Ministry of Higher Education and Scientific Research
Scientific Supervision and Evaluation Authority
Quality Assurance and Academic Accreditation Department

Academic Program Description For the Department of Electronic Engineering For the academicyear 2023-2024

Academic Program Description Form

University name: University of Nineveh
College/Institute : College of Electronics Engineering
Scientific Department: Department of Electronic Engineering
Name of academic or professional program : Bachelor of Science in Electronic Engineering
Final Degree Name: Bachelor of Science in Electronic Engineering
Academic system : Annual with Bologna system for first and second grades
Description preparation date: 24-5-2024
Date of filling the file: 24-5-2024

Signature:
Scientific assistant:
Bilal A. Jebur
Date:

Signature:
Head of department:
Harith Ahmed Mohammed
Date:

The file was checked by the Quality Assurance and University Performance Division.
the date: 16/09/2024
the signature:

Approval of the dean
Prof. Dr. Khaled Khalil

16/9/2024

1. Program vision

Electronics Engineering should specialize in electronics engineering sciences and be distinguished by its engineering education and scientific research leading to the advancement of knowledge, the development of the profession, and serving the community through partnership with industries, engineering and service institutions, and the graduation of cadres to provide the community with highly qualified cadres.

2. Program message

1. Education : Providing specialized engineering educational programs with a precise specialization for undergraduate and graduate studies. Providing a distinguished and recognized educational environment so that its graduates have high professional experience and basic engineering education that enables them to contribute effectively to serving their community and raising the level and progress of their profession. All of this falls within the international standard specifications and is implemented by adopting the ABET quality system in the field of engineering education.
2. Research: Providing a high-level research environment so that its professors, researchers and students can conduct research in basic, applied and exploratory engineering fields and disseminate and apply available and new knowledge in a way that serves the community and the region and interacts with the world.
3. :Leadership Developing leadership capabilities for staff and students, and instilling self-learning, reflection, and deduction abilities in those who possess talent in the field of profession.
4. Community Service : Interacting with the community and engaging in the field of developing the country's industry and engineering institutions, which leads to the social and economic development of the country through consultations, continuous education, and commitment to industrial problems as research to provide solutions for them.

3. Program objectives

A. Graduation of engineers Specialists in the field of engineering sciences Electronics and its applications with high specifications, they have the ability to work in Public and private sector.
B. Effective contribution to the renaissance and progress of society through holding seminars, conferences and continuous education.
C. Producing solid applied scientific research in the field of electronic engineering for the purpose of solving industrial and service problems in society.
D. Strengthening the leadership aspect among members and graduates and instilling a spirit of cooperation among them.
E. Granting postgraduate degrees in the department's various specializations with high specifications.
F. Adopting the approach of updating the curricula and improving performance in activities and events to ensure achieving the desired goals of the department according to (ABET) quality standards.

4. Program accreditation

NOTHING

5. Other external influences

NOTHING

6. Program Structure

* comments	percentage	Study unit	Number of courses	Program Structure
Basic course	%7.8	12	4	Institutional Requirements
Basic course	%23.4	36	8	College Requirements
Basic course	%68.8	106	25	Department Requirements
essential	In the third stage			Summer training
				Other

* Notes may include whether the course is basic or optional

7. Program Description

Credit hours		Course name	Course code	Academic stage
practical	theoretical			
-	3	Mathematics I	NVEE206	First / Semester 1
3	3	DC Circuits Analysis	NVEE215	First / Semester 1
-	2	Physical Electronics	NVEE218	First / Semester 1
2	2	Computer science	NVEEEL114	First / Semester 1
-	2	Mechanical engineering principles	NVEE203	First / Semester 1
-	2	Democracy and Human Rights	NV12	First / Semester 1
3	3	AC Circuits Analysis	NVEE216	First / Semester 2
	3	Mathematics II	NVEE207	First / Semester 2
-	2	Physics Of Semiconductor	NVEE219	First / Semester 2
2	2	Digital Techniques	NVEE217	First / Semester 2
3	-	Engineering Drawing	NVEE201	First / Semester 2
	2	English	NVU11	First / Semester 2
				Second / Medical Equipment Electronics
-	2	Engineering Analysis I	NVEE208	Second / Semester 1
2	2	Signal Analysis	NVEEELM211	Second / Semester 1
3	2	Electronic I	NVEEELM212	Second / Semester 1
-	3	Digital design	NVEE223	Second / Semester 1
2	2	Electromagnetic fields I	NVEE215	Second / Semester 1
-	2	Human Physiology	NVEEELM 213	Second / Semester 1
2	2	signals and systems	NVEE210	Second / Semester 2
-	2	Engineering Analysis II	NVEE209	Second / Semester 2
-	2	Electronic II	NVEEELM221	Second / Semester 2
2	2	programming	NVEEELM222	Second / Semester 2
	2	Electromagnetics FieldsII	NVEE221	Second / Semester 2
-	2	The Crimes of the Defunt Baath Party	NVU13	Second / Semester 2
				Second / Industrial
-	2	Engineering Analysis I	NVEE208	Second / Semester 1
3	2	Electronic I	NVEEELI212	Second / Semester 1
2	2	DC Machines	NVEEELI213	Second / Semester 1
2	2	Computer Programming	NVEEELI214	Second / Semester 1
-	2	The crimes of the defunct Baath Party	NVU13	Second / Semester 1
-	2	Fundamentals of Electromagnetics	NVEE221	Second / Semester 1
-	2	Engineering Analysis II	NVEE209	Second / Semester 2
2	2	Electronics II	NVEEELI222	Second / Semester 2

2	2	AC Machines	NVEEELI223	Second / Semester 2
2	2	Computer Languages	NVEEELI224	Second / Semester 2
-	3	Digital Design	NVEE223	Second / Semester 2
2	2	Signals and Systems	NVEE210	Second / Semester 2
-	3	Electronic II	EE3301	the third
-	3	Digital Signal Processing	EE3201	the third
-	3	Control Engineering	EE3302	the third
-	3	Microprocessors	EE3303	the third
		Digital System Design I	EE3304A	
-	3	Digital System Design II	EE3304B	the third
-	3	Communications	EE3305	the third
-	3	ELECTRONIC INSTRUMENTATION	EE3306	the third
6	-	Laboratory	EE3307	the third
-	3	Industrial Electronic	E E4301	Fourth
-	3	DATA TRANSMISSION& COMPUTER ETWORKS	EE4302	Fourth
-	3	Microprocessor & Micro Controller	EE4303	Fourth
-	3	Microelectronics	EE4304	Fourth
-	3	Radiation	EE4305	Fourth
		Antenna and Propogation	EE430 8	
-	3	Computer aided design	EE4306	Fourth
3	1	Engineering Project	EE4307	Fourth
6	-	Laboratory	EE408	Fourth

8. Expected learning outcomes of the program

A - Cognitive objectives

A1. Enabling graduate students to gain knowledge, understanding, principles and basic theories in the field of electronics engineering.

A2. Empowering students Graduates will understand and comprehend advanced modern scientific topics in the field of specialization in electronics engineering.

A3. Enabling graduate students to understand the mathematical principles and basics of representing, analyzing, and studying systems and how to design different electronic systems.

A4. Helping the student to learn about the most important computer software used in the field of solving engineering problems and to be able to understand the basics of the operation of electronic systems and how to program them to perform specific practical tasks.

B- Program specific skill objectives

B1 Ability to design and implement the assembly components of electronic systems.
B2 Ability to design and implement various software, in addition to those related to basic operating systems and information systems, and the ability to use the advanced and various technologies. and use it in different applications.
B3: Ability to understand the basics of designing and operating electronic devices and keeping up with modern technology.
B4: The ability to set appropriate specifications for electronic devices and the basic programs required to operate them, in addition to the technical equipment required to implement automation and e-government operations.

Teaching and learning strategies

- Follow-up through the implementation of duties and accuracy in dealing with them.
- Forming small groups of students to solve a specific problem and exchange opinions with colleagues about it.
- Opening the door to discussion on some issues in a way that ensures everyone's participation and getting used to hearing different opinions.

Evaluation methods

1- Midterm and final exams
2- Short daily exams
3- Conducting laboratory experiments, writing reports and discussing laboratory results.
4- Participation in scientific conferences and classroom activities that include designing some electronic systems.
5- electronic exams and assignments within a specific time on educational platforms.

C- Emotional goals and the value

C1 Developing the student's ability to perform the tasks assigned to him and complete them on time with accuracy and dedication.
C2 the development of scientific analytical thinking based on basic scientific and logical rules.
C3 Enabling the student to dialogue and discuss issues related to his specialization in a fruitful manner.
C4 Exchange views and allow others to clarify different points of view on the issues raised.

Evaluation methods

- ✓ Evaluation and correction of students' joint work (basic and applied) .
- ✓ Distinguishing those with constructive opinions and a scientific approach to solving various problems.
- ✓ Adopting students' opinions and feedback through electronic questionnaires and taking opinions according to the majority

D - General and transferable skills (other skills related to employability and personal (development

1. The ability to conduct scientific and logical analysis based on basic facts or practical experience when hiring.
2. The possibility of using advanced technology of various types to carry out important applications in the field of various electronics engineering.
3. Ability to work within one team and cooperate to accomplish a specific task through active participation and exchange of different opinions to reach the optimal solution.
4. Ability to self-develop and open doors to modern technology and applications Advanced and benefit from information and skills acquired in the academic program.

Teaching and learning methods

- ✓ Continuous follow-up of the academic program and all its activities.
- ✓ Form groups of students and involve them in solving a real problem and discussing the proposed solutions.
- ✓ Opening the door to dialogue on some issues and hearing different opinions about the program and its continuous development.
- ✓ Focus on the nature of the problems addressed by graduation projects. For the past year, and emphasize on the practical aspects of it, which give the student additional experience that will benefit him later in the field of work when employed.

Evaluation methods

- ✓ Student ratings upon graduation.
- ✓ Participation rate in various activities and businesses.
- ✓ assessment and comparison with peer and teacher assessment.
- ✓ Personal interviews with prospective students Graduation
- ✓ Interviews are not with beneficiaries and recruitment companies.

9. Evaluation methods

- Participation in the classroom, whether in person or online.
- Submitting laboratory reports.
- Evaluation of the practical implementation of experiments.
- Providing various activities.
- Daily, quarterly, and final exams in person and online.

