter design
Week 4	High-pass filter design
Week 5	Band-pass filter design
Week 6	Band-reject filter design
Week 7	The operational amplifier Sine-wave oscillators
Week 8	<b>Mid Term Exam.</b> Operational Amplifier, Low and High -pass filter design, Band-pass and Band-reject filter design and Oscillators.
Week 9	Waveform generator
Week 10	Precision Ac to DC conversion
Week 11	Half-wave Rectifier
Week 12	Full-wave Rectifier
Week 13	Multistage transistor amplifier
Week 14	Class B push-pull operation
Week 15	Discrete digital electronics
Week 16	<b>Preparatory week before the final Exam</b>

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	Text	Available in the Library?
<b>Required Texts</b>	1) Integrated Electronic, Analog And Digital Circuits And Systems. By Millman Halkias. Mcgraw Hill 1972. 2) Electronic Devices and Circuit Theory. By R. Boylested and L. Nashelesky. Sixth edition. Prentice – Hall international, 1996.	Yes
<b>Recommended Texts</b>	1) The Art of Electronics. By Paul Horowitz, and Winfield Hill. Second Edition. Cambridge University Press, 2001. 2) Feedback. By Fred D. Walohouer. Second Edition. John Wily &sons, 1982.	Yes

	3) Analysis and design of Analog Integrated circuit. By P. R. Gray. John Wily 2000.	
<b>Websites</b>	<a href="https://www.physics-and-radio-electronics.com/electronic-devices-and-circuits.html">https://www.physics-and-radio-electronics.com/electronic-devices-and-circuits.html</a>	

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Communications I</b>		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103053		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	Five
Administering Department	Electrical Engineering	College	College of Engineering
Module Leader	Dr. Samir Jasim Mohammed	e-mail	<a href="mailto:Dr.samiralmuraab@uobabylon.edu.iq">Dr.samiralmuraab@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Mr. Ahmed Hussein Shatti	e-mail	<a href="mailto:Eng.ahmed.hussein@uobabylon.edu.iq">Eng.ahmed.hussein@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Ahmed Abdulkadhim Hamad	e-mail	<a href="mailto:eng.ahmed.ak@uobabylon.edu.iq">eng.ahmed.ak@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p><b>This module aims to:</b></p> <ol style="list-style-type: none"><li>1- Provide a comprehensive understanding of communication systems and the functionality of their elements.</li><li>2- Cover the classification of systems and signals, including an in-depth study of noise signals and their classification.</li><li>3- Discuss the modulation types and their advantages in communication systems.</li><li>5- Explore linear modulation techniques such as AM, DSB, and SSB.</li><li>6- Examine standard AM broadcast receivers and Frequency Division Multiplexing (FDM) systems.</li><li>7- Discuss nonlinear modulation techniques (FM and PM) and their applications.</li><li>8- Understand the methods of producing Narrowband FM (NBFM) and Wideband FM (WBFM) signals.</li><li>9- Learn the bandwidth calculation in both linear and nonlinear modulation systems.</li><li>10- Learn the average power calculations in both linear and nonlinear modulation systems.</li><li>11- Study the generation and demodulation processes for both linear and nonlinear modulation techniques.</li></ol> <p>The module aims to equip students with a comprehensive understanding of communication systems, signal processing, and modulation techniques. It covers a wide range of topics, from the basics of communication systems to the advanced concepts of Modulation and demodulation. Students will gain practical skills in analyzing and designing efficient communication systems.</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p><b>Upon completion of this semester, students are expected to:</b></p> <ol style="list-style-type: none"><li>1. Understand the fundamental elements and functions of communication systems.</li><li>2. Classify and describe different types of systems, such as the LTI system.</li><li>3. Classify and analyze various signals used in communication systems.</li><li>4. Identify and classify noise signals.</li></ol>

	<p>5. Comprehend the modulation process and explain its advantages in communication</p> <p>6. Identify and differentiate between different types of Modulation.</p> <p>7. Understand the principles and characteristics of AM, DSB, and SSB modulation.</p> <p>8. Understand the principle of the standard AM broadcast commercial receivers.</p> <p>9. Describe the principles and components of frequency-division multiplexing (FDM) systems.</p> <p>10. Understand the principles and characteristics of FM and PM Modulation.</p> <p>11. Calculate bandwidth and average power in the linear (AM) and nonlinear Modulation (FM) systems.</p> <p>12. Explain the generation and demodulation processes of AM and FM signals.</p>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Indicative content includes the following:</p> <p>Basic Definitions and Elements of Communication System [3 hours]</p> <p>Signal and System [6 hours]</p> <p>Noise Signals [4 hours]</p> <p>Linear Modulation [4 hours]</p> <p>Generation of AM. DSB. SSB [4 hours]</p> <p>Demodulation of AM. DSB. SSB [4 hours]</p> <p>Standard AM Receiver &amp; Examples [4 hours]</p> <p>Commercial AM Receivers &amp; Examples [3 hours]</p> <p>Multiplexing techniques (FDM) [4 hours]</p> <p>Nonlinear Modulation (Angle Modulation) [5 hours]</p> <p>NBFM for a single-tone waveform [4 hours]</p> <p>WBFM for a single-tone waveform [4 hours]</p> <p>Generation of WBFM signal [4 hours]</p> <p>Demodulation of FM signals [3 hours]</p> <p>Bandwidth and Power Calculation &amp; Examples [6 hours]</p>

<p style="text-align: center;"><b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم</p>	
<p><b>Strategies</b></p>	<p>Type The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.13
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	125		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	10% (10)	9, 15	LO # 2-9 and 10-12
	<b>Assignments</b>	2	10% (10)	4, 12	LO # 3, 4, 10 and 11
	<b>Projects / Lab.</b>	1	10% (10)	Continuous	
	<b>Report</b>	1	10% (10)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2hr	10% (10)	10	LO # 2-9
	<b>Final Exam</b>	3hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	Material Covered
<b>Week 1</b>	Basic Definitions and Terms of the Communication System
<b>Week 2</b>	Signal and System
<b>Week 3</b>	Noise Signals
<b>Week 4</b>	Linear Modulation + Assign.
<b>Week 5</b>	Generation of AM. DSB. SSB
<b>Week 6</b>	Demodulation of AM. DSB. SSB

<b>Week 7</b>	Standard AM Receiver & Examples
<b>Week 8</b>	Commercial AM Receivers & Examples
<b>Week 9</b>	Multiplexing techniques (FDM) + <b>Quiz</b>
<b>Week 10</b>	<b>Midterm Exam</b>
<b>Week 11</b>	Nonlinear Modulation (Angle Modulation) & NBFM for a single-tone waveform
<b>Week 12</b>	WBFM for a single-tone waveform + <b>Assign.</b>
<b>Week 13</b>	Generation of WBFM signal + <b>Report</b>
<b>Week 14</b>	Demodulation of FM signals
<b>Week 15</b>	Bandwidth and Power Calculation & Examples + <b>Quiz</b>
<b>Week 16</b>	<b>Final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	N.A.
<b>Week 2</b>	N.A.
<b>Week 3</b>	N.A.
<b>Week 4</b>	N.A.
<b>Week 5</b>	N.A.
<b>Week 6</b>	N.A.
<b>Week 7</b>	N.A.
<b>Week 8</b>	N.A.
<b>Week 9</b>	N.A.
<b>Week 10</b>	N.A.
<b>Week 11</b>	N.A.
<b>Week 12</b>	N.A.
<b>Week 13</b>	N.A.
<b>Week 14</b>	N.A.
<b>Week 15</b>	N.A.
<b>Week 16</b>	N.A.

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1-Introduction to Communication Systems (Ferrel G. Stremmler) 2-Communication Systems (A. Bruce Carlson)	Yes
Recommended Texts	Introduction to Communication Systems (Ferrel G. Stremmler)	No
Websites		

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Power I		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103054		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGIII	Semester of Delivery	Five
Administering Department	Electrical engineering	College	College of Engineering
Module Leader	Hayder Hussein Kadhum	e-mail	<a href="mailto:eng.hayder.kadhum@uobabylon.edu.iq">eng.hayder.kadhum@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Master's
Module Tutor	Hayder Hussein Kadhum	e-mail	<a href="mailto:eng.hayder.kadhum@uobabylon.edu.iq">eng.hayder.kadhum@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Sarmad Khaleel Ibrahim	e-mail	<a href="mailto:sarmad.ibrahim@uobabylon.edu.iq">sarmad.ibrahim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1- Gain knowledge about the fundamental principles, parameters, and characteristics of Electrical Design of Overhead Lines.</li> <li>2- Gain knowledge about the fundamental principles, parameters, and characteristics of Mechanical Design of Overhead Lines I</li> <li>3- Learn about the Underground Cables..</li> </ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<p>A student who has successfully completed this course should be able to:</p> <ol style="list-style-type: none"> <li>1. Understanding overall Electrical Design of Overhead Lines.</li> <li>2 Understanding overall Mechanical I Design of Overhead Lines.</li> <li>3. Understanding Underground Cables.</li> <li>4. Understanding Overhead Lines and Underground Cables Problems</li> </ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A - Electrical Design of Overhead Lines</u></p> <p>Constants of a Transmission Line(Resistance, Inductance and Capacitance) Flux Linkages (Flux linkages due to a single current carrying conductor , Flux linkages due to internal flux. Flux linkages due to external flux and Flux linkages in parallel current carrying conductors.</p> <p><b>Inductance of a Transmission Line</b>(Inductance of a Single Phase Two-wire Line Inductance of a 3-Phase Overhead Line, Symmetrical spacing, Unsymmetrical spacing Concept of Self-GMD and Mutual-GMD, Bundled Conductors on transmission line.</p> <p><b>Capacitance of a Transmission Line</b> Electrical Field And Potential Difference, Capacitance of a Single Phase Two-wire Line Capacitance of a 3-Phase Transmission Line Resistance of a Transmission Line, Classification of Overhead Transmission Lines, Short transmission lines, medium transmission lines, long transmission lines, Determination of Generalized Constants for Short, Medium and Long Transmission Lines, Complex Power Flow Through Transmission Lines, and Complex Power Flow Through Transmission Lines (General Form using ABCD Parameters of Transmission Line).</p> <p style="text-align: right;">[21 hrs]</p>

	<p><u>Part B Mechanical Design Overhead Lines</u></p> <p>Introduction , Main Components of Overhead Lines , Conductor Materials , Line Supports , Supports Types , Insulators ,Types of Insulators , Potential Distribution over Suspension Insulator , String Efficiency , Corona , Sag in Overhead Lines , Effect of wind and ice loading</p> <p>[21 hrs]</p>
	<p><u>Part C Underground Cables</u></p> <p>Construction of Cables, Insulating Materials for Cables Classification of Cables , Insulation Resistance of a Single-Core Cable , Capacitance of a Single-Core Cable , Dielectric Stress in a Single-Core Cable , Most Economical Conductor Size in a Cable , Capacitance of 3-Core Cables , Measurements of Ce and , Permissible Current Loading</p> <p>[20 hrs]</p>

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<ol style="list-style-type: none"> <li>1. Learning Technologies on Campus using Whiteboard and TV monitor.</li> <li>2. Hand out lecture notes.</li> <li>3. Video lectures on YouTube and google classroom.</li> </ol>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	48	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	3.2
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.46
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	<b>100</b>		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	5, 9,13	LO # 1-4, 5-8, and 9-12
	Assignments	3	10% (10)	4,8, 12	LO # 1-3, 5-7 and 8-11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	Continuous
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	16 or 17	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Review of Syllabus and study the constructional details of the Transmission Line.
Week 2	No-Load performance of Transmission Line under different lengths
Week 3	Effect of operating Capacitance on Transmission Line performance.
Week 4	Cable Behavior at no-load. + Assign.
Week 5	Matched Load performance of Transmission Line. +Quiz
Week 6	Performance characteristics for Transmission Line with ohmic – Inductive Loading.
Week 7	Performance characteristics for Transmission Line with ohmic – Capacitive Loading.
Week 8	Mid-term Exam + Assign.
Week 9	Performance characteristics for Three phase short circuit (part 1). +Quiz
Week 10	Performance characteristics for Three phase short circuit (part 2).
Week 11	Performance characteristics for Transmission Line with Inductive Loading
Week 12	Performance characteristics for Transmission Line with Capacitive Loading. + Assign.
Week 13	Influence of earth fault neutralizers (part 1) +Quiz + Report
Week 14	Influence of earth fault neutralizers (part 2)
Week 15	Asymmetrical short circuits
Week 16	Final Revision

<b>Delivery Plan (Weekly Lab. Syllabus)</b> المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	Text	Available in the Library?
<b>Required Texts</b>	9- Power System Analysis and Design, 5th ed., J. Duncan Glover, Mulukutla S. Sarma, and Thomas. 10- Principles of Power System, V.K. Mehta, Rohit Mehta, 2005. 11- Power System Analysis Third Edition 3rd Edition, Hadi Saadat	No

<b>Recommended Texts</b>	2- Principles of Power System, V.K. Mehta, Rohit Mehta, 2005.	No
<b>Websites</b>	<a href="https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering">https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering</a>	

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Electrical Machines III</b>		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	<b>UOBAB 0103055</b>		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGIII	Semester of Delivery	Five
Administering Department	ELEC	College	Engineering
Module Leader	Tahani Hamodi Mazher Al-Mhana	e-mail	<a href="mailto:eng.tahany.hamodi@uobabylon.edu.iq">eng.tahany.hamodi@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Tahani Hamodi Mazher Al-Mhana	e-mail	<a href="mailto:eng.tahany.hamodi@uobabylon.edu.iq">eng.tahany.hamodi@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Sarmad Khaleel Ibrahim	e-mail	<a href="mailto:sarmad.ibrahim@uobabylon.edu.iq">sarmad.ibrahim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	<b>UOBAB 0103044</b>	Semester	4
Co-requisites module	None	Semester	None

## Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ul style="list-style-type: none"> <li>• To give a broad understanding of Induction machines and their applications.</li> <li>• To provide students with an in-depth knowledge concerning Induction machines principles of operation.</li> <li>• To provide students with knowledge regarding to practical issues in three phase/ single phase induction motor such as starting.</li> <li>• To help student to derive equations describing operation of Induction machines, formulate relevant equivalent circuits and analyse problems related to operation of Induction machines.</li> <li>• To provide students with practical information related to the AC machines. This module has laboratory sessions where students can apply theoretical concepts to practical situations. Students will gain hands-on experience in three phase transformer and three phase AC machines including Induction and Synchronous machines.</li> </ul>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<p>After successful completion of this module, students should be able to:</p> <ul style="list-style-type: none"> <li>• Describe the general structure and components of Induction motors and generators.</li> <li>• Explain the operating principles of Induction machines.</li> <li>• The principles of operation and characteristics of Induction motors and Induction generators; fundamental characteristics of various types of Induction machines.</li> <li>• Tackle problems of analysis of performance and explain the shape of characteristics of actual machines.</li> <li>• Use equivalent circuits to analyse Induction machines in steady state operation.</li> <li>• Calculate losses and efficiency of induction motor and generator.</li> <li>• Control the speed of Induction motor.</li> <li>• Solve the starting problem in single phase Induction motor.</li> <li>• Develop laboratory skills through laboratory sessions.</li> </ul>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Indicative content includes the following:</p> <p><b>Part A: Three phase Induction motor</b></p> <p>Introduction to AC Machines, Faraday' Law, Lenz' Law, induced voltage, electromechanical Energy conversion, Three-phase induction machines,</p>

	<p>introduction to three-phase Induction motor (I.M), construction, rotor types: Squirrel cage and Wound rotor types, applications, principle of operation of a three-phase Induction motor, rotating magnetic field and induced voltages, speed of magnetic field rotation, slip, voltage and frequency induced in the rotor, motor under load, equivalent circuit model of the three-phase I.M: Transformer model of the three-phase I.M, rotor circuit model, final equivalent circuit, solving the equivalent circuit using Thevenin Theorem, power and torque in three-phase induction Motor, losses efficiency, power-flow diagram, Induction machines torque-speed characteristics, derivation of induced torque equation, maximum torque equation, starting torque equation, determination of equivalent circuit model parameters: no-load and locked-rotor tests, dc test for stator resistance, speed control methods of three-phase induction motors: Stator voltage control, Stator frequency control, V/F control, static rotor resistance control and pole changing method, starting induction motors: reduced voltage starting, series resistance starting, delta-wye starting. [36 hrs]</p> <p><b>Part B : Single phase Induction motors</b></p> <p>Single-phase induction motors, double-revolving field theory, starting of single-phase induction motors: split phase motors, capacitor-start motors, capacitor-start capacitor-run (permanent-split capacitor) motors, shaded pole motor, equivalent circuit model of single-phase induction motors with forward and reverse magnetic fields. [ 6 hrs]</p> <p><b>Part C : Induction generators</b></p> <p>Induction generators, induction generators operating alone, induction generators in wind power plants. Power stage, DFIG. [3 hrs]</p> <p><b>Note: the total hours should be equal the USSWL/sem=52</b></p>
--	--