10. Faculty

Specialization	General Specialization	Certificate	Academic title	Full name and surname	T
PhD	Electronics and communications	Electrical Engineering	Mr	Khaled Khalil Mohammed Jassim	1
PhD	plasma	Physics	Mr	Qais Dhnoon, the star of Abdullah Al Ahmed Jassim	2
PhD	Microelectronics	Electrical Engineering	assistant professor	Ahmed Dhnoon Younis Hussein Al-Naqeeb	3
PhD	communication	Electrical Engineering	assistant professor	Mujahed Fahmy Ibrahim Ismail Al-Azzou	4
PhD	communication	Computer Engineering	assistant professor	Ouss Zuhair Younis Suleiman	5
PhD	Power electronics	Electrical Engineering	assistant professor	Harith Ahmed Mohammed Ahmed Al-Badrani	6
PhD	communication	Electrical Engineering	assistant professor	Ahmed Mohammed Ahmed Salama	7
Modern History	date	PhD	assistant professor	Hisham Suwadi Hashim	8
PhD	Microelectronics	Electrical Engineering	Teacher	Omar Badr Mohammed Khader Al Nuaimi	9
PhD	communication	Computer Engineering	Teacher	Ihab Essam Daoud Suleiman Al-Rawji	10
PhD	Computer and information technology	Computer Engineering	Teacher	Magic is necessary for Qudori Khader Al-Dulaimi	11
PhD	Digital image analysis and processing	Computer Engineering	Teacher	Sarmed Fakhr El-Din Ismail Jassim Al-Mawla	12
Master's	Electronics and communications	Electrical Engineering	Teacher	Sinan Khaled Mohammed Hassan Shanshal	13
Master's	Electronics and communications	Electrical Engineering	Teacher	Nour Talal Mahmoud Aziz Kadawi	14
Master's	Electronics and communications	Electrical Engineering	Teacher	Khaled Fazaa Mahmoud Mohammed	15
Master's	Electronic	Electronic engineering	Teacher	Imad Abdel Halim Abdo Ali Al Mulla Khader	16
Master's	Electronic	Electronic engineering	Teacher	Abdul Hamid Mohammed Jassim Mohammed Al-Jabouri	17
Master's	Solid state	Electrical Engineering	Teacher	A whisper of Fawaz Dhnoon Mohammed Al-Raho	18
Master's	Electronics and communications	Electrical Engineering	Teacher	Heba Abdel Khaleq Hamdoun Abdel Sawaf	19
Master's	Power electronics	Electrical Engineering	Assistant Professor	Shawkat Mohammed Younis Mal Allah	20
Master's	Electronics and communications	Electrical Engineering	Assistant Professor	Zahraa Siddiq Yahya Ahmed Al-Sayegh	21
Master's	Electronics and communications	Electrical Engineering	Assistant Professor	Amna Idris Kanaan Suleiman Hayo	22
Master's	Computer and information technology	Computer Engineering	Assistant Professor	Names of Nabil Khalil Omar	23

Master's	Power electronics	Electrical Engineering	Assistant Professor	Mohamed Ibrahim Mohamed Ahmed	24
Master's	Electronic	Electronic engineering	Assistant Professor	Hamam Maher Abdul Shaheen Al-Hamdani	25
Master's	Calculators	Computer Engineering	Assistant Professor	Younis Saber Othman Khattab Al-Rifai	26
Master's	Electronic	Electronic engineering	Assistant Professor	Harith Hazem Dhnoon Younis	27
Master's	Electronic	Electrical Engineering	Assistant Professor	Abdul Mohsen Ahmed Hussein Al-Shalawi expresses	28
Master's	Electronic	Electronic engineering	Assistant Professor	Sinan Mahmoud Ayoub Mahmoud Al-Raho	29
Master's	Thermal engineering	Mechanical Engineering	Assistant Professor	Mohammed Saleh Safar Rasool	30
Master's	Computer and information technology	Electronic engineering	Assistant Professor	Amer Talal Ali Ahmed	31
Master's	Thermal engineering	Mechanical Engineering	Assistant Professor	Hani Mohammed Saleh Salman	32
Master's	Electronics and communications	Electrical Engineering	Assistant Professor	Rasha Walid Hamad	33
Master's	Electronics and communications	Electrical Engineering	Assistant Professor	Omar Naguib Saadi	34
Master's	Power and machinery	Electrical Engineering	Assistant Professor	Maysara Abdul Jabbar Qasim	35
Master's	Power electronics	Electrical Engineering	Assistant Professor	Hisham Mohammed Mahmoud	36
Master's	Electronics	Electronic engineering	Assistant Professor	Hajar Khalil Ibrahim Ahmed	37
Master's	Thermal engineering	Mechanical Engineering	Assistant Professor	Mohammed Saleh Safar Rasool	38
Bachelor	engineering	engineering	nothing	Star Obaid Dahwi	39
Bachelor	engineering	engineering	nothing	Tariq Hussein Khader	40
Higher Diploma	engineering	engineering	nothing	Marwa Essam Ahmed	41
Bachelor	engineering	engineering	nothing	Adel Ghazi Sharif	42
Bachelor	engineering	engineering	nothing	Mohammed Muwaffaq Hadi	43
Bachelor	engineering	engineering	nothing	Asaad Abdul Ghani Saleh	44
Bachelor	engineering	engineering	nothing	Yathrib Walid Qasim Khalil	45
Bachelor	engineering	engineering	nothing	Saif El-Din Kamal	46
Bachelor	engineering	engineering	nothing	Ammar Ahmed Abdullah	47
Bachelor	Management and Economics	Management and Economics	nothing	Pearl Hazem Fathallah	48
diploma	institute	institute	nothing	Idris Mohammed Younis Ahmed	49

11. Acceptance Criteria

The approved admission plan for new students in the department's programs naturally follows the central admission plan of the Ministry of Higher Education and Scientific Research and is implemented by the university and the college. It can be said that the students enrolled in the department's programs represent the highest levels of their grades among applicants to the College of Electronics

Engineering , as the principle of comparison is based on the average of the preparatory study and the student's desire to determine the study program within the programs of the College of Electronics Engineering. Therefore, the nature of the students accepted in the department's programs are distinguished by their academic and intellectual levels and their giving throughout the program period.

12. The most important sources of information about the program

Detailed information about the department's programs can be obtained By visiting the official website of the University of Nineveh and browsing the website of the College of Electronics Engineering:
www.uoninevah.edu.iq

Self-evaluation report and annual department guide within the university and college guide .

13. Program development plan

The curriculum is updated annually according to the latest relevant scientific books and labor market requirements, in addition to using the international information network to view the curriculum items of the subject in other leading international universities in this field.

Curriculum Skills Chart

Please tick the boxes corresponding to the individual learning outcomes of the programme being assessed.

Required learning outcomes of the program																		
General and transferable skills Other skills) related to employability and personal (development				**Emotional and value goals**				**Program specific skill objectives**				**Cognitive objectives**				**essential or optional**	**Course name**	**Course code**	**Year/Level**
D4	**D3**	**D2**	**D1**	**A4**	**A3**	**A2**	**A1**	**B4**	**B3**	**B2**	**B1**	**A4**	**A3**	**A2**	**A 1**				
※	※	※	※	※	※	※	※		※		※	※	※	※	※	essential	Mathematics I	NVEE206	**the first**
※	※	※	※	※	※		※	※	※	※	※	※	※	※	※	essential	DC Circuits Analysis	NVEE215	
※	※		※	※	※	※	※	※	※	※	※		※	※	※	essential	Physical Electronics	NVEE218	
※	※		※		※	※	※	※	※	※	※	※	※	※	※	essential	Computer science	NVEEELM111	
※			※		※	※	※	※	※	※	※		※		※	secondary	Mechanical engineering principles	NVEE203	
※	※	※		※		※	※					※			※	secondary	Democracy and Human Rights	NVU12	
※	※		※	※	※	※	※	※	※		※	※	※	※	※	essential	AC Circuits Analysis	NVEE216	
※	※	※	※	※	※	※	※	※		※	※	※		※	※	essential	Mathematics II	NVEE207	
※	※		※	※	※			※	※	※	※	※	※		※	essential	Physics Of Semiconductor	NVEE219	
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※	※	※	※	※	※	※	※	※	※	※	※	※		※	※	secondary	Engineering Drawing	NVEE201	
※	※	※		※	※	※	※	※	※		※	※		※	※	secondary	English	NVU11	
※			※		※	※	※	※	※	※	※	※	※	※	※	essential	Engineering Analysis I	NVEE208	

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	⁎	⁎	⁎	⁎			⁎		⁎		⁎	⁎		⁎	⁎	essential	Human Physiology	NVEEELM 213	
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⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	essential	Electronic II	NVEEELM221	
	⁎	⁎			⁎		⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	essential	programming	NVEEELM222	
	⁎	⁎			⁎		⁎	⁎		⁎	⁎	⁎	⁎	⁎	⁎	essential	Electromagnetics FieldsII	NVEE221	
	⁎	⁎			⁎		⁎		⁎	⁎			⁎	⁎		secondary	The Crimes of the Defunt Baath Part	NVU13	
⁎	⁎	⁎			⁎		⁎	⁎		⁎	⁎	⁎	⁎	⁎	⁎	essential	Engineering Analysis I	NVEE208	**Second/ Industrial**
⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	essential	Electronic I	NVEEELI212	
	⁎	⁎			⁎		⁎	⁎	⁎	⁎		⁎	⁎	⁎	⁎	essential	DC Machines	NVEEELI213	
⁎	⁎	⁎	*	⁎	⁎	⁎	⁎		⁎	⁎	⁎		⁎	⁎	⁎	essential	Computer Programming	NVEEELI214	
*	⁎	⁎	*	*	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎		⁎		secondary	The crimes of the defunct Baath Party	NVU13	
⁎	⁎	⁎	*	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎		⁎	⁎	essential	Fundamentals of Electromagnetics	NVEE221	
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	⁎	⁎			⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	essential	AC Machines	NVEEELI223	
⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎		⁎	⁎	⁎	⁎	essential	Computer Languages	NVEEELI224	
	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	essential	Digital Design	NVEE223	
⁎	*	⁎	*	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	essential	Signals and Systems	NVEE210	
	⁎	*	⁎	⁎	⁎	⁎	⁎		⁎	⁎		⁎	⁎	⁎	⁎	essential	Electronic II	EE3301	

⁎	⁎	*	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	essential	Digital Signal Processing	EE3201	**the third**
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⁎			⁎	⁎	⁎	⁎		⁎	⁎			⁎	⁎		⁎	essential	DIGITAL SYSTEM DESIGN	EE3304	
⁎		⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎		⁎	⁎		⁎	⁎	essential	Communications	EE3305	
⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	essential	ELECTRONIC INSTRUMENTATIO N	EE3306	
	⁎	⁎		⁎	⁎	⁎		⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	essential	Laboratory	EE3307	
⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎		⁎	⁎	⁎	⁎		⁎	essential	Industrial Electronic	EE4301	**Fourth**
⁎	⁎		⁎	*	⁎	⁎	⁎		⁎	⁎	⁎		⁎	⁎	⁎	essential	DATA TRANSMISSION& COMPUTER ETWORKS	EE4302	
⁎		⁎	⁎	*	⁎	⁎	⁎	⁎	⁎	⁎		⁎	⁎		⁎	essential	Microprocessor & Micro Controller	EE4303	
⁎	⁎	⁎	⁎	*	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	essential	Microelectronics	EE4304	
⁎	⁎	⁎		*	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	essential	Microwave Engineering	EE405	
⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎		⁎		⁎	⁎	⁎	⁎	essential	Computer aided design	EE4306	
⁎	⁎	⁎	⁎	*	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	⁎	essential	Engineering Project	EE4201	
⁎	⁎	⁎	⁎	*	⁎	⁎	⁎	⁎	⁎	⁎		⁎	⁎	⁎	⁎	essential	Laboratory	EE4307	

Course Description

For the academic year 2023-2024

University of Nineveh

Faculty of Electronics Engineering

Department of Electronic Engineering

Courses specification for first class (First Course)

Module Information

Module Title	**DC Circuits Analysis**		**Module Delivery**	
Module Type	**Base**		☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEE215			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	11		**Semester of Delivery**	1
Administration Department			**College**	
Module Leader	Zahraa Siddiq Yahya		**e-mail**	
Module Leader's Acad. Title	Lecturer assistant		**Module Leader's Qualification**	
Module Tutor	Zahraa Siddiq Yahya		**e-mail**	Email
Peer Reviewer Name	Name		**e-mail**	Email
Scientific Committee Approval Date	06/01/2023		**Version Number**	1.0

Relation with other Modules

Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	1. To identify the basic concepts of DC Electrical Eng. circuits. 2. To understand how is the calculation of current, voltage, and power . 3. To understand and cover the basic DC circuit analysis methods and theorems .

Module Learning Outcomes	1. Explain the function of each element in DC Electrical circuits . 2. Use the basic circuit analysis methods and theorems to simplify the DC Electrical circuits. 3. Explain the difference between transformation methods. 4. Applying the appropriate analysis method to reach the aim in its simplest form.
Indicative Contents	Indicative content includes the following. Part A – BASIC CONCEPTS: Voltage & current; Power & Energy; Dependent and independent sources; Ohm's laws series & parallel connections; Delta-star connections and transformations. [15 hrs] Part B - DC Network Theorems : Source transformation; Linearity & superposition; Thevenin's & Norton's Theorems; Source transportation; source superposition; Nodal analysis; Mesh analysis. [35 hrs]

Learning and Teaching Strategies

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

Student Workload (SWL)

Structured SWL (h/sem (	30	**Structured SWL (h/w)**	4

		A	
Unstructured SWL (h/sem)	30	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	**60**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	[3,6,9,12]	LO (#1- #12)
	Assignments	1	10% (10)	14	LO #4, #7, #(10-13)
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	12	LO #11
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	10	LO #(1-8)
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered

Week 1	Voltage & current
Week 2	Power & Energy
Week 3	Dependent and independent sources
Week 4	Ohm's laws
Week 5	series & parallel connections
Week 6	Delta-star connections and transformations
Week 7	Kirchhoff's Current & Voltage Laws (KCL), (KVL)
Week 8	Source transformation
Week 9	Linearity & superposition
Week 10	Nodal analysis
Week 11	Mesh analysis
Week 12	Thevenin's Theorem
Week 13	Norton's Theorem
Week 14	Max. power transfer
Week 15	**Preparatory week before the final exam**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	**"Engineering Circuit Analysis"** By W. Hayt	Yes

Recommended Texts	**"Introductory Circuit Analysis"** By Boylested	Yes

Grading Scheme

Group	Grade	Appreciation	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under processing (	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Module Title	**Computer science**	**Module Delivery**	
Module Type	**Core**		**☐Theory**
Module Code	**NVEEELM114**		**☒Lecture**
ECTS Credits	**4**		**XLab**
SWL (hr/sem)	**100**		**Tutorial**
			Practical
			☐Seminar

Module Level		**Semester of Delivery**	1
Administration Department	ELM	**College**	NE
Module Leader	Asmaa Nabeel	**e-mail**	**asmaa.khaleel@uoninevah.edu.iq**
Module Leader's Acad. Title	Lecturer Assist	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	Email
Scientific Committee Approval Date	4/7/2023	**Version Number**	1.0

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	**General overview of personal computer architecture** **Computer peripherals, keyboard, screen, mouse, and storage media** **Computer buses, ports, interfaces** **Overview of MSDOS operating system** **MSDOS internal commands** **MSDOS external commands** **Introduction to computer languages** **Overview of windows operating system** **Windows desktop, changing settings, starting programs** **Creating, deleting, copying, moving, searching for files and folders** **Using my computer, my document, and help facility** **Using windows control panel** **Using the windows accessories paint, notepad, word pad, …etc** **Setup applications to windows, remove applications from windows** **Connecting to the internet, using the windows explorer** **Using the Microsoft Word** **Using the Microsoft Excel** **Using the Matlab**
Module Learning Outcomes	1.Understanding the important components of the computer and its operating system. 2. Understanding the meaning of MSDOS operating system and its commands. 3. Understanding the windows operating system 4. Understanding the Microsoft office (word, power point, excel). 5. Understanding the high and low level languages 6. Learn about how the strings represented in C language. 7. Introduction to Matlab
Indicative Contents	1. explain the components of computer hardware and software 2.Introduction to the types of computers 3. storage media 4. computer ports 5. Computer networks and the types of it 6. The internal and external MSDOS commands 7. windows operating system 8. word office program 9.power point office program 10. Excel program 11. Matlab

Learning and Teaching Strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)	125	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	65	**Unstructured SWL (h/w)**	2
Total SWL (h/sem)	190		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	10 % (10)	2, 4, 5,6	LO #1, 2, 10 and 11
	Assignments	1	10 % (10)	14	LO # 3, 4, 6 and 7
	Projects / Lab.	0	0	0	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	1	20	14	
Summative assessment	**Midterm Exam**	1.5hours	30 % (20)	10	LO #1-4
	Final Exam	3 hours	5 0% (4 0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	**Introduction to** the part of computers in hardware and software, computer types, storage media
Week 2	**Explain the computer ports, computer networks**
Week 3	**Introduction to MSDOS operating system and the internal commands of it**

Week 4	**External Ms DOS command, file and folder related commands and the editor**
Week 5	Windows operating system
Week 6	Windows commands)change the background, screen saver, resolution), change the status of files, printing files, copy and save files, backups, Recycle bin, compressing files, viruses
Week 7	Microsoft office word (creating new word file, bars, types and styles of fonts, copy and select of texts, saving of word file)
Week 8	MS WORD: spell checking, inserting symbols, add borders, change the document setup, insert table, page numbering, insert equations and effects)
Week 9	MS Power point:(how to design professional presentation, change the layout of presentation and background of it, numbering slides, insert charts, insert table and audio)
Week 10	MS Power point(insert an effect to the object in slide, transition between slides, grouping of objects, insert equation, copy, save and print the slides then how to start the presentation)
Week 11	MS EXCEL (getting started with excel, how to create a spreadsheet, copy and rename the work book, entering and deleting of data in sheet, inserting and deleting rows& columns, selecting cells, adding border to sheet)
Week 12	MS EXCEL:how to write a formula in sheet, functions, summation of data in row or column, average function, max& min functions, count& counta, round function, save and print the spread sheet
Week 13	Overview of High & Low level languages
Week 14	**Matlab**
Week 15	
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	The application of each part of the covered drawing subject theoretically and according to the weekly sequence of the curriculum in the AutoCAD laboratory **Note: By two hours a week**

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1.“ **Computer Science”**	No
Recommended Texts	**2. " MATLAB Handbook"**	No
Websites	https://www.tutorialsmate.com/2021/12/parts-of-computer https://www.koenig-solutions.com/matlab-programming	

Grading Scheme

Group	Grade	Appreciation	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under (processing	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information

Subject information

Module Title	Mathmatics1	**Module Delivery**	
Module Type	Base	☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NVEE206**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	1	**Semester of Delivery**	1
Administration Department	Electronic Eng. Dep.	**College**	Electronics Engineering
Module Leader	Hani MS Salman	**e-mail**	hani.mohamed@uoninevah.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	MSc
Module Tutor	Name (if available)	**e-mail**	Email
Peer Reviewer Name	Name	**e-mail**	Email
Scientific Committee Approval Date		**Version Number**	1.0

Relation with other Modules

Relationship with other subjects

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Course objectives, learning outcomes and guiding content

Module Objectives Subject objectives	4. Gain proficiency in differentiating trigonometric function, inverse trigonometric function, hyperbolic function, natural logarithm, exponential function, and general exponential function. 5. Master differentiation techniques for various types of jobs. 6. To learn how to sketch curves and deal with the transcendental functions. 7. To increase the skills related to differentiation applications. 8. Develop a strong foundation in Integration of trigonometric function, inverse trigonometric function, hyperbolic function,

	natural logarithm, exponential function, and general exponential function. 9. Understand the concept of Application of the definite integral, including finding volumes of revolution, lengths of curves, and surface areas of revolution. 10. To learn the methods of Integration – Trigonometric Substitutions, Quadratics, Partial fractions, Integration by parts, and Further Substitutions. 11. Apply calculus principles to solve real-world engineering problems, developing problem-solving skills and the ability to apply calculus concepts to practical situations.
Module Learning Outcomes Learning outcomes for the subject	1. Understand the concept of differentiation as a rate of change and slope of the curve. 2. Understand the basic differentiation rules, chain rule, implicit differentiation, higher order differentiation, partial differentiation, Differentiation of trigonometric functions and Hyperbolic Functions. 3. Learn the applications of differentiation. 4. Solve Maximum and Minimum problems. 5. Learn how to Plot the Curve. 6. Learn Transcendental functions: graphs, and derivative. 7. Understand the concept of integration: types of integrals. definite integrals, infinite integrals. Integration of trigonometric function, inverse trigonometric function, hyperbolic function, natural logarithm, exponential function, and general exponential function . 8. Apply definite integration to as areas between curves, volumes of revolution, length of the curve and surface area of revolution. 9. Learn Methods of Integration – Trigonometric Substitutions, Quadratics, Partial fractions, Integration by parts, and Further Substitutions. 10. Develop critical thinking and problem-solving skills by applying calculus.
Indicative Contents Guidance Contents	Indicative content includes the following. <u>Part A – Differentiation:</u> Definitions and notations, basic differentiation rules, chain rule, implicit differentiation, higher order differentiation, partial differentiation, Differentiation of trigonometric functions and Hyperbolic Functions: . Applications of differentiation – slope tangents and normal, rate of change, velocity and acceleration, maxima and minima and inflexion points, and Curve plotting. [16 hrs] Transcendental Functions – definitions, properties, graphs, derivative. [4 hrs] <u>Part B – Integration:</u> Definitions and notations, types of integrals: definite integrals, infinite integrals. Integration of trigonometric function, inverse trigonometric

	function, hyperbolic function, natural logarithm, exponential function, and general exponential function . [12 hrs] Application of the definite integral – areas between curves, volumes of revolution, length of the curve and surface area of revolution. [12 hrs] Methods Of Integration – Trigonometric Substitutions, Quadratics, Partial fractions, Integration by parts, and Further Substitutions. [16 hrs]

Learning and Teaching Strategies

Learning and teaching strategies

Strategies	This module's major aim is to foster student engagement, improve critical thinking abilities, and promote collaborative learning. Interactive seminars, interesting tutorials, and exercises active participation, allowing students to hone their critical thinking skills and encourage engineering mathematics principles to problem solving. Moreover, students collaborate on engineering mathematics issues, examine real-world scenarios, and explore the practical applications of the principles acquired through group activities, projects, and conversations. This method not only increases students' comprehension of engineering mathematical concepts, but it also fosters cooperation, communication, and key interpersonal skills that will be useful in their future engineering activities.

Student Workload (SWL)

The student's academic load is calculated for 15 weeks.