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<p>In this module "Electrical machines III", Various teaching and learning approaches will be adopted to enhance students' understanding and engagement. Some common strategies are listed below:</p> <p>39. Learning Technologies on Campus using Whiteboard and TV monitor. On campus Lectures are the main teaching method in this module. It can include visual aids such as slides and diagrams to facilitate in-depth subject understanding. Instructors may also provide real-life examples and applications to make the content more relatable.</p>

40. **Multimedia and Interactive Tools:** Multimedia resources, such as video lectures on YouTube channel and google classroom can be used to enhance understanding and engage students.
41. **Practical Examples and Problem-Solving:** Instructors can use practical examples and problem-solving exercises to help students apply theoretical concepts to real-world situations. By presenting and solving problems related to electrical circuits, students can develop critical thinking and analytical skills.
  1. **Laboratory Work:** Laboratory sessions provide hands-on experience and reinforce theoretical concepts. Students can perform experiments and measurements using electrical components and instruments. This allows them to apply theoretical knowledge, gain practical skills, and understand the behavior of AC machines in a controlled environment.
  2. **Group Discussions and Collaborative Learning:** Students can work together to solve problems, analyze case studies, or discuss challenging concepts. This promotes peer learning, critical thinking, and communication skills.
  3. **Inquiry-Based Teaching:** Encouraging students to ask a lot of questions is an effective teaching strategy that does not only motivate students to think more practically but also helps them to become independent learners.
  4. **Tutorials:** Tutorials offer opportunities for students to seek additional help and clarification on specific topics.
  5. **Assessments and Feedback:** Regular assessments, such as quizzes, assignments, and exams, can be used to evaluate students' understanding and progress. Constructive feedback helps students identify areas for improvement and reinforces their learning.
  6. **Online Resources and Platforms:** Online resources, such as e-learning platforms, online forums, and educational websites, can support student learning outside the classroom. These resources can provide additional readings, practice exercises, and interactive modules to supplement classroom teaching.
  7. **Self-directed Learning:** Encouraging students to take ownership of their learning through self-directed study.

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	93	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	6
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.8
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	15% (15)	5 , 9	LO # 2, 3,4 and 6, 7,8
	<b>Assignments</b>	2	10% (10)	6, 12	LO # 3, 4 , 5 and 9, 10 and 11
	<b>Projects / Lab.</b>	1	10% (10)	Continuous	
	<b>Report</b>	1	5% (5)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	11	LO # 1-10
	<b>Final Exam</b>	3hr	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	<b>Material Covered</b>
<b>Week 1</b>	Welcome to this course, syllabus, and expectations. Textbook. Introduction to AC Machines. Power relationship, Faraday' Law, Lenz' Law. Induced voltage. Electromechanical Energy conversion.
<b>Week 2</b>	Three-phase induction machines. Introduction to three-phase Induction motor (I.M), construction, rotor types: Squirrel cage and wound rotor. Induction motors applications.
<b>Week 3</b>	Principle of operation of a three-phase Induction motor, Rotating Magnetic Field and Induced Voltages.
<b>Week 4</b>	Speed of magnetic field rotation. Slip, voltage and frequency induced in the rotor, Motor Under load.

<b>Week 5</b>	Equivalent circuit model of the three-phase I.M: Transformer model of the three-phase I.M, rotor circuit model, Final equivalent circuit. +Quiz
<b>Week 6</b>	Solving the equivalent circuit using Thevenin Theorem. + Assign.
<b>Week 7</b>	Power and torque in three-phase induction Motor, losses efficiency. Power-flow diagram.
<b>Week 8</b>	Induction machines torque-speed characteristics. Derivation of induced torque equation, maximum torque equation, starting torque equation.
<b>Week 9</b>	Determination of equivalent circuit model parameters: no-load and locked-rotor tests, dc test for stator resistance. +Quiz
<b>Week 10</b>	Speed control methods of three-phase induction motors: Stator voltage control, Stator frequency control, V/F control.
<b>Week 11</b>	<b>Mid-term Exam</b> + Static rotor resistance control and pole changing method.
<b>Week 12</b>	Starting induction motors: reduced voltage starting, series resistance starting, delta-wye starting. + Assign.
<b>Week 13</b>	Single-phase induction motors, double-revolving field theory. Starting of single-phase induction motors: split phase motors, capacitor-start motors, capacitor-start capacitor-run (permanent-split capacitor) motors. Shaded pole motor. + Report
<b>Week 14</b>	Equivalent circuit model of single-phase induction motors with forward and reverse magnetic fields.
<b>Week 15</b>	Induction generators, induction generators operating alone, induction generators in wind power plants. Power stage, DFIG.
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	Three phase transformer connections (Bank): Star- star and star-delta connections
<b>Week 2</b>	Three phase transformer connections (Bank):delta-star, delta-delta and open delta
<b>Week 3</b>	Three phase transformer connections (single unit) primary side
<b>Week 4</b>	Three phase transformer connections (single unit) secondary side
<b>Week 5</b>	Load test of three phase transformer
<b>Week 6</b>	Open circuit and short circuit tests of three phase transformer
<b>Week 7</b>	Calculating three phase power using two wattmeter method
<b>Week 8</b>	<b>Mid-term Exam</b>

<b>Week 9</b>	Equivalent circuit parameters determination of a three phase squirrel cage induction motor
<b>Week 10</b>	Load test of a three phase Induction motor (I.M)
<b>Week 11</b>	Speed control of a three phase I.M (part 1)
<b>Week 12</b>	Speed control of a three phase I.M (part 2)
<b>Week 13</b>	Characteristics and speed control of 3-phase slip-ring induction motor
<b>Week 14</b>	Voltage regulation of 3-phase alternator using indirect methods (Open circuit and short cct.)
<b>Week 15</b>	Alternators synchronization (parallel operation)
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	Text	Available in the Library?
<b>Required Texts</b>	Electric Machinery Fundamental, fifth edition, Stephen J. Chapman.	Yes
<b>Recommended Texts</b>	1- Electrical Machines, Drives, and Power System, fifth edition, Theodore Wildi. 2- Electric Machinery, sixth edition, A. E. Fitzgerald, Charles Kingsley, Jr., Stephen D. Umans.	No
<b>Websites</b>		

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Optical Communication		Module Delivery
Module Type	E		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103056		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGIII	Semester of Delivery	Five
Administering Department	Electrical Engineering	College	Engineering
Module Leader	Ibrahim Abdullah Murdas	e-mail	eng.ibraheem.abdullaa@uobabylon.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Ibrahim Abdullah Murdas	e-mail	<a href="mailto:eng.ibraheem.abdullaa@uobabylon.edu.iq">eng.ibraheem.abdullaa@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Ahmed Abdulkadhim Hamad	e-mail	<a href="mailto:eng.ahmed.ak@uobabylon.edu.iq">eng.ahmed.ak@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<p>a. To study the fundamentals of optical Fiber Communications b. To study about the various optical fiber modes, configuration and transmission characteristics of optical fibers. c. To learn about the various optical sources, detectors and transmission techniques. d. To explore various idea about optical fiber measurements and various coupling techniques e. To enrich the knowledge about optical communication systems and networks</p>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<p>Upon completion of this course, students should be able to: A1. Understand the syllabus and concept of basics of optical communication. A2. Understand the rules and regulations for this type of course. A3. Fundamental concept of fiber optics. A4. Read and write symbols and abbreviations for different types of terms. A5. Understand how transmission light signal through the fiber. A6. Read different technical books and lecture notes.</p>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>B1. Students should be able to analysis optical communication systems successfully. B2. Students should be able to solve practical problems. B3. Students should be able to analysis the optical communication systems based on data given. B4. Students should be able to search topics online and make reports.</p> <p><b>Should be included with NUMBER of hours of the USSWL/sem=52</b></p>

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

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

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	48	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	3
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.466
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	10% (10)	5 , 10	LO # 3 and 4, 8 and 9
	<b>Assignments</b>	2	10% (10)	6 , 12	LO # 4 and 5, 10 and 11
	<b>Projects</b>	1	10% (10)	Continuous	
	<b>Report</b>	1	10% (10)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	7	LO # 1-7
	<b>Final Exam</b>	3hr	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	Material Covered
<b>Week 1</b>	Introduction to Optical Fibers, Evolution of fiber optic system
<b>Week 2</b>	Element of an Optical Fiber Transmission link- Ray Optics-Optical Fiber Modes and Configurations
<b>Week 3</b>	Mode theory of Circular Wave guides- Overview of Modes-Key Modal concepts
<b>Week 4</b>	Linearly Polarized Modes -Single Mode Fibers-Graded Index fiber structure
<b>Week 5</b>	Degradation Optical Fibers, Attenuation - Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses + Quiz

<b>Week 6</b>	Signal Distortion in Optical Wave guides-Information Capacity determination -Group Delay- Material Dispersion + Assing.
<b>Week 7</b>	<b>Mid-term Exam</b>
<b>Week 8</b>	Wave guide Dispersion, Signal distortion in SM fibers-Polarization Mode dispersion, Intermodal dispersion
<b>Week 9</b>	Pulse Broadening in GI fibers-Mode Coupling -Design Optimization of SM fibers-RI profile and cut-off wavelength
<b>Week 10</b>	Fiber Optical Sources and Coupling, Direct and indirect Band gap materials-LED structures - Light source materials -Quantum efficiency and LED power, Modulation of a LED, lasers Diodes-Modes and Threshold condition + Quiz
<b>Week 11</b>	Rate equations -External Quantum efficiency -Resonant frequencies -Laser Diodes, Temperature effects, Introduction to Quantum laser
<b>Week 12</b>	Fiber amplifiers- Power Launching and coupling, Lencing schemes, Fibre -to- Fibre joints, Fibre splicing + Assing.
<b>Week 13</b>	Fiber Optical Receivers , PIN and APD diodes -Photo detector noise, SNR + Report
<b>Week 14</b>	Detector Response time, Avalanche Multiplication Noise -Comparison of Photo detectors
<b>Week 15</b>	Fundamental Receiver Operation - preamplifiers, Error Sources
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	N.A.
<b>Week 2</b>	N.A.
<b>Week 3</b>	N.A.
<b>Week 4</b>	N.A.
<b>Week 5</b>	N.A.
<b>Week 6</b>	N.A.
<b>Week 7</b>	N.A.
<b>Week 8</b>	N.A.
<b>Week 9</b>	N.A.

Week 10	N.A.
Week 11	N.A.
Week 12	N.A.
Week 13	N.A.
Week 14	N.A.
Week 15	N.A.
Week 16	N.A.

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	John M. Senior "Optical Fiber Communications Principles and Practice" third edition published 2009 © Pearson Education Limited .	Yes
<b>Recommended Texts</b>	Gerd Keiser, Optical Fiber Communications, third edition, McGraw Hill, 2000	No
<b>Websites</b>		

### Grading Scheme

#### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Analysis II		Module Delivery
Module Type	S		<input type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103061		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	6
Administering Department	Electrical engineering	College	College of Engineering
Module Leader	Dr. Haider Jabber Abd	e-mail	<a href="mailto:eng.haider.jabber@uobabylon.edu.iq">eng.haider.jabber@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Haider Jabber Abd	e-mail	<a href="mailto:eng.haider.jabber@uobabylon.edu.iq">eng.haider.jabber@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Osama Qasim Jumah Al- Thahab	e-mail	<a href="mailto:eng.osama.qasim@uobabylon.edu.iq">eng.osama.qasim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOBAB 0103051		Semester
Co-requisites module	None		Semester

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<p>The main objectives of this course can be summarized as follows:</p> <ol style="list-style-type: none"><li>5. Introduces an introduction to the theory of probability, conditional probability, outcomes ways (Permutations and Combinations),</li><li>6. Understanding the probability concepts and how apply to the analysis, design, and optimization of electrical systems</li><li>7. Study the random variables subject for both continuous and discrete Variables with their applications and display the joint Distribution principles</li><li>8. Explain the Probability Distributions with its kinds and their specification to the application.</li><li>9. Clarify the numerical analysis with different methods and orders and knowing how can applied to the electrical system networks</li><li>10. Study the concept of Partial Differential Equations and its application of different specialty</li><li>11. Explanation the complex number theorem , Polar Form of Complex Numbers</li><li>12. Display the statistics criteria with their formula and calculation</li></ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<p>After successful completion of this module, students are expected to obtain the following outcomes:</p> <ol style="list-style-type: none"><li>1. Students learn about the principles of probability, Conditional Probability, Random Variables, Probability Distributions and their applications.</li><li>2. Study will understand the concept of numerical analysis and how can apply it to solve the electrical system networks</li><li>3. Studying PDEs in electrical engineering equips students with a mathematical framework to analyze and solve complex problems related to wave propagation, electromagnetic fields and circuit analysis</li><li>4. Understand on the concept of statistics and statistical graphs and how to get results for a lot of statistical engineering issues</li><li>5. The complex numbers allows students to solve previously unsolvable equations, understand the behavior of electrical circuits and signals, analyze control systems</li></ol>

<b>Indicative Contents</b> المحتويات الإرشادية	<b>Part 1: Theory of Probability</b> Introduction to Probability, Experiments, Outcomes, Conditional Probability, Permutations and Combinations, Random Variables, Continuous and Discrete Random Variables, joint Distribution, Binomial, Normal and Poison Distributions . ( 20 hrs)		
	<b>Part 2 Numerical Analysis</b> Numerical Analysis, Numerical Solution of Equations by Iteration with one variable, Numerical Method for 1st order differential Equations, Numerical Solution of Nonlinear system, Numerical Integration. ( 15 hrs)		
	<b>Part 3 Partial Differential Equations</b> Partial Differential Equations , Laplace equation, Wave's equation, Heat's equation ( 10 hrs)		
	<b>Part 4 Complex Numbers</b> Complex Numbers, Complex Plane, Polar Form of Complex Numbers, Powers and Roots ( 9 hrs)		
	<b>Part5 Statistics</b> Statistics, Histograms and Frequency Polygons, Cumulative-Frequency Distributions and Ogives ( 8 hrs)		
<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم			
<b>Strategies</b>	12. Learning Technologies on Campus using Whiteboard and TV monitor. 13. Hand out lecture notes. Video lectures on YouTube and google classroom		
<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	63	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.13
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 , 10	LO # 3 and 4, 8 and 9
	Assignments	2	10% (10)	6 , 12	LO # 4 and 5, 10 and 11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	Continuous
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	16 or 17	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Probability, Experiments, Outcomes, Conditional Probability.
Week 2	Permutations and Combinations.
Week 3	Random Variables, Continuous and Discrete Random Variables, joint Distribution
Week 4	Binomial, Normal and Poison Distributions.
Week 5	Numerical Analysis, Numerical Solution of Equations by Iteration with one variable.
Week 6	Numerical Method for 1st order differential Eq.
Week 7	Mid-term Exam + Numerical Analysis Using MATLAB
Week 8	Numerical Solution of Nonlinear system
Week 9	Numerical Integration
Week 10	Partial Differential Equations , Laplace equation.
Week 11	Wave's equation, Heat's equation
Week 12	Complex Numbers, Complex Plane.
Week 13	Polar Form of Complex Numbers, Powers and Roots.
Week 14	Statistics, Histograms and Frequency Polygons
Week 15	Cumulative-Frequency Distributions and Ogives.
Week 16	Preparatory week before the final Exam

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	Mid-term Exam
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	

## Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	2. Advance Engineering Mathematics – WILEY-2000	Yes
<b>Recommended Texts</b>	1. "Probability: For the Enthusiastic Beginner" by David J. Morin (2020) 2. "Probability: Theory and Examples" by Rick Durrett (2019) 3. "Introduction to Probability" by Joseph K. Blitzstein and Jessica Hwang (2019)	Yes
<b>Websites</b>		

## Grading Scheme

### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electronics IV		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103062		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGIII	Semester of Delivery	
Administering Department	Electrical Engineering	College	Engineering College
Module Leader	Osama Qasim Jumah Al-Thahab	e-mail	<a href="mailto:eng.osama.qasim@uobabylon.edu.iq">eng.osama.qasim@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Osama Qasim Jumah Al-Thahab	e-mail	<a href="mailto:eng.osama.qasim@uobabylon.edu.iq">eng.osama.qasim@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Hassan Jassim	e-mail	<a href="mailto:hassan.jasim@uobabylon.edu.iq">hassan.jasim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOBAB 0103052		Semester 5
Co-requisites module	None		Semester

## Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. The student take a knowledge about the Multifunctional Operational Amplifier design, and aims to identify the features. Amplifier analysis (DC &amp; AC), as well as the DC offset phase. Learn about Op-Amplifier applications</li> <li>2. Studying of inverting and non-inverting amplifier, in addition to, integration and differentiation, addition and subtraction, comparison, and rectifiers.</li> <li>3. Give a knowledge about Precision clamper, sample and old circuit, and peak detector circuit</li> <li>4. Studying the oscillators, RC oscillator design, LC oscillator and the crystal oscillator.</li> <li>5. Design the active filter and the ladder filter with the GIC concept, in addition to Biquad filter.</li> <li>6. Integrated circuit Fabrication. Learn about Fabrication processes, resistors, capacitors, transistor fabrication, Layout design rules, and full custom, semicustom design and phase locked loop (PLL).</li> <li>7. Introduction to Multisim program, applying Oscillators, OP-Amp applications, and Active filters.</li> </ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. The understanding of Operational Amplifier design and its applications.</li> <li>2. Discuss the effect of inverting and non-inverting amplifier, in addition to, integration and differentiation, addition and subtraction, comparison.</li> <li>3. Sketch the output of Precision clamper, sample and old circuit, and peak detector circuit with half wave rectifier.</li> <li>4. Analyze different oscillators like RC and LC oscillators.</li> <li>5. Discuss the effect of active filter on different frequency level by using traditional active filters.</li> <li>6. Learn the effect of GIC concept on the Ladder filter.</li> <li>7. Make the students learn about how the Integrated Circuit will fabricated. Taking into account the fabrication of resistors, capacitors and transistors. In addition to PLL design.</li> <li>8. Designing all electronic circuits in the Multisim program.</li> </ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p><b>1- Operational Amplifier Design</b> (6 Hrs) OP-Amp characteristics and structure, difference amplifier (DC and AC analysis), DC level shifting stage.</p> <p><b>2- Operational Amplifier Applications</b> (12)</p>

	<p>Hrs)</p> <p>Inverting and non – inverting amplifier, integrator, differentiator, adder, subtractor, comparator, precision diode, rectifier, precision clamps, sample and hold circuit, and peak detector.</p> <p><b>3- Oscillator</b> (8 Hrs)</p> <p>Oscillator concept, RC oscillator, LC oscillator, crystal oscillator.</p> <p><b>4-Active Filters</b> (12 Hrs)</p> <p>Filter concept, types, approximations, active RC design, biquad structure, ladder design, and GIC.</p> <p><b>5- Integrated Circuit Fabrication</b> (8 Hrs)</p> <p>Fabrication process, IC components (resistors, capacitors), transistor fabrication, layout design rules, full custom, semicustom design, phase locked loop (PLL).</p> <p><b>6- Multisim Program</b> (6 Hrs)</p> <p>Applying OP-Amplifier Applications, Oscillators applications, and different Active filters types.</p>
--	---

<b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم	
<b>Strategies</b>	<p>This section discusses the effective learning and teaching strategies to improve the learning, skills and outcomes of third class students of electrical engineering during the studying of Electronic IV.</p> <ol style="list-style-type: none"> <li>1- Provide course information in a simple and understandable manner by using the blackboard, digital screen and computer.</li> <li>2- The use of conditioning, conjugation and meaning to increase comprehension of the study material.</li> <li>3- Encourage students to think critically and motivate them to research and explore.</li> <li>4- Providing special exams to measure students' level of understanding.</li> <li>5- Encouraging students to cooperate and teamwork.</li> <li>6- Using pictures, charts and illustrations to clarify concepts and information and facilitate understanding.</li> </ol>

	<p>7- Paying attention to the individual talents and interests of students and allowing them to learn according to their individual learning style.</p> <p>8- Teach the student how become a Self-learning student to make them able to solve different questions.</p> <p>9- Students are assigned a project to produce a product or solve a specific problem.</p> <p>10- Digital learning: it uses technology and multimedia to facilitate the learning process and motivate students.</p> <p>These strategies will help students in understanding the module (Electronics IV) very well and faster.</p>
--	---

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	48	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	3
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.5
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	10% (10)	5 , 9	LO # 2 and 4
	<b>Assignments</b>	2	10% (10)	6 , 12	LO # 2 and 5
	<b>Project/Lab</b>	0	0%	Continuous	
	<b>Report</b>	1	10% (10)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	8	LO # 1-7
	<b>Final Exam</b>	3hr	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
---	--

	Material Covered
Week 1	OP-Amp characteristics and structure
Week 2	Difference amplifier (DC and AC analysis)
Week 3	Inverting and non – inverting amplifier, integrator, and differentiator.
Week 4	Adder, subtractor, comparator, precision diode, rectifier, precision clamps.
Week 5	Sample and hold circuit, and peak detector.
Week 6	Oscillator concept, RC Oscillator.
Week 7	LC oscillator, crystal oscillator.
Week 8	<b>Mid Term Exam. OP-Amp concepts and applications, Oscillator circuits</b>
Week 9	Filter concept, types, and approximations.
Week 10	Active RC design, ladder design.
Week 11	Biquad structure & GIC.
Week 12	Fabrication process, IC components.
Week 13	Resistors, capacitors, transistor fabrication, Layout design rules
Week 14	Full custom, semicustom design, phase locked loop (PLL).
Week 15	Introduction to Multisim program, applying OP-Amp applications, Active filters, and Oscillators
Week 16	<b>Preparatory week before the final Exam</b>

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1) Integrated Electronic, Analog And Digital Circuits And Systems. By Millman Halkias. Mcgraw Hill 1972. 2) Electronic Devices and Circuit Theory. By R. Boylested and L. Nashelsky. Sixth edition. Prentice – Hall international, 1996.	Yes
Recommended Texts	1. Operational Amplifiers. By Dan I. Porat. Second edition. John Wily &sons, 1988. 2. Electronic Engineering. By Charles L. Ally, and Kenneth W. Atwood. Third Edition. John Wily &sons,	No

	1973.	
<b>Websites</b>	<a href="https://www.physics-and-radio-electronics.com/electronic-devices-and-circuits.html">https://www.physics-and-radio-electronics.com/electronic-devices-and-circuits.html</a>	

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Communications II		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103063		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Electrical Engineering	College	College of Engineering
Module Leader	Samir Jasim Mohammed	e-mail	<a href="mailto:Dr.samiralmuraab@uobabylon.edu.iq">Dr.samiralmuraab@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Ahmed Hussein Shatti	e-mail	<a href="mailto:eng.ahmed.hussein@uobabylon.edu.iq">eng.ahmed.hussein@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Ahmed Abdulkadhim Hamad	e-mail	<a href="mailto:eng.ahmed.ak@uobabylon.edu.iq">eng.ahmed.ak@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOBAB 0103053		Semester 5
Co-requisites module	None		Semester

## Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p><b>This module aims to:</b></p> <ol style="list-style-type: none"><li>1- Provide a comprehensive understanding of transmission line theory and its importance in communication systems.</li><li>2- Introduce key components of transmission lines, including standing wave ratio (SWR), characteristic impedance (<math>Z_0</math>), and reflection coefficient.</li><li>3- Teach students how to calculate and analyze transmission line parameters using Smith Chart simulation.</li><li>4- Explore digital communication systems and their advantages and disadvantages.</li><li>5- Discuss pulse modulation and sampling theory in digital communication.</li><li>6- Cover various modulation techniques, including pulse amplitude modulation (PAM), pulse width modulation (PWM), pulse density modulation (PDM), pulse code modulation (PCM), delta modulation (DM), and digital carrier modulation techniques like amplitude shift keying (ASK), frequency shift keying (FSK), and phase shift keying (PSK).</li><li>7- Cover the study of time division multiplexing (TDM) and its role in transmitting multiple information signals over a common channel.</li><li>8- Learn examples of advanced communication systems.</li></ol>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p><b>By the end of this semester, students are expected to:</b></p> <ol style="list-style-type: none"><li>1. Understand the fundamentals of transmission line theory and its importance.</li><li>2. Identify and describe the main components of a transmission line.</li><li>3. Calculate parameters such as SWR, <math>Z_0</math>, and reflection coefficient with Smith Chart.</li><li>4. Explain the basic principles and components of digital communication systems.</li><li>5. Analyze the advantages and disadvantages of digital communication.</li><li>6. Understand pulse modulation techniques and sampling theory.</li><li>7. Differentiate between PAM, PWM, and PDM modulation techniques.</li><li>8. Explain the principles and applications of PCM and DM and learn other types of</li></ol>