Structured SWL (h/sem) Regular student load during the semester	62	**Structured SWL (h/w)** Regular weekly student load	4
Unstructured SWL (h/sem) Irregular student load during the semester	88	**Unstructured SWL (h/w)** Irregular student load per week	5.9
Total SWL (h/sem) The student's total academic load during the semester	**150**		

Module Evaluation

Course material evaluation

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome

Formative assessment	**Quizzes**	2	30% (30)	5 and 10	LO #1 #2 #3 and #4, #7, #8
	Assignments	1	10% (10)	12	LO #7 - #9
	Projects / Lab.	-	-	-	-
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Theoretical weekly curriculum

	Material Covered
Week 1	Introduction – Differentiation definitions and notations, review of basic differentiation rules , chain rule, and Implicit differentiation.
Week 2	Partial differentiation and higher order differentiation.
Week 3	Differentiation of trigonometric functions and hyperbolic functions. Applications of differentiation; slope, tangents and normal.
Week 4	Rate of change, velocity and acceleration, maximum and minima, inflexion points and Curve plotting
Week 5	Transcendental Functions – definitions, properties, and graphs, derivative.
Week 6	Definitions and notations of integration, Types of integrals: definite integrals and infinite integrals. Integration of trigonometric function.
Week 7	Integration of inverse trigonometric function, hyperbolic function. Mid-term Exam
Week 8	Integration of inverse trigonometric function, hyperbolic function, natural logarithm, exponential function, and general exponential function.
Week 9	Application of the definite integral – areas between curves, volumes of revolution, length of the curve and surface area of revolution.
Week 10	
Week 11	
Week 12	Methods Of Integration – Trigonometric Substitutions, Quadratics, Partial fractions, Integration by parts, and Further Substitutions.
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources

Learning and teaching resources

	Text	Available in the Library?
Required Texts	G. B. Thomas Jr., M. D. Weir, J. Hass, and F. R. Giordano, "Thomas' Calculus," 12th ed., Pearson, 2019.	Yes
Recommended Texts		
Websites	https://www.coursera.org/learn/introduction-to-calculus#syllabus https://www.edx.org/learn/calculus https://www.khanacademy.org/math/calculus-1	

Grading Scheme

Grading chart

Group	Grade	Appreciation	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Module Title	**Physical Electronics**	**Module Delivery**	
Module Type	**Core**	☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEE218		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	**Semester of Delivery**	1
Administration Department	Electronic	**College**	Ninevah University
Module Leader	Hamsa Fawaz Thanoon	**e-mail**	hamsa.thanoon@uoninevah.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc
Module Tutor		**e-mail**	Email
Peer Reviewer Name		**e-mail**	Email
Scientific Committee Approval Date	04/07/2023	**Version Number**	1.0

Relation with other Modules

Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. To develop problem solving skills and understanding of Atomic Structure 2. To understand Energy band structure of metal, insulator, and semiconductor. 3. To understand the properties of intrinsic P and N type semiconductors. 4. To understand Electrical conduction in intrinsic semiconductor. 5. To understand the properties of extrinsic semiconductors. 6. To understand Electrical conduction in extrinsic semiconductor
Module Learning Outcomes	1. Recognize how semiconductors work in electronics circuits. 2. List the various terms associated with electronics circuits. 3. Summarize what is meant by a basic of semiconductors. 4. Discuss the reaction and involvement of semiconductors in generating the currents. 5. Describe mobility of electrons and conductivity in metals. 6. Define Ohm's law. 7. Identify the pure semiconductors. 8. Identify the impure semiconductors 9. Discuss the impure semiconductors N and P types 10. Explain the type of electronic emission.
Indicative Contents	Indicative content includes the following. Part A - Energy Bands in Solids Describe the structure of an atom ◆ Discuss insulators, conductors, and semiconductors and how they differ. [9 hrs] Revision problem classes [3 hrs] Part B - Transport Phenomena in Semiconductor Describe how current is produced in a semiconductor ◆ Describe the properties of n-type and p-type semiconductors. [30 hrs]

Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills.

Student Workload (SWL)			
Structured SWL (h/sem)	111	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	65	**Unstructured SWL (h/w)**	2
Total SWL (h/sem)	**176**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	10	[2,4,5,6]	LO (#1- #12)
	Assignments	2	10	14	LO #4, #7, #(10-13)
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	12	LO #11
Summative assessment	**Midterm Exam**	1.5 hr	20% (20)	10	LO #(1-8)
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Energy Bands in Solids
Week 2	Fermi-Dirac distribution function
Week 3	Properties of intrinsic P and N type semiconductors
Week 4	Mobility and conductivity
Week 5	Electrical conduction in intrinsic semiconductor
Week 6	Hall Effect
Week 7	Generation and recombination of charges
Week 8	Diffusion current continuity equation
Week 9	Injection minority carrier charges
Week 10	N-type semiconductor
Week 11	Solved problems
Week 12	P-type semiconductor
Week 13	Solved problems
Week 14	Photo-conductivity
Week 15	Preparatory week before the final exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1.“NTEGRATEDELECTRONICS”ByMILLMAN&HALKIES 2. “SEMICONDUCTOR DEVICES & CIRCUITS” ,JOHN WILEY & SONS	Yes
Recommended Texts	1. (Floyed) 2. Theraja Chapter 51	Yes

Grading Scheme

Group	Grade	Appreciation	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under processing (	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Module Title	**Mechanical Engineering Principle**			**Module Delivery**
Module Type	**Base**			☐**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**
Module Code	NVEE203			
ECTS Credits	6			
SWL (hr/sem)	**150**			
Module Level	1	**Semester of Delivery**	1	
Administration Department	Type Dept. Code	**College**	Type College Code	
Module Leader		**e-mail**		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.	
Module Tutor		**e-mail**		
Peer Reviewer Name	Name	**e-mail**	Email	
Scientific Committee Approval Date	07/02/2023	**Version Number**	1.0	

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	Students will be able to: 1. Students will be able to: 2. Knowing the different methods of making calculations related to forces and their effects on two- and three-dimensional systems 3. Clarify that the subject represents a very important introduction to other subjects for the later stages of the student's study and building a scientific base for the student to ensure the possibility of understanding the relevant topics in the later stages. 4. The student will learn different applications of commonly used mechanical machinery. 5. The student will learn strong basics of Mechanical Engineering fundamentals.
Module Learning Outcomes	1. Have understood and overcome any misconceptions about basic concepts in physics (force, energy, work etc). 2. Restate existing problem solving skills in a form more suitable for engineering applications . 3. Interpret basic engineering applications of mechanics in more detail. 4. Acquire four basic thinking skills: 1. Perceive, or resolve, contradictions involving their preconceptions about mechanics. 2. Organize the basic ideas of mechanics in a form suitable for problem solving. 3. Apply basic principles in mechanics to realistic engineering situations. 4. Solve realistic engineering problems.
Indicative Contents	**Indicative content includes the following:-** **Statics – Introduction [25 hrs]** ○ Vectors ○ Newton's Laws ○ Fundamental Units ○ Types of force ○ Parallelogram law ○ Resultant forces ○ Moments and couples ○ Moment of couples ○ Equilibriums ○ Free body diagram ○ Coplanar system ○ Friction: Nature of friction; Theory of friction; Coefficient of friction **Dynamics – Introduction [20 hrs]** ○ Basic concepts ○ Newton's Laws

	○ Formulation and solution of problems ○ Kinematics of Particles ○ Rectilinear motion ○ Curvilinear motion ○ Relative motion ○ Kinetics of Particles ○ Newton's second law ○ Work and energy -

Learning and Teaching Strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)	25	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem)	20	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	45		

Module Evaluation

As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	6	5 % (5)	2, 5, 9, 12,13,15	LO #1, 2, 10 and 11
	Assignments	6	5 % (5)	2, 5, 9, 12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	0	0 %		
	Report	0	0%	0	
Summative assessment	**Midterm Exam**	3hr	30 % (30)	10	LO #1-7
	Final Exam	3 hours	60 % (4 0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	Force system; Units system;
Week 2	Parallelogram law; Forces + components
Week 3	Result of coplanar forces
Week 4	Components of force in space
Week 5	Moment of force
Week 6	Moment of force
Week 7	Moment of force
Week 8	Free body diagram; Coplanar system
Week 9	Friction: Nature of friction; Theory of friction
Week 10	Coefficient of friction
Week 11	Coefficient of friction
Week 12	Coefficient of friction
Week 13	Normal and tangential components of acceleration
Week 14	Normal and tangential components of acceleration
Week 15	
Week 16	Normal and tangential components of acceleration

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1. Engineering Mechanics (statics) By : JL MERIAM 2. Engineering Mechanics (Dynamics) By: JL MERIAM	Yes
Recommended Texts	➢	No
Websites		

Grading Scheme

Group	Grade	Appreciation	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work is required, but credit is given.

	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information

Subject information

Module Title	**Democracy and Human Rights**	**Module Delivery**	
Module Type	**Basic**	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NV12**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		

Module Level	1	**Semester of Delivery**	1
Administration Department	Dept. of Electronic	**College**	EE
Module Leader	Husham Swadi Hashim	**e-mail**	Husham.hashim@uoninevah.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	PHD
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	06/01/2023	**Version Number**	1.0

Relation with other Modules

Relationship with other subjects

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Course objectives, learning outcomes and guiding content

Module Aims Subject objectives	Explaining the concepts of human rights and democracy -1 Explaining the importance of human rights in our public life and at all levels -2 (.academic, professional, social, etc) Explaining the importance of creating a conscious concept of the term -3 democracy within governance systems and its impact on political stability. The necessity of understanding the close connection between rights and - 4 building a democratic society that guarantees the freedom of its individuals and safeguards their interests.

	The necessity of focusing on the fact that building a sound concept of -5 human rights and a democratic society can only be achieved through laws that guarantee this, and the importance of these laws in building a stable society that guarantees the rights of all its individuals within a democratic political system.
Module Learning Outcomes Learning outcomes for the subject	Establishing the values of freedom and equality in the foundations of actual -1 participation in building society. Working to build a stable , real environment by implementing laws within a -2 democratic society. Seeking to provide the foundations for protecting individuals within - 3 democratic societies.
Indicative Contents Guidance Contents	- Part One: The Historical Development of Human Rights First: Primitive societies - Prehistory - Eastern civilizations (Mesopotamia and the Pharaonic civilization as an (example) as an example - Western civilizations (Greek and Roman) Second: Heavenly laws - Judaism - Christianity - Islam (in more detail) Third: The development of human rights in positive laws Social contracttheory - World Wars and their Impact on Human Rights - International organization Section Two: Human Rights, Definition and Types First: Definition and Identification - The right in Islamic jurisprudence - The right to legal jurisprudence - Definition of human rights Second: Divisions of human rights (this is done through a detailed study and (comparison between law and Islamic law Collective rights (right to self-determination, right to development, right to a suitable environment, right to live in peace) ,Individual rights (economic and cultural rights, civil and political rights (personal rights- Section Three: Guarantees of respect and protection of human rights First: Guarantees in Islamic law Second: Guarantees at the national level Third: Guarantees at the international level Vocabulary of democracy The first course: includes the subject of public freedoms between Sharia and law. The second course: includes the subject of state administration systems between Sharia and law. Public freedoms (between Sharia and law) First: Introduction Second: Definition of public freedoms

	- Linguistic origin - Historical origin - Legal basis - The legal basis Third: Foundations of public freedoms - Justice - Equality - Freedom Fourth: Descriptive public freedoms - Freedom of opinion - Freedom of thought - Freedom of the media Goodevening Fifth: Islamic Sharia and public freedoms - Islam's position on women (inheritance, marriage, taking up jobs) - Islam's position on freedom of belief State management systems First: - In defining political systems The idea of the political system - The legitimacy of political systems Types of political systems Second: In the democratic system - An original introduction Definition of democracy - Pillars and foundations of the democratic system Third: Models of democracy - Direct democracy

Learning and Teaching Strategies

Learning and teaching strategies

Strategies	Following the direct teaching method by presenting and explaining the material and using educational tools to explain it by clarifying the mechanisms of the scientific concept of the terms democracy and human rights.

Student Workload (SWL)

Student's academic load

Structured SWL (h/sem) Regular student load during the semester	16	**Structured SWL (h/w)** Regular weekly student load	1

Unstructured SWL (h/sem) Irregular student load during the semester	9	**Unstructured SWL (h/w)** Irregular student load per week	0.5
Total SWL (h/sem) The student's total academic load during the semester	25		

Module Evaluation

Course material evaluation

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

Delivery Plan (Weekly Syllabus)

Theoretical weekly curriculum

	Material Covered
Week 1	Historical development of human rights
Week 2	Heavenly laws
Week 3	The development of human rights in positive laws
Week 4	Human rights, definition and types
Week 5	Guarantees of respect and protection of human rights
Week 6	Guarantees in Sharia and at the national and international levels
Week 7	Mid-term Exam
Week 8	The concept of democracy
Week 9	Public freedoms between Sharia and law
Week 10	Definition of public freedoms and the foundations of freedoms
Week 11	Islamic Sharia and public freedoms
Week 12	State management systems
Week 13	Democracy: An Introduction
Week 14	Pillars and foundations of the democratic system
Week 15	Models of democracy
Week 16	**Preparatory week before the final exam**

Learning and Teaching Resources

Learning and teaching resources

	Text	Available in the Library?
Required Texts		Yes
Recommended Texts		No
Websites		

Grading Scheme

Grading chart

Group	Grade	Appreciation	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C – Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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.

Courses specification for first class (Second Course)

Module Information					
Module Title	**Digital Techniques**			**Module Delivery**	
Module Type	**Base**			**☒Theory**	
Module Code	**NVEE217**			**☒Lecture**	
ECTS Credits	**5**			**☐Lab**	
SWL (hr/sem)	**125**			**☒Tutorial**	
				☒Practical	
				☐Seminar	
Module Level			**Semester of Delivery**	2	
Administration Department			**College**	Type College Code	
Module Leader	(Younis Saber Othman), (Noor Alhuda Saad Abbas)		**e-mail**		
Module Leader's Acad. Title	Lecturer Assistant		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	Email	
Scientific Committee Approval Date	4/7/2023		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	1. To learn new number systems and how to convert between them 2. To identify and learn the logic gates and Boolean algebra 3. How to minimize the Boolean functions using Boolean algebra and Karnaugh maps 4. To understand, draw, and identify the combined logic circuits using the discrete logic 5. To understand, draw, and identify the combined logic circuits using the MSI integrated circuits 6. To use the 3-variables and 4-variables Karnaugh map for Boolean minimization
Module Learning Outcomes	Students will be able to: 1. Learning new number systems and how to convert between them 2. Identify the logic gates and learn the Boolean algebra 3. Minimize the Boolean functions 4. Understand, draw, and identify the combined logic circuits using the discrete logic and MSI integrated circuits 5. Identify and use the 3-variables and 4-variables Karnaugh map
Indicative Contents	**Indicative content includes the following:-** **NUMBER SYSTEMS:- [10 Hrs]** Decimal number system; Binary; Octal and hexadecimal number systems; Conversion from one number to another number system; Addition; Subtraction; Multiplication and division using different number system; Representation of binary number insignia-magnitude ; Sign 1's completion and align 2's complement notation; Rules for addition and subtraction with complement representation; BCD; EBCDIC; ASCII; Extended ASCII; Gray and other codes. **LOGIC GATES AND BOOLEAN ALGEBRA:- [10 Hrs]** AND; OR; NOT; NAND; NOR; Ex-OR logic gates; Positive and negative logic; Fundamental concepts of Boolean algebra; De-murrage's laws; Principles of duality; Simplification of Boolean expressions; Canonical and standard forms for Boolean function; SOP and POS, forms; Realization of Boolean functions using only NAND and NOR gates. **BOOLEAN FUNCTION MINIMIZATION:- [10 Hrs]** Objectives of the minimization procedures; Karnaugh map method; The 3-Variable Karnaugh Map; The 4-Variable Karnaugh Map; Karnaugh Map SOP Minimization; Don't care conditions; Karnaugh Map POS Minimization; Converting between POS and SOP Using the Karnaugh Map. **COMBINATIONAL LOGIC CIRCUITS USING DISCRETE LOGIC GATES:- [5 Hrs]** Parity generator and checker; Code converters; Majority circuits; magnitude comparator.

	COMBINATIONAL LOGIC CIRCUIT USING MSI INTEGRATED CIRCUITS:- [10 Hrs] Encoder; priority encoder; decoder; Multiplexer and demultiplexer circuits; Implementation of Boolean functions using decoder and Multiplexer; BCD to 7-segment decoder; Common anode and common cathode 7-segment displays; Random access memory; Read only memory and erasable programmable ROMS

Learning and Teaching Strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)	45	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	45	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	90		

Module Evaluation

		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10 % (10)	1-14	LO #1-14
	Assignments	1	5 % (5)	6	LO #1-6
	Projects / Lab.	10 Lab	10 % (10)	5-14	LO #5-14
	Report	3	5% (5)	5-14	LO #5-14
Summative assessment	**Midterm Exam**	1.5hr	20 % (20)	10	LO #1-10
	Final Exam	2 hours	5 0% (5 0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	**NUMBER SYSTEMS:-** Decimal number system; Binary; Octal and hexadecimal number systems; Conversion from one number to another number system; Addition; Subtraction; Multiplication and division using different number system; Representation of binary number insignia-magnitude ; Sign 1's completion and align 2's complement notation; Rules for addition and subtraction with complement representation; BCD; EBCDIC; ASCII; Extended ASCII; Gray and other codes.
Week 2	
Week 3	
Week 4	**LOGIC GATES AND BOOLEAN ALGEBRA:-** AND; OR; NOT; NAND; NOR; Ex-OR logic gates; Positive and negative logic; Fundamental concepts of Boolean algebra; De-murrage's laws; Principles of duality; Simplification of Boolean expressions; Canonical and standard forms for Boolean function; SOP and POS, forms; Realization of Boolean functions using only NAND and NOR gates.
Week 5	
Week 6	
Week 7	**BOOLEAN FUNCTION MINIMIZATION:-** Objectives of the minimization procedures; Karnaugh map method; The 3-Variable Karnaugh Map; The 4-Variable Karnaugh Map; Karnaugh Map SOP Minimization; Don't care conditions; Karnaugh Map POS Minimization; Converting between POS and SOP Using the Karnaugh Map.
Week 8	
Week 9	
Week 10	
Week 11	**COMBINATIONAL LOGIC CIRCUITS USING DISCRETE LOGIC GATES:-** Parity generator and checker; Code converters; Majority circuits; magnitude comparator.
Week 12	
Week 13	**COMBINATIONAL LOGIC CIRCUIT USING MSI INTEGRATED CIRCUITS:-** Encoder; priority encoder; decoder; Multiplexer and demultiplexer circuits; Implementation of Boolean functions using decoder and Multiplexer; BCD to 7-segment decoder; Common anode and common cathode 7-segment displays; Random access memory; Read only memory and erasable programmable ROMS
Week 14	
Week 15	
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 5-14	Introduction to KL-31001 DIGITAL LOGIC LAB Exp. 1: Logic Gates Exp. 2: NAND, NOR, XOR Gates Exp. 3: AND-OR-INVERTER(AOI) Circuits Exp. 4: Bit Parity Generator Circuits Exp. 5: Comparator Circuits Exp. 6: Decoder Exp. 7: Encoder

	Exp. 8: Multiplexer Exp. 9: Demultiplexer

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	**Digital Fundamentals** | Eleventh Edition Global Edition | by Thomas L. Floyd | Pearson Education 2015	PDF
Recommended Texts	**Logic and Computer Design Fundamentals** | Fifth Edition Global Edition | by Morris Mano • Charles R. Kime • Tom Martin | Pearson Education 2016	PDF
Websites	(Telegram Group and Google classroom)	

Grading Scheme

Group	Grade	Appreciation	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under (processing	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information

Module Title	**AC circuits Analysis**	**Module Delivery**	
Module Type	**Base**	☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEE216		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	**Semester of Delivery**	2
Administration Department	Type Dept. Code	**College**	Type College Code
Module Leader	Zahraa Siddiq Yahya	**e-mail**	
Module Leader's Acad. Title	Lecturer assistant	**Module Leader's Qualification**	
Module Tutor	Zahraa Siddiq Yahya	**e-mail**	Email
Peer Reviewer Name	Name	**e-mail**	Email
Scientific Committee Approval Date	06/01/2023	**Version Number**	1.0

Relation with other Modules

Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	12. To identify the basic concepts of energy storage elements. 13. To identify the basic of Alternating Current AC. 14. To understand and cover the basic AC circuit analysis methods and theorems .
Module Learning Outcomes	11. Explain the function of each element in AC Electrical circuits . 12. Use the basic circuit analysis methods to simplify the AC Electrical circuits. 13. Applying the appropriate analysis method to reach the aim in its simplest form.
Indicative Contents	Indicative content includes the following. Part A – energy storage elements: The capacitor; The Inductor; Analysis of RC-transient circuits; Analysis of RL-transient circuits; RLC transient circuits. [15 hrs] Part B - AC circuit analysis **:** the basic of Alternating Current AC; The Phasor equivalent circuit; series & parallel connections and equivalent impedance; Methods of Ac-circuit Analysis; superposition; Nodal & Mesh analysis; Thevenin's Theorem; Norton's Theorem; Power factor and average power in the sinusoidal Ac-circuits; Complex power; Series & parallel resonance. [35 hrs]

Learning and Teaching Strategies	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of

	simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

Structured SWL (h/sem (	30	**Structured SWL (h/w)** A	4
Unstructured SWL (h/sem)	30	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	**60**		

Module Evaluation

		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (20)	[3,6,9,12]	LO (#1- #12)
	Assignments	1	10% (10)	14	LO #4, #7, #(10-13)
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	12	LO #11
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	10	LO #(1-8)
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	The capacitor & The inductor
Week 2	Analysis of RC & RL -transient circuits
Week 3	Analysis of RLC transient circuits
Week 4	The basic of alternating current AC
Week 5	The phasor equivalent circuit
Week 6	series & parallel connections and equivalent impedance
Week 7	Methods of Ac-circuit Analysis
Week 8	superposition
Week 9	Nodal & Mesh analysis
Week 10	Thevenin's Theorem
Week 11	Norton's Theorem
Week 12	Power factor and average power in the sinusoidal Ac-circuits
Week 13	Complex power
Week 14	Series & parallel resonance
Week 15	**Preparatory week before the final exam**

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	**"Engineering Circuit Analysis"** By W. Hayt	Yes
Recommended Texts	**"Introductory Circuit Analysis"** By Boylested	Yes

Grading Scheme

Group	Grade	Appreciation	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under processing (	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Subject information

Module Title	**Engineering Drawing**	**Module Delivery**	
Module Type	Core	☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	NVEE201		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	**Semester of Delivery**	2
Administration Department		**College**	
Module Leader	Noor Yassar	**e-mail**	
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor	Name (if available)	**e-mail**	Email
Peer Reviewer Name	Name	**e-mail**	Email
Scientific Committee Approval Date	06/01/2023	**Version Number**	1.0

Relation with other Modules

Relationship with other subjects

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Course objectives, learning outcomes and guiding content

Module Objectives	Students will be able to:

Subject objectives	6. Drawing engineering shapes manually and clearly, including the effective use of the computer-aided drawing program (AutoCAD). 7. Develop a solid understanding of the basic principles of engineering drawing, Included the ability to work with concepts, analytically, and visualize them and a functional understanding of how these ideas will manifest in the real world. 8. Determine the strategies to be used and the assumptions to be made. 9. Use both manual and computer approaches in drawing figures. 10. Develop the ability to use engineering tools flexibly and creatively. 11. Develop an integrated understanding of the AutoCAD module. 12. Developing their ability to communicate scientific ideas. 13. Develop expertise in experimental methods.
Module Learning Outcomes Learning outcomes for the subject	14. Understand and apply the basics of drawing types of lines. 15. Define, explain and apply engineering drawing operations. 16. Understand the basics of drawing an ogee curves 17. Understand and apply the basic idea of central projection theory. 18. Explanation of the central and parallel projection theory to understand the projection process. 19. Explain Different Views are Front View (FV), Top View (TV) and Side View (SV) FV is a view projected on VP. TV is a view projected on HP. SV is a view projected on PP. 20. Ability to draw using AutoCAD.
Indicative Contents Guidance Contents	**Introduction to engineering drawing and its tools** Introduction and introducing students to the subject of engineering drawing, which includes Identification of engineering tools and how to use them. **Engineering shapes and the arcs, lamina. , Dimensions:** - Various engineering operations:- - Drawing a straight line parallel to a known straight line - The division of the rectum into two halves - Angle division is known. - Drawing a straight line parallel to a known straight line from a point that does not belong to the known straight line. - Draw a tangent to a circle from a point that does not belong to it. - Draw a tangent to two contiguous circles from the outside. - Draw a tangent to two contiguous circles from the inside **Multi view projection** - Perpendicular Projection Theory of Objects: - Types of projections resulting from vertical projection and approved in the projection of various engineering objects - Front view - Side view. - Top view **Using AutoCAD** - Apply everything that has been explained in the engineering manual drawing on the AutoCAD program and drawing the three-dimensional models

Learning and Teaching Strategies

Learning and teaching strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

The student's academic load is calculated for 15 weeks.