	<p>digitizing methods.</p> <p>9. Identify and describe modulation techniques such as ASK, FSK, and PSK.</p> <p>10. Explain the principles and applications of TDM multiplexing.</p> <p>11- Discover examples of some advanced communication systems.</p>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Indicative content includes the following:</p> <p><b>Transmission Line:</b> Introduction to two-line conductors, Equations: Distributive Parameters, Transmission Line Examples [12 hours]</p> <p><b>Lab:</b> Second Order Low and High Pass Active Filter, AM-DSB-LC Modulation and Demodulators and AM-DSB-SC.</p> <p><b>Propagation:</b> Propagation Constant, Reflection coefficients, and SWR and Transmission Line Examples [10 hours]</p> <p><b>Lab:</b> Frequency Division Multiplexing, Pulse Width Modulation/Demodulation and Frequency Modulation</p> <p><b>Introduction to Digital Communication</b> (Pulse Modulation), Sampling Theory and PAM, PWM, PPM Generation [18 hours]</p> <p><b>Lab:</b> Frequency Demodulation Analog to Digital Converter and Pulse Amplitude Modulation (PAM)</p> <p><b>Digital Modulation:</b> Pulse Code Modulation (PCM), Delta Modulation (DM) and Signalling Format [16 hours]</p> <p><b>Lab:</b> Phase-Locked Loop (PLL), Pulse Code Modulation (PCM)</p> <p>Digital Carrier Modulation, Multiplexing Techniques, Time Division Multiplexing (TDM) [15 hours]</p> <p><b>Lab:</b> Delta Modulation (DM) and Frequency Shift Keying (FSK)</p>

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

<p><b>Student Workload (SWL)</b> الحمل الدراسي للطالب</p>			
<b>Structured SWL (h/sem)</b>	108	<b>Structured SWL (h/w)</b>	7

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.46
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	175		

### Module Evaluation

#### تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	5 ,10, 15	LO # 1-3, 4-8, and 9, 10
	Assignments	2	10% (10)	4 , 12	LO # 1-3 and 6-9
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	Continuous
Summative assessment	Midterm Exam	2hr	10% (10)	11	LO # 1-8
	Final Exam	3hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Transmission Line: Introduction to two-line conductors
<b>Week 2</b>	Transmission Line Equations: Distributive Parameters
<b>Week 3</b>	Transmission Line Examples
<b>Week 4</b>	Propagation Constant, Reflection coefficients, and SWR
<b>Week 5</b>	Transmission Line Examples + Quiz
<b>Week 6</b>	Introduction to Digital Communication (Pulse Modulation)
<b>Week 7</b>	Sampling Theory
<b>Week 8</b>	PAM, PWM, PPM Generation
<b>Week 9</b>	Pulse Code Modulation (PCM)
<b>Week 10</b>	Delta Modulation (DM) + Quiz
<b>Week 11</b>	<b>Mid-term Exam:</b> Other Types of Digitizing (adaptive DM, differential PCM, compressed PCM)
<b>Week 12</b>	Digital Carrier Modulation and Signalling Format
<b>Week 13</b>	Multiplexing Techniques
<b>Week 14</b>	Time Division Multiplexing (TDM)

<b>Week 15</b>	Advanced communication systems + Quiz
<b>Week 16</b>	Final Exam

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	Second Order Low and High Pass Active Filter
<b>Week 2</b>	AM-DSB-LC Modulation
<b>Week 3</b>	AM-DSB-LC Demodulators
<b>Week 4</b>	AM-DSB-SC
<b>Week 5</b>	Frequency Division Multiplexing
<b>Week 6</b>	Pulse Width Modulation/Demodulation
<b>Week 7</b>	Frequency Modulation
<b>Week 8</b>	<b>Mid-term Exam</b>
<b>Week 9</b>	Frequency Demodulation
<b>Week 10</b>	Analog to Digital Converter
<b>Week 11</b>	Pulse Amplitude Modulation (PAM)
<b>Week 12</b>	Phase-Locked Loop (PLL)
<b>Week 13</b>	Pulse Code Modulation (PCM)
<b>Week 14</b>	Delta Modulation (DM)
<b>Week 15</b>	Frequency Shift Keying (FSK)
<b>Week 16</b>	<b>Final Exam</b>

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	1-Introduction to Communication Systems (Ferrel G. Stremler) 2-Communication Systems (A. Bruce Carlson)	Yes
<b>Recommended Texts</b>	Modern digital and analog communication systems (Ding, Zhi_ Lathi - 2018_2019)	No
<b>Websites</b>		

## Grading Scheme

### مخطط الدرجات

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Power II		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103064		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Electrical engineering	College	College of Engineering
Module Leader	Dr. Sarmad Khaleel Ibrahim	e-mail	<a href="mailto:Sarmad.ibrahim@uobabylon.edu.iq">Sarmad.ibrahim@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Sarmad Khaleel Ibrahim	e-mail	<a href="mailto:Sarmad.ibrahim@uobabylon.edu.iq">Sarmad.ibrahim@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Kasim Karamm Abdalla	e-mail	<a href="mailto:eng.kassim.kerem@uobabylon.edu.iq">eng.kassim.kerem@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOBAB 0103054		Semester 5
Co-requisites module	None		Semester

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b></p> <p>أهداف المادة الدراسية</p>	<p>4- Gain knowledge about the fundamental principles, parameters, and characteristics of transmission lines.</p> <p>5- Develop skills in analyzing the performance of transmission lines, including voltage drop, power losses, line impedance, and power transfer capability.</p> <p>6- Learn about the parameters used to characterize transmission lines, including resistance, inductance, capacitance, and shunt admittance. Study transmission line models, such as the distributed parameter model, the pi-model, and the T-model, to analyze line behavior and perform simulations.</p> <p>7- Learn about DC distribution systems and their applications, including radial and Ring configurations</p> <p>8- Study AC distribution systems and their applications, including radial configurations</p> <p>9- Learn about Variable Load on Power Stations and their Effects of variable.</p>
<p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>A student who has successfully completed this course should be able to:</p> <ol style="list-style-type: none"> <li>1. Understanding overall transmission line performance, classification, and Complex Power Flow at steady-state operation under normal conditions.</li> <li>2. Understanding accurate and approximate models for all transmission lines.</li> <li>3. Understanding Distribution Systems including A.C. and D.C Distribution System Problems.</li> <li>4. Addresses the important concept of Variable Load. How is it possible to affect customer's voltage within the standard as the load varies all the time.</li> <li>5. Understanding the Some of the important effects of variable load on a power station.</li> </ol>
<p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A - Performance of Transmission Lines</u></p> <p>Performance of Transmission Lines, Classification of Overhead Transmission Lines, Short transmission lines, medium transmission lines, long transmission lines, Determination of Generalized Constants for Short, Medium and Long Transmission Lines, Complex Power Flow Through Transmission Lines, and Complex Power Flow Through Transmission Lines (General Form using ABCD Parameters of Transmission Line). [24 hrs]</p> <p><b>Lab:</b> Transmission Line Analysis, Cable Behavior at no-load, Matched Load performance and characteristics of Transmission Line with ohmic – Inductive</p>

	<p>and ohmic – Capacitive Loading.</p> <p><u>Part B - Distribution Systems</u></p> <p>Distribution Systems, Types of D.C. Distributors, Uniformly Loaded Distributor Fed at One End, Distributor Fed at Both Ends - Concentrated, Loading, Uniformly Loaded Distributor Fed at Both Ends, Distributor with Both Concentrated and Uniform Loading,</p> <p>Ring Distributor, Ring Main Distributor with Interconnector, A.C. Distribution Calculations, and Methods of Solving A.C. Distribution Problems. [23 hrs]</p> <p><b>Lab:</b> Performance characteristics for Three phase short circuit and Performance characteristics for Transmission Line with Inductive and capacitive Loading.</p> <p><u>Part C - Variable Load on Power Stations</u></p> <p>Variable Load on Power Stations, Effects of variable load, Load Curves, Units Generated per Annum, Load Duration Curve, Types of Loads, Load Curves and Selection of Generating Units. [10 hrs]</p> <p><b>Lab:</b> Influence of earth fault neutralizers and Asymmetrical short circuits</p>
--	--

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

<b>Strategies</b>	<ol style="list-style-type: none"> <li>1. Learning Technologies on Campus using Whiteboard and TV monitor.</li> <li>2. Hand out lecture notes.</li> <li>3. Video lectures on YouTube and google classroom.</li> </ol>
-------------------	---

### Student Workload (SWL)

#### الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	93	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	6
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.8
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	5, 9,13	LO # 1-4, 5-8, and 9-12
	Assignments	3	10% (10)	4,8, 12	LO # 1-3, 5-7 and 8-11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	Continuous
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	16 or 17	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Performance of Transmission Lines
Week 2	Classification of Overhead Transmission Lines
Week 3	Short transmission lines
Week 4	Medium transmission lines
Week 5	Long transmission lines
Week 6	Determination of Generalized Constants for Short, Medium, and long Transmission Lines
Week 7	Complex Power Flow Through Transmission Lines, and Complex Power Flow Through Transmission Lines (General Form using ABCD Parameters of Transmission Line).
Week 8	Mid-term Exam: Transmission Lines Analysis and Power Flow Through Transmission Lines
Week 9	Introduction of Power Distribution System (A.C and D.C Distribution Systems)
Week 10	D.C Distributor Fed at One End and Both Ends - Concentrated Loading with Equal and Unequal voltages
Week 11	D.C Distributor Fed at One End and Both Ends - Uniformly Loading with Equal and Unequal voltages
Week 12	D.C Distributor with Both Concentrated and Uniform Loading and Ring Main Distributor with and without Interconnector
Week 13	A.C. Distribution System and Methods of Solving A.C. Distribution Problems

<b>Week 14</b>	Variable Load on Power Stations and Main Effects of variable load on Power station Performance
<b>Week 15</b>	Load Curves and Load Duration Curve
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	Review of Syllabus and study the constructional details of the Transmission Line.
<b>Week 2</b>	No-Load performance of Transmission Line under different lengths
<b>Week 3</b>	Effect of operating Capacitance on Transmission Line performance.
<b>Week 4</b>	Cable Behavior at no-load.
<b>Week 5</b>	Matched Load performance of Transmission Line.
<b>Week 6</b>	Performance characteristics for Transmission Line with ohmic – Inductive Loading.
<b>Week 7</b>	Performance characteristics for Transmission Line with ohmic – Capacitive Loading.
<b>Week 8</b>	<b>Mid-term Exam</b>
<b>Week 9</b>	Performance characteristics for Three phase short circuit (part 1).
<b>Week 10</b>	Performance characteristics for Three phase short circuit (part 2).
<b>Week 11</b>	Performance characteristics for Transmission Line with Inductive Loading
<b>Week 12</b>	Performance characteristics for Transmission Line with Capacitive Loading.
<b>Week 13</b>	Influence of earth fault neutralizers (part 1)
<b>Week 14</b>	Influence of earth fault neutralizers (part 2)
<b>Week 15</b>	Asymmetrical short circuits
<b>Week 16</b>	Final Revision

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

	Text	Available in the Library?
<b>Required Texts</b>	12- Power System Analysis and Design, 5th ed., J. Duncan Glover, Mulukutla S. Sarma, and Thomas. 13- Power System Analysis Third Edition 3rd Edition, Hadi	No

	Saadat	
<b>Recommended Texts</b>	1. Principles of Power System, V.K. Mehta, Rohit Mehta, 2005.	No
<b>Websites</b>	<a href="https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering">https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering</a>	

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Electrical Machines IV</b>		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	<b>UOBAB 0103065</b>		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Electrical Engineering	College	Engineering College
Module Leader	Tahani Hamodi Mazher Al-Mhana	e-mail	<a href="mailto:eng.tahany.hamodi@uobabylon.edu.iq">eng.tahany.hamodi@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Tahani Hamodi Mazher Al-Mhana	e-mail	<a href="mailto:eng.tahany.hamodi@uobabylon.edu.iq">eng.tahany.hamodi@uobabylon.edu.iq</a>
Peer Reviewer Name	Dr. Sarmad Khaleel Ibrahim	e-mail	<a href="mailto:sarmad.ibrahim@uobabylon.edu.iq">sarmad.ibrahim@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	<b>UOBAB 0103055</b>		Semester 5
Co-requisites module	None		Semester None

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ul style="list-style-type: none"> <li>• To give a broad understanding of Synchronous machines and their applications.</li> <li>• To study the principle of operation for Synchronous generators and motors.</li> <li>• To develop skills in analyzing the performance of Synchronous machines.</li> <li>• To analyze problems related to operation and control of Synchronous motors and generators.</li> <li>• To understand the effect of load variations on synchronous motor and generators.</li> </ul>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<p>After successful completion of this module, students should be able to:</p> <ul style="list-style-type: none"> <li>• Describe the general structure and components of Synchronous generators and motors.</li> <li>• Explain the operating principles of Synchronous machines.</li> <li>• Be able to describe the basic tests for parameter identification.</li> <li>• Use equivalent circuits to analyse Synchronous machines in steady state.</li> <li>• Construct phasor diagrams for different loads and to use the vector method for analysis of Synchronous machines.</li> <li>• Analyse the performance of Synchronous generators and motors.</li> </ul>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Indicative content includes the following:</p> <p><b>Part A: Synchronous generators</b></p> <p>Introduction to Synchronous Machines, basic principle of operation. Construction, Salient and non-Salient pole types, armature reaction phasor diagram for non-salient pole generators. generated EMF, effect of distribution and chording of winding, armature reaction, synchronous reactance, leakage reactance, equivalent circuit of an alternator, phasor diagram of a loaded non-salient type alternator for various types of loads, voltage regulation, methods of estimation of voltage regulation using EMF, MMF, ZPF &amp; ASA method, short circuit ratio, operating characteristics, power angle characteristics of non-Salient pole alternator, operation for fixed input and variable excitation, power flow equations, losses and efficiency, synchronizing to infinite bus bars, parallel operation of alternators, and two reaction theory and torque-angle characteristic of a salient-pole alternator. [30 hrs]</p> <p><b>Part B : Synchronous motors</b></p> <p>Power-angle characteristics of Salient-pole Machines. Determination of <math>X_d</math> and <math>X_q</math>, Synchronous motor, voltage equation, equivalent circuit, phasor diagram of</p>

	<p>Synchronous motor, operation at constant load with variable excitation, power equations, torque and torque angle, V-curves, synchronous motor starting, applications, Synchronous condensers, Hunting and damping. [ 12 hrs]</p> <p><b>Part C : Permanent magnet Synchronous machines</b></p> <p>Construction, operating characteristics and applications. [3 hrs]</p>
--	---

<p style="text-align: center;"><b>Learning and Teaching Strategies</b></p> <p style="text-align: center;">استراتيجيات التعلم والتعليم</p>	
<b>Strategies</b>	<p>In this module "Electrical machines IV", Various teaching and learning approaches will be adopted to enhance students' understanding and engagement. Some common strategies are listed below:</p> <ol style="list-style-type: none"> <li>42. Learning Technologies on Campus using Whiteboard and TV monitor. On campus Lectures are the main teaching method in this module. It can include visual aids such as slides and diagrams to facilitate in-depth subject understanding. Instructors may also provide real-life examples and applications to make the content more relatable.</li> <li>43. Multimedia and Interactive Tools: Multimedia resources, such as video lectures on YouTube channel and google classroom can be used to enhance understanding and engage students.</li> <li>44. Practical Examples and Problem-Solving: Instructors can use practical examples and problem-solving exercises to help students apply theoretical concepts to real-world situations. By presenting and solving problems related to electrical circuits, students can develop critical thinking and analytical skills.</li> <li>45. Group Discussions and Collaborative Learning: Students can work together to solve problems, analyze case studies, or discuss challenging concepts. This promotes peer learning, critical thinking, and communication skills.</li> <li>46. Inquiry-Based Teaching: Encouraging students to ask a lot of questions is an effective teaching strategy that does not only motivate students to think more practically but also helps them to become independent learners.</li> <li>47. Tutorials: Tutorials offer opportunities for students to seek additional help and clarification on specific topics.</li> <li>48. Assessments and Feedback: Regular assessments, such as quizzes, assignments, and exams, can be used to evaluate students' understanding and progress. Constructive feedback helps students</li> </ol>

	<p>identify areas for improvement and reinforces their learning.</p> <p>49. Online Resources and Platforms: Online resources, such as e-learning platforms, online forums, and educational websites, can support student learning outside the classroom. These resources can provide additional readings, practice exercises, and interactive modules to supplement classroom teaching.</p> <p>50. Self-directed Learning: Encouraging students to take ownership of their learning through self-directed study.</p>
--	--

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	48	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	3
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.466
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	15% (15)	5 , 9	LO # 2, 3,4 and 6, 7,8
	<b>Assignments</b>	2	10% (10)	6, 12	LO # 3, 4 , 5 and 9, 10 and 11
	<b>Projects / Lab.</b>	1	10% (10)	Continuous	
	<b>Report</b>	1	5% (5)	13	Continuous
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	11	LO # 1-10
	<b>Final Exam</b>	3hr	50% (50)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
---	--