Structured SWL (h/sem) Regular student load during the semester	45	**Structured SWL (h/w)** Regular weekly student load	3
Unstructured SWL (h/sem) Irregular student load during the semester	55	**Unstructured SWL (h/w)** Irregular student load per week	3.7
Total SWL (h/sem) The student's total academic load during the semester	**100**		

Module Evaluation

Course material evaluation

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

Delivery Plan (Weekly Syllabus)

Theoretical weekly curriculum

	Material Covered
Week 1	Introduction and introducing students to the subject of engineering drawing, which includes identification of engineering tools and how to use them.
Week 2	Teach students how to apply and draw the following engineering operations: Drawing a straight line parallel to a known straight line, the division of the rectum into two halves, angle division and drawing a straight line parallel to a known straight line.
Week 3	Teach students how to draw a tangent to two contiguous circles from the outside, Draw a tangent to two contiguous circles from the inside
Week 4	Draw a tangent to one circle from the inside and the other from the outside and draw a tangent to a circle passing through a straight line.
Week 5	Multi view projection Perpendicular Projection Theory of Objects: • Types of projection in drawing and its practical importance
Week 6	Types of projections resulting from vertical projection and approved in the projection of various engineering objects: Front view, Side view, Top view
Week 7	Mid-term Exam + Introduction to AutoCAD
Week 8	Apply everything that has been explained in the engineering manual drawing on the AutoCAD program and drawing the three-dimensional models
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus)

Weekly lab schedule

	Material Covered
Week 1-15	The application of each part of the covered drawing subject theoretically and according to the weekly sequence of the curriculum in the AutoCAD laboratory

Learning and Teaching Resources

Learning and teaching resources

	Text	Available in the Library?

Required Texts	EGINEERING DRAWING AND GRAPHIC TECHNOLOGY", Fourteenth Edition, By: THOMAS E.FRENCH, CHARLES VIERCK, ROBERT J.FOSTER,McGRAW-HILL	Yes
Recommended Texts	➢ William D.CallisterJr.&David D.Rethwisch.(2010)"Material Science and Engineering An Introduction", eightEdition.	No
Websites	ENGINEERING DRAWING Any edition	

Grading Scheme

Grading chart

Group	Grade	Appreciation	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Subject information

Module Title	**MathematicsII**	**Module Delivery**	
Module Type	**Base**		☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	**NVEE 207**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		

Module Level	1	**Semester of Delivery**	1
Administration Department	Electronic Eng. Dep.	**College**	Electronics Engineering
Module Leader	Hani MS Salman	**e-mail**	hani.mohamed@uoninevah.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	MSc
Module Tutor	Name (if available)	**e-mail**	Email
Peer Reviewer Name	Name	**e-mail**	Email
Scientific Committee Approval Date		**Version Number**	1.0

Relation with other Modules

Relationship with other subjects

Prerequisite module	NEEM1211	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents Course objectives, learning outcomes and guiding content	
Module Objectives Subject objectives	1. To obtain a good knowledge of dealing with complex numbers. 2. Establish a strong foundation in matrices and their operations, determinants, and inverse matrices. This includes covering definitions, notations, properties, types, and basic operations on matrices, enabling effective application in problem-solving. 3. enhancing students' proficiency in matrix-based solutions for linear systems of equations using Cramer's rule, the inverse method, and the Gauss elimination method 4. To provide the students with the knowledge to deal with vectors and their mathematical operations. 5. To Learn about the polar coordinates, and the graphs of polar equations. 6. Apply calculus principles to solve real-world engineering problems, developing problem-solving skills and the ability to apply calculus concepts to practical situations.
Module Learning Outcomes Learning outcomes for the subject	21. Comprehend and utilize complex numbers within the Argand diagram, and 22. master complex number operations (Addition, subtraction, product, quotient, power, and roots) and De Moivre's Theorem. 23. Understand the concept of linear algebra and matrices. 24. Identify the types of matrices such as square matrices, zero matrix and identity. 25. Perform the common matrix operations such as addition, subtraction, scalar multiplication, and multiplication. 26. Find the transpose of a matrix. 27. Compute the determinants. 28. Compute the inverse of the matrix. 29. Identify whether the matrix is invertible or singular. 30. Relate a matrix to a homogenous system of linear equation. 31. Solve a system of linear equations by matrices: using Cramer's rule. 32. Solve a system of linear equations by matrices: using the inverse method. 33. Solve a system of linear equations by matrices: using Gauss Elimination Method. 34. Identify the rank of the matrix and its relationship to the solution of linear equations. 35. Find the eigenvalues and eigenvectors of a matrix. 36. Represent a vector in space.

	37. Compute dot and cross products in vectors. 38. Understand the meaning of del operator, gradient, divergence, and curl and to compute the del operation, gradient, divergence, and curl. 39. Learn about the vector functions. 40. Convert from Cartesian to Polar coordinates and vice versa. 41. Sketch in polar system. 42. Utilize mathematical reasoning and critical thinking skills to analyze and interpret mathematical concepts and their applications in Electronics engineering. 43. Develop proficiency in mathematical problem-solving, both independently and collaboratively, and communicate solutions effectively.
Indicative Contents Guidance Contents	Indicative content includes the following. <u>Part A – Review of Complex Numbers:</u> The Argand diagram, Addition, Subtraction; Product, Quotient, power and roots, and Demoiver's Theorem. [4hrs] <u>Part B – Matrices and Determinants:</u> Matrices and Determinants: Definitions and notations, Properties, types of matrices, basic operations on matrices, computation of the determinants of matrices, properties of determinants. [8 hrs] Inverse of the Matrices. [4 hrs] Solution of the system of linear equations-solution of the system of linear equation using Cramer's rule, solution of the system of linear equation using the inverse method. [12 hrs] Revision problem classes [4 hrs] solution of the system of linear equation using Gauss Elimination Method. [4 hrs] Eigenvalues and eigenvector. [4 hrs] <u>Part C – Review of Vectors:</u> Representation of vectors in space (i;j;k), unit vectors, Scalar product, and Vector product. [8 hrs] <u>Part D – Vector Calculus:</u> Vectors – del operator, Parametric Equations of Lines in Space, the distance from a Point to a line in Space, plane equation in space, the Distance from the Point to a Plane, Angles Between Planes, vector function versus Scalar function, del operator, Gradient, Divergence and Curl. [12 hrs] <u>Part E – Polar Coordinates:</u> Polar coordinates – polar coordinate system, transformation between polar and Cartesian coordinates, graphs of polar equations. [4 hrs]

Learning and Teaching Strategies

Learning and teaching strategies

Strategies	This module's major aim is to foster student engagement, improve critical thinking abilities, and promote collaborative learning. Interactive seminars, interesting tutorials, and exercises active participation, allowing students to hone their critical thinking skills and encourage engineering mathematics principles to problem solving. Moreover, students collaborate on engineering mathematics issues, examine real-world scenarios, and explore the practical applications of the principles acquired through group activities, projects, and conversations. This method not only increases students' comprehension of engineering mathematical concepts, but it also fosters cooperation, communication, and key interpersonal skills that will be useful in their future engineering activities.

Student Workload (SWL)

The student's academic load is calculated for 15 weeks.

Structured SWL (h/sem) Regular student load during the semester	62	**Structured SWL (h/w)** Regular weekly student load	4
Unstructured SWL (h/sem) Irregular student load during the semester	88	**Unstructured SWL (h/w)** Irregular student load per week	5.9
Total SWL (h/sem) The student's total academic load during the semester	**150**		

Module Evaluation

Course material evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	30% (30)	6 and 14	LO #1 - #11, #16- #19
	Assignments	1	10% (10)	13	LO #12-#15
	Projects / Lab.	-	-	-	-
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #11
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Theoretical weekly curriculum

	Material Covered
Week 1	The Argand diagram, Addition, Subtraction; Product, Quotient, power and roots, and Demoiver's Theorem.
Week 2	Matrices and Determinants: Definitions and notations, Properties, types of matrices, basic operations on matrices, computation of the determinants of matrices, properties of determinants.
Week 3	
Week 4	Inverse of the Matrices.
Week 5	Solution of the system of linear equations-solution of the system of linear equation using Cramer's rule.
Week 6	solution of the system of linear equation using the inverse method.
Week 7	solution of the system of linear equation using Gauss Elimination Method.
Week 8	Revision problem classes, Mid-term Exam
Week 9	Eigenvalues and eigenvector. [4 hrs]
Week 10	Representation of vectors in space (i;j;k), unit vectors, Scalar product, and Vector product.
Week 11	
Week 12	Vectors – del operator, Parametric Equations of Lines in Space, the distance from a Point to a line in Space, plane equation in space, the Distance from the Point to a Plane, Angles Between Planes, vector function versus Scalar function, del operator, Gradient, Divergence and Curl.
Week 13	
Week 14	
Week 15	Polar coordinates – polar coordinate system, transformation between polar and Cartesian coordinates, graphs of polar equations.

Learning and Teaching Resources

Learning and teaching resources

	Text	Available in the Library?
Required Texts	**"Higher Engineering Mathematics", 7 th edition by John Bird**	No
	G. B. Thomas Jr., M. D. Weir, J. Hass, and F. R. Giordano, "Thomas' Calculus," 12th ed., Pearson, 2019.	Yes

Recommended Texts	**"Introduction to Linear Algebra". 4th edition by Strang, Gilbert** **"Linear Algebra for Everyone". 2020 by Strang, Gilbert** **Zill, DG, Wright, WS, & Cullen, MR (2011). Advanced Engineering Mathematics. Jones & Bartlett Publishers.**	No
Websites	https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010 https://www.khanacademy.org/math/linear-algebra https://www.ohio.edu/mechanical-faculty/williams/html/PDF/MatricesLinearAlgebra.pdf	

Grading Scheme

Grading chart

Group	Grade	Appreciation	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Module Title	**Physical of semiconductors**	**Module Delivery**	
Module Type	**Core**	☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	NVEE219		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	**Semester of Delivery**	2
Administration Department	EI	**College**	NE
Module Leader	Hamsa Fawaz Thanoon	**e-mail**	hamsa.thanoon@uoninevah.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc
Module Tutor		**e-mail**	Email
Peer Reviewer Name		**e-mail**	Email
Scientific Committee Approval Date	04/07/2023	**Version Number**	1.0

Relation with other Modules

Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	

	1. To develop problem solving skills and understanding of Atomic Structure 2. To understand Energy band structure of metal, insulator, and semiconductor. 3. To understand the properties of intrinsic P and N type semiconductors. 4. To understand Electrical conduction in intrinsic semiconductor. 5. To understand the properties of extrinsic semiconductors. 6. To understand Electrical conduction in extrinsic semiconductor
Module Learning Outcomes	1. Recognize how semiconductors work in electronics circuits. 2. List the various terms associated with electronics circuits. 3. Summarize what is meant by a basic of semiconductors. 4. Discuss the reaction and involvement of semiconductors in generating the currents. 5. Describe mobility of electrons and conductivity in metals. 6. Define Ohm's law. 7. Identify the pure semiconductors. 8. Identify the impure semiconductors 9. Discuss the impure semiconductors N and P types 10. Explain the type of electronic emission.
Indicative Contents	Indicative content includes the following. Part A - Energy Bands in Solids Describe the structure of an atom ◆ Discuss insulators, conductors, and semiconductors and how they differ. [9 hrs] Revision problem classes [3 hrs] Part B - Transport Phenomena in Semiconductor Describe how current is produced in a semiconductor ◆ Describe the properties of n-type and p-type semiconductors. [30 hrs]

Learning and Teaching Strategies

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills.

Student Workload (SWL)

Structured SWL (h/sem)	111	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	65	**Unstructured SWL (h/w)**	2
Total SWL (h/sem)	**176**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	10	[2,4,5,6]	LO (#1- #12)
	Assignments	2	10	14	LO #4, #7, #(10-13)
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	12	LO #11
Summative assessment	**Midterm Exam**	1.5 hr	20% (20)	10	LO #(1-8)
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered

Week 1	PN junction in equilibrium
Week 2	Volt Ampere characteristics; Temperature dependence
Week 3	diffusion capacity
Week 4	Non-linear properties; Ideal diode; Basic theory and analysis of simple diode circuit; DC load line; Small signal analysis and concept of dynamic resistance; AC load line
Week 5	Diode capacitance;Temperature effects of diode
Week 6	Different types of diodes (Zener; schottckey);
Week 7	(Varactor diode; Tunnel and negative resistance diodes).
Week 8	Circuit analysis of half wave and full wave rectifiers
Week 9	Bridge rectifier; Ripple and form factor calculations
Week 10	Types of filters; C filters , L filter , L .C. filter, PIE filter; Analysis of filter and calculation of ripple and regulation.
Week 11	Solved problems
Week 12	Clipping and Clam Ping Circuit:
Week 13	Transistors: PNP; NPN
Week 14	The BJT as an Amplifier
Week 15	Preparatory week before the final exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1: "SOLID STATE DIVICES" ,PHI; 4TH EDITION , 1995.By STREETMAN , 2: "SEMICONDUCTOR DEVICES & CIRCUITS" ,JOHN WILEY & SONS ,1992.By: MS TYAGI 3: "ELECTRONICS DEVICES & CIRCUITS THEORY" , HI; By BOYLSTED & NASHELSKY	Yes
Recommended Texts	3. (Floyed) 4. Theraja Chapter 51	Yes

Grading Scheme

Group	Grade	Appreciation	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under processing (	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Subject information

Module Title	**English**	**Module Delivery**	
Module Type	**Basic**	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**NV U 11**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		

Module Level	1	**Semester of Delivery**	2
Administration Department	Dept. of Computer and Information	**College**	College of Electronics Engineering
Module Leader	Noor Mothafar Hamid	**e-mail**	noorm.hame@duoninevah.edu.iq
Module Leader's Acad. Title		**Module Leader's Qualification**	MA
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	06/01/2023	**Version Number**	1.0

Relation with other Modules

Relationship with other subjects

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Course objectives, learning outcomes and guiding content

Module Aims Subject objectives	7. To develop skills, reading, writing and understanding of English language through the application of teaching techniques. 8. To understand scientific subjects and technical terms through reading and comprehension. 9. This course deals with the basic concepts of scientific subjects. 10. This course handles how to write simple research and how to make a successful presentation. 11. To understand the scientific language in English.

Module Learning Outcomes Learning outcomes for the subject	5. Recognize parts of speech and tenses in English language. 6. List the various terms associated with scientific texts. 7. Summarize what is meant by a basic electric circuit. 8. Discuss Electric currents, series and parallel circuits. 9. Describe electrical power, charge, and current. 10. Discuss computers, communication and the future of computers.. 11. Identify the basic circuit elements and their applications. 12. Explain energy types and forms. 13. Discuss the various properties of radio waves and vacuum tubes. 14. Explain modulation. 15. Discuss Electromagnetism.
Indicative Contents Guidance Contents	Indicative content includes the following. 1.parts of speech _verb _ noun _ pronoun 2.Tenses _Past _Present _future 3. Electric currents and circuits _AC/DC _parallel, serious _Grounding, fuse, short circuit 4.Radio waves and vacuum tubes 5. Electromagnetism. 6. The future of computers, communication applications. _fiber optics. 7. Induction. _Electric generator _Electric transformer _self-induction _servomechanism 8. Incandescent lamp. 9. Energy. _types of energy _forms of energy 10. Introduction to electron and electricity. 11.Electricity and electronics.
Learning and Teaching Strategies Learning and teaching strategies	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation by reading, writing and comprehension in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, presentation, interactive tutorials, by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

Student's academic load

Structured SWL (h/sem) Regular student load during the semester	33	**Structured SWL (h/w)** Regular weekly student load	2
Unstructured SWL (h/sem) Irregular student load during the semester	17	**Unstructured SWL (h/w)** Irregular student load per week	1.4
Total SWL (h/sem) The student's total academic load during the semester	50		

Module Evaluation

Course material evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20 % (20)	4.6	LO #1, 2, 3,4,5and 6
	Assignments	2	5% (5)	9, 12	LO # 7,8,9,10,and 11
	Presentation	1	10 % (10)	Continuous	
	Report	1	5% (5)	13	LO #6,10
Summative assessment	**Midterm Exam**	2 hours	10 % (10)	7	LO #1-8
	Final Exam	2 hours	5 0% (5 0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Theoretical weekly curriculum

	Material Covered
Week 1	Parts of speech
Week 2	Tenses
Week 3	Electric currents and circuit
Week 4	Radio waves and vacuum tubes
Week 5	The future of computers, communication applications.
Week 6	Induction -Electric generator -Electric transformer
Week 7	Mid-term Exam
Week 8	Induction -Self-induction

	-Servomechanism
Week 9	Incandescent lamp.
Week 10	Energy. -types of energy -forms of energy
Week 11	Introduction to electron and electricity.
Week 12	Electricity and electronics
Week 13	The cathode ray tube
Week 14	Propagation
Week 15	Modulation
Week 16	**Preparatory week before the final exam**

Learning and Teaching Resources

Learning and teaching resources

	Text	**Available in the Library?**
Required Texts	English in electrical engineering and electronics. The language of electrical and electronic engineering in English.	Yes
Recommended Texts	English for electrical engineering and computing.	No
Websites	https://www.askoxford.com/betterwriting/succesfulcv/application/?view=uk	

Grading Scheme

Grading chart

Group	**Grade**	Appreciation	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C – Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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.

Courses specification for Second class Medical Engineering (First Course)

Module Information

Module Title	Engineering analysisI	**Module Delivery**	
Module Type	Base		☐**Theory**
Module Code	NVEE208		☒**Lecture**
ECTS Credits	6		☐**Lab**
SWL (hr/sem)	150		☒**Tutorial**
			☐**Practical**
			☐**Seminar**

Module Level		**Semester of Delivery**	1
Administration Department	Electronics dept	**College**	Electronics engineering college
Module Leader	Dr. Omar B Mohammed	**e-mail**	omar.mohammed@uoninevah.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	

Relation with other Modules

Prerequisite module	Mathematics II	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	This course covers the following topics: Multiple Integrals, Vectors Functions, Numerical Analysis, Statistics and Probability. Those areas of mathematics which are most important in connection with practical problems for modeling different areas of science, computer can be easily utilized to find the properties of such systems.
Module Learning Outcomes	Upon successful completion, students will: 1. Improve their problem-solving skills. 2. Apply that knowledge toward practical problems in different areas of science. 3. Utilize the computer capabilities to solve such problems using proper methods. 4. Learn how to deal with geometry in 3D; Find areas and volumes. 5. Solve ordinary and differential equations numerically. 6. Learn the importance of probability and statistics in everyday use.
Indicative Contents	Vectors Functions Multiple Integrals Numerical Analysis Statistics Probability

Student Workload (SWL)

Structured SWL (h/sem)		**Structured SWL (h/w)**	
Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	
Total SWL (h/sem)			

Module Evaluation

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

Learning and Teaching Strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Vectors: Vector in space, dot and cross product. Lines and planes in space. Vector functions valued and motion in space: position, velocity and acceleration, tangential vectors, curve and normal vector.
Week 2	
Week 3	
Week 4	
Week 5	Multiple Integrals:

Week 6	Double Integral in rectangular coordinates, areas and volumes. Double Integral in Polar Coordinates, areas and volumes. Triple Integrals in rectangular, cylindrical, and spherical coordinates, volumes.
Week 7	
Week 8	
Week 9	Numerical Analysis: Solution of non-linear equations by iteration; bisection and Newton-Raphson. Numerical Integration; trapezoidal rule. Numerical solution of 1st order ordinary differential equations; Euler's method.
Week 10	
Week 11	
Week 12	
Week 13	Statistics and Probability: Definitions, mutually exclusive and conditional probability, permutations and combinations Probability distribution: binomial, normal and Poisson distributions.
Week 14	
Week 15	
Week 16	Preparatory week before the final exam

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	Advanced Engineering Mathematics By KREYSIK	Yes
Recommended Texts	Calculus By Finney& Thomas	Yes
Websites		

Grading Scheme

Group	**Grade**	Appreciation	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under (processing	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information

Module Title	Signal Analysis			**Module Delivery**	
Module Type	Core			**Theory** **☒ Lecture** **Lab** **☐ Tutorial** **☐ X Practical** **☐ Seminar**	
Module Code	NVEEELM211				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	1 1		**Semester of Delivery**	1	
Administration Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	Email	
Peer Reviewer Name	Name		**e-mail**	Email	
Scientific Committee Approval Date	06/25/2023		**Version Number**	1.0	

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	Student will be able to: 15. identify signals concepts. 16. Understand the classification of signals. 17. understand the different operations on signals. 18. perform Fourier and Laplace transformations of signals.
Module Learning Outcomes	44. Definition of the signal concept. 45. Introduction of mathematical models. 46. Explain continuous time signals. Discrete time signals. 47. Categorize the signals. 48. Achieve operations on signals. 49. Introduction of basic signals. 50. Define convolution operation between two signals. 51. Introduction of frequency domain and Fourier analysis. 52. Laplace Transformation.
Indicative Contents	Indicative content includes the following. Introduction to signals: - Definition and mathematical models. - Categorization of signals. - Operation on signals. - Basic types of signals. Convolution operation: - Introduction to convolution. - Convolution properties. Signal transformation: - Fourier series and transform. - Laplace Transform.

Learning and Teaching Strategies	
Strategies	To make students interesting with both types of signals: continuous and discrete. Also with classifications of signals and operations on them. To make them familiar with time and frequency range and analysis of a signal. Also to make them familiar with different types of transforms of signals. Also to make them have an experience with solving different problems and examples.