	Material Covered
Week 1	Welcome to this course, syllabus, and expectations. Textbook. Introduction to Synchronous Machines. Basic principle of operation.
Week 2	Construction of Synchronous generators/ Alternators. Salient and non-Salient pole types. Armature reaction phasor diagram for non-salient pole generators.
Week 3	Generated EMF, effect of distribution and chording of winding.
Week 4	Armature reaction, synchronous reactance, leakage reactance. Equivalent circuit of an alternator.
Week 5	Phasor diagram of a loaded non-salient type alternator for various types of loads.
Week 6	Voltage regulation and methods of estimation of voltage regulation using EMF, MMF, ZPF & ASA method. Short circuit ratio and its importance.
Week 7	Operating characteristics, power angle characteristics of non-Salient pole alternator.
Week 8	Operation for fixed input and variable excitation, power flow equations. Losses and efficiency.
Week 9	Synchronizing to infinite bus bars, parallel operation of alternators.
Week 10	Two reaction theory and torque-angle characteristic of a salient-pole alternator.
Week 11	<b>Mid-term Exam</b> : Power-angle characteristics of Salient-pole Machines. Determination of $X_d$ and $X_q$ .
Week 12	Synchronous motor, voltage equation and equivalent circuit.
Week 13	Phasor diagram of Synchronous motor, operation at constant load with variable excitation, power equations. Torque and torque angle.
Week 14	V-curves, synchronous motor starting, Applications. Synchronous condensers. Hunting and damping.
Week 15	Permanent magnet machines.
Week 16	<b>Preparatory week before the final Exam</b>

### Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the

		Library?
<b>Required Texts</b>	Electric Machinery Fundamental, fifth edition, Stephen J. Chapman.	Yes
<b>Recommended Texts</b>	3- Electrical Machines, Drives, and Power System, fifth edition, Theodore Wildi. 4- Electric Machinery, sixth edition, A. E. Fitzgerald, Charles Kingsley, Jr., Stephen D. Umans.	No
<b>Websites</b>		

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

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

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Antennas & Waves Propagations		Module Delivery
Module Type	ELECTIVE II		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOBAB 0103066		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGIII	Semester of Delivery	
Administering Department	Electrical Engineering	College	Engineering
Module Leader	MUTHANNA JAAFAR ABBAS	e-mail	<a href="mailto:eng.muthanna.j@uobabylon.edu.iq">eng.muthanna.j@uobabylon.edu.iq</a>
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Master
Module Tutor		e-mail	
Peer Reviewer Name	Dr. Saad Saffah	e-mail	<a href="mailto:eng.saad.saffah@uobabylon.edu.iq">eng.saad.saffah@uobabylon.edu.iq</a>
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOBAB 0103042		Semester 4
Co-requisites module	None		Semester

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<b>Module Aims</b> أهداف المادة الدراسية	To equip students with various issues related to basic antenna concepts, different types of dipole antenna, small loop antenna, array of point sources, microwave antennas, wave propagation characteristics, link power budget calculations, and radar range equation.
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	The course will enable the students to gain preliminary knowledge in antennas and wave propagation.
<b>Indicative Contents</b> المحتويات الإرشادية	Basic of Antenna (12hrs) Antenna Array (10hrs) Radio Wave Propagation (10hrs) Radar (10hrs) Discussion (10hrs)

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

<b>Strategies</b>	<ul style="list-style-type: none"> <li>- Methods of teaching and learning               <ul style="list-style-type: none"> <li>• The usual theoretical presentation method using the writing board and depending on the subject's method (how and why) and according to the subject's curriculum.</li> <li>• Theoretical presentation method using the (data show) device, depending on the subject's method (how and why) and according to the subject's curriculum.</li> </ul> </li> <li>-Evaluation modalities               <ul style="list-style-type: none"> <li>• Direct questions (how and why) of the subject during the theoretical.</li> <li>• sudden exams during the theoretical lectures.</li> <li>• Quarterly exams the theoretical lectures.</li> <li>• Final exams for the theoretical lectures.</li> </ul> </li> <li>- Transferred general and qualifying skills (other skills related to employability and personal development).                We are developing the student's ability to perform assignments and deliver them on time.                Logical and programmatic thinking to find programmatic solutions to various issues.                We are developing the student's ability to dialogue and discussion.                Developing the student's ability to deal with modern technology, especially the Internet             </li> </ul>
-------------------	--

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	48	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	3
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.47
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	100		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	1	10% (10)	5 , 10	LO # 3 and 4, 8 and 9
	<b>Assignments</b>	1	10% (10)	2 , 12	LO # 4 and 5, 10 and 11
	<b>Projects / Lab.</b>	0	0	Continuous	
	<b>Report</b>	1	10% (10)	13	LO # 1-7
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	7	LO # 1-7
	<b>Final Exam</b>	3hr	60% (60)	16 or 17	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b> المنهاج الاسبوعي النظري	
	Material Covered
<b>Week 1</b>	Basic Antenna Concepts: Antennas Parameters Definitions, Radiation Pattern, Beam Solid Angle, Radiation Intensity, Directivity and Gain, Aperture Concept, Effective Height, Wave Polarization, Cross Field, Reciprocity Theorem, Image Theorem, Field Regions.
<b>Week 2</b>	Ideal Dipole: E and H Fields, Radiation Resistance, Normalized Pattern and Power Pattern, Effective Length.
<b>Week 3</b>	Short Dipole: E and H Fields, Radiation Resistance, Normalized E Fields, Normalized Power Pattern.

<b>Week 4</b>	Thin Linear Dipole: Current Distribution, E and H Fields, Radiation Resistance, Normalized E Fields.
<b>Week 5</b>	Small Loop Antenna: E and H fields, Radiation Resistance, Folded Dipole, Yagi Antenna, Helical Antenna.
<b>Week 6</b>	Array of Point Sources: Two Isotropic Point Sources, Non-Isotropic Point Sources, Principles of Pattern Multiplication, Linear Array of N-Isotropic Point Sources, Broadside Array, End Fire Array, Scanning Array.
<b>Week 7</b>	<b>Mid-term Exam +</b> Microwave Antennas: Horn Antennas, Reflector Antennas, Slot Antennas, Lens Antennas, Broadband and Frequency, Independent Antennas.
<b>Week 8</b>	Wave Propagation Characteristics: Phase Constant, Attenuation and Phase Velocity in a Lossless and Conducting Mediums, Conductors and Dielectrics, Wave Propagation in a Good Dielectrics, Wave Propagation in a Good Conductors, Surface Impedance .
<b>Week 9</b>	Reflection and Refraction of EMWs: Direction Cosine, Wave Polarization, Reflection by a Perfect Conductor: Normal Incidence, Oblique Incidence, Perpendicular Polarization, Parallel Polarization, Reflection by a Perfect Dielectric: Normal Incidence, Oblique Incidence, Perpendicular Polarization, Parallel Polarization, Brewster Angle.
<b>Week 10</b>	Radio Wave Propagation: Definitions, Frequency Spectrum and Frequency Bands.
<b>Week 11</b>	Ionospheric Propagation: The Ionosphere, Propagation in variable refractive index medium, Reflection and Refraction Waves by The Ionosphere, Critical Frequency, Maximum Usable Frequency and Optimal Frequency.
<b>Week 12</b>	Tropospheric propagation: Normal Refraction, Reflection and Refraction, Ducting Phenomena, Tropospheric Scatter Propagation, Fading.
<b>Week 13</b>	Ground Wave propagation: Surface Wave, Space Wave (Sky Wave), Propagation Over a Plan Earth, Effect of Earth Curvature on Line of Sight (LOS) Propagation, Fresnel Zones.
<b>Week 14</b>	Link Power Budget Calculations: Effective Isotropic Radiated Power (EIRP), Path Loss, Received Power Level, Receiver Thermal Noise Threshold, Min Detectable Signal.
<b>Week 15</b>	<b>Radar Range Equation</b>
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	Mid-term Exam
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	<ul style="list-style-type: none"> <li>John D. Kraus and Ronald J. Marhefka, "Antennas For All Applications", McGraw-Hill, 3rd edition, 2002.</li> <li>Kai Fong Lee, "Principles of Antenna Theory", John Wiley &amp; Sons, 1984.</li> </ul>	Yes
Recommended Texts	<ul style="list-style-type: none"> <li>Constantine A. Balanis, "Antenna Theory Analysis and Design", John Wiley &amp; Sons, 3rd edition, 2005.</li> <li>Yi Huang and Kevin Boyle, "Antennas: From Theory to Practice", John Wiley &amp; Sons, 2008.</li> <li>Joseph J. Carr, "Practical Antenna Handbook", McGraw-Hill, 4th edition, 2001.</li> <li>Robert E. Collin, "Antennas and Radiowave Propagation", McGraw-Hill, international student edition, 1985.</li> </ul>	No
Websites	<a href="https://my.uobabylon.edu.iq/webuser/staff/staff_edit.aspx?complete=0">https://my.uobabylon.edu.iq/webuser/staff/staff_edit.aspx?complete=0</a>	

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