Student Workload (SWL)

Structured SWL (h/sem (	64	**Structured SWL (h/w)** A	4
Unstructured SWL (h/sem)	86	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	**150**		

Module Evaluation

		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	6	10% (10)	2, 5, 9, 12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	2, 5, 9, 12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20% (20)	2, 5, 9, 12,13,15	LO #3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO #1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Basic definitions. Mathematical models.
Week 2	Continuous time signals
Week 3	Discrete time signals
Week 4	Signal classifications

Week 5	Energy and power of signals
Week 6	Basic operations on continuous signals.
Week 7	Basic operations on discrete signals.
Week 8	Time domain representation of continuous signals; sinusoidal and complex exponential signals
Week 9	singularity function signals
Week 10	Convolution definition and operation
Week 11	Convolution properties
Week 12	Frequency domain representation of continuous signals. Spectra and bandwidth of the signal
Week 13	Fourier series representations of periodic signals.
Week 14	Fourier transform representations of non periodic signals.
Week 15	Laplace Transform of continuous signals. Laplace properties.

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	**Signals and systems. Simon S. Haykin**	Yes
Recommended Texts	**Signals and linear systems. G. E. Carlson**	

Grading Scheme

Group	**Grade**	Appreciation	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under processing (	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Module Title	**Electronic I**	**Module Delivery**	
Module Type	**core**		☐**Theory**
Module Code	**NVEEELM212**		☒**Lecture**
ECTS Credits	**5**		☐**Lab**
SWL (hr/sem)	**125**		☒**Tutorial** ☒**Practical** ☐**Seminar**

Module Level		**Semester of Delivery**	1
Administration Department	Electronics	**College**	Electronic Engineering college
Module Leader		**e-mail**	
Module Leader's Acad. Title	Assistant Prof.	**Module Leader's Qualification**	PhD
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	Ahmad.younis@uoninevah,edu,iq
Scientific Committee Approval Date	12/06/2023	**Version Number**	1.0

Relation with other Modules

Prerequisite module	NEEI2212	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	12. To understand the basic analysis of bipolar transistor amplifier 13. To be familiar with the dc and ac analysis of transistor amplifier 14. To understand the dc and ac analysis of FET amplifier 15. To illustrate and to understand the frequency response of the amplifier 16. To understand the basic concept of feedback concept 17. To be able to deal with different feedback amplifier topologies 18. To study the advantages of negative feedback on amplifier performance 19. To be familiar with feedback amplifier ac analysis 20. To understand the construction and ideal characteristic of operational amplifier 21. To study and analyze op-amp equivalent circuit 22. To be familiar with basic op-amp applications 23. To start with studying power electronic devices
Module Learning Outcomes	16. Understand and apply the basic theory and operation of transistor amplifiers 17. Define and explain the frequency response of bipolar transistor amplifier 18. Understand the basic concept of negative feedback 19. Understand and analyze the feedback amplifier 20. Understanding the operation of ideal operational amplifier 21. Dealing with dc and ac op-amp equivalent circuit 22. Understanding the basic application of op-amp 23. Power electronic devices principle overview

Indicative Contents	**Transistor and FET amplifier analysis:** Small signal model analysis, low frequency and high frequency analysis, hybrid model, hybrid-Pi model analysis. **Amplifier with negative feedback:** Basic concept, feedback analysis, feedback configurations, Feedback effects on gain, bandwidth, input and output resistances **Operational amplifier:** Ideal Op-amp equivalent circuit; Operational Amplifier Specification; Circuit analysis of an Op-amp; Closed loop Op-amp Circuit (Inverting and Non-Inverting Circuit). **Op-amp Applications:** Summation & subtraction Circuit, Differential circuit Buf circuit, Ideal and practical Integrator circuits, ideal and practical Differentiator circuits, Examples . **Power electronic devices:** UJT Construction, operation and characteristics; Thyrsistor Equivalent Circuit; Thyrsistor Characteristics and operation; Application of the devices.

Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)	74	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	101	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	175		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10 % (10)	2, 5, 9, 12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10 % (10)	2, 5, 9, 12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20 % (20)	2, 5, 9, 12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1:30hr	20 % (20)	10	LO #1-4
	Final Exam	3 hours	4 0% (4 0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Small signal model analysis
Week 2	Low and high frequency response of transistor amplifier
Week 3	Hybrid and hybrid-Pie equivalent circuit analysis
Week 4	Negative feedback concept and analysis
Week 5	Advantages of negative feedback on amplifier
Week 6	Amplifier feedback topologies
Week 7	Feedback effect on amplifier gain, bandwidth, and on input-output resistances
Week 8	operational amplifier construction and operation
Week 9	ideal and practical op-amp equivalent circuit
Week 10	Inverting and non-inverting closed loop amplifier

Week 11	Integration and differentiation active circuits Summation and subtraction op-amp circuits
Week 12	
Week 13	UJT transistor construction
Week 14	Thyristor equivalent circuit and characteristics Subject review
Week 15	
Week 16	**Subject review**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	**Practical experiments in transistor amplifier frequency response at low and high frequency** **To measure the effect of feedback on amplifier performance** **To measure the performance of different op-amp circuits.**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	Electronic Devices By Millmann Electronic Devices By Floyd	yes
Recommended Texts	**SOLID STATE DIVICES", PHI; 4TH EDITION** , 1995.By STREETMAN, **SEMICONDUCTOR DEVICES & CIRCUITS", JOHN WILEY & SONS, 1992.By** : MS TYAGI	Yes
Websites	Electronic circuits	

Grading Scheme

Group	**Grade**	Appreciation	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.

	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under (processing	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information

Subject information

Module Title	Digital Design	**Module Delivery**	
Module Type	**Core**		☒ **Theory**
Module Code	**NVEE223**		☒ **Lecture**
ECTS Credits	4		☐ **Lab**
SWL (hr/sem)	100		☒ **Tutorial**
			☐ **Practical**
			☐ **Seminar**
Module Level		**Semester of Delivery**	1
Administration Department	Electronic Eng. Dep.	**College**	Electronics Engineering
Module Leader	Amer Talal Ali	**e-mail**	
Module Leader's Acad. Title	Lecturer assistant	**Module Leader's Qualification**	
Module Tutor	Amer Talal Ali	**e-mail**	
Peer Reviewer Name	Name	**e-mail**	
Scientific Committee Approval Date	06/01/2023	**Version Number**	

Relation with other Modules

Relationship with other subjects

Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents Course objectives, learning outcomes and guiding content	
Module Objectives Subject objectives	19. To understand Advanced Minimization techniques for large numbers of bits to simplify the large designs. 20. Understand how to Design an Arithmetic and Logic unit. 21. Understand how to Design using programmable logic device. 22. To understand the sequential Logic Circuits. 23. To understand how to Design synchronous and asynchronous counters. 24. To understand the Design of Registers.
Module Learning Outcomes Learning outcomes for the subject	1. Using Advanced Minimization techniques for large numbers of bits to simplify the large designs. 2. Design an Arithmetic and Logic unit. 3. Design using programmable logic device. 4. Design sequential Logic Circuits synchronous and asynchronous. 5. Design Registrations. 6. Design synchronous and asynchronous counters.
Indicative Contents Guidance Contents	Indicative content includes the following. Part A – minimization techniques for large numbers of bits [14 hrs] Part B – Initialization to design and Design an Arithmetic and Logic unit . [14 hrs] Part C – Design using programmable logic device . [6 hrs] Part D – sequential Logic Circuits. [18 hrs]

Learning and Teaching Strategies

Learning and teaching strategies

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking and digital designing skills. This will be achieved through classes and interactive tutorials.

Student Workload (SWL)

The student's academic load is calculated for 15 weeks.

Structured SWL (h/sem) Regular student load during the semester	60	**Structured SWL (h/w)** Regular weekly student load	4
Unstructured SWL (h/sem) Irregular student load during the semester	60	**Unstructured SWL (h/w)** Irregular student load per week	4
Total SWL (h/sem) The student's total academic load during the semester	**120**		

Module Evaluation

Course material evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	[3,6,9,12]	LO (#1- #12)
	Assignments	1	10% (10)	14	LO #4, #7, #(10-13)
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	12	LO #11
	Midterm Exam	1.5 hr	10% (10)	10	LO #(1-8)

Summative assessment	**Final Exam**	2 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Theoretical weekly curriculum

	Material Covered
Week 1	Introduction to Digital Design
Week 2	The 5-Variable Karnaugh Map; The 5-Variable Karnaugh Map with don't care conditions
Week 3	Map Entered variable Karnaugh Map
Week 4	ADDITIONAL MINIMAZATION TECNHNIQUES: Tabular method; Quine-McCluskey
Week 5	Design using multiplexer: - Shannon Expansion
Week 6	top-down design of combined CIRCUITS: - Gate Level: Adders; Subtractor
Week 7	Design an Arithmetic and Logic unit
Week 8	memory and type of memories
Week 9	Design using programmable logic device (PLD): - PROM; PAL; PLA;
Week 10	sequential LOGIC: - Type of flip-flops; Timing Diagram; Basic concepts of counters; Binary counters; BCD counters; Up down counter
Week 11	sequential LOGIC: -Design of counters using state diagrams and tables;
Week 12	sequential LOGIC: -Mealy and Moore Circuits;
Week 13	synchrous CIRCUITS: Shift left and right register; Registers with parallel load; Serial –in parallel-out (SIPO) and parallel-in-serial-out (PISO).
Week 14	synchrous CIRCUITS: Shift Registers; Twisted Ring Counter; Maximum Length Shift Counter.
Week 15	Preparatory week before the final exam

Learning and Teaching Resources

Learning and teaching resources

	Text	Available in the Library?
Required Texts	"Digital and analog communication" 2001 By LW Couch Sixth Edition	Yes
Recommended Texts	- Digital Communications Fifth Edition, 2008, John G. Proakis, and Masoud Salehi. Introduction to Communication Systems" 1992 By F. Stremler. -ELEMENTS OF INFORMATION THEORY" 2006 By THOMAS M. COVER and JOY A. THOMAS -Digital Communication, 2004 by Abbas Kattoush.	Yes
Websites		

Grading Scheme

Grading chart

Group	Grade	Appreciation	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Module Title	Electromagnetic Fields I	**Module Delivery**	
Module Type	Core		☐**Theory**
Module Code	NVEE215		☒**Lecture**
ECTS Credits	4		☐**Lab**
SWL (hr/sem)	100		☒**Tutorial** ☐**Practical** ☐**Seminar**

Module Level		**Semester of Delivery**	1
Administration Department	Type Dept. Code	**College**	Type College Code
Module Leader	SINAN KHALID SHANSHAL	**e-mail**	**sinan.mohammed@uoninevah.edu.iq**
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	Email
Scientific Committee Approval Date	02/07/2023	**Version Number**	1.0

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	To develop knowledge of the laws governing the behavior of electrical fields, and to relate the laws governing the fields to applications in a range of electrical and electronic engineering application.
Module Learning Outcomes	On completion of the course the students should be able: • to have detailed knowledge of the physical background and terminology of the electrostatic field theory for electrical engineering problems • to understand the electrostatic field behavior • to select and use appropriate theoretical models for analysis, problem solving and finding solutions related to the electrostatic fields • to understand how laws of electrostatic can be applied to problems arising in engineering.
Indicative Contents	Electric charge and the electric field Electric flux density and Gauss's Law Electric potential Electric field in matter and boundary conditions Capacitance

Learning and Teaching Strategies

Strategies	Through the presentation of a theoretical explanation with the aid of white board and 'Data Show', to illustrate syllabus (examples and exercises) and using text books.

Student Workload (SWL)

Structured SWL (h/sem)	45	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	?	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	?		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	15 % (10)	5,8,10,12	LO #1-5, 9 and 11
	Assignments	4	15 % (10)	6,9,11,13	LO #1-5, 6, 10 and 12
	Projects	0	0 % (0)		
	Report	0	0% (0)		
Summative assessment	**Midterm Exam**	1.5hr	20 % (20)	10	LO #1-8
	Final Exam	3 hours	5 0% (4 0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Review of Vector Calculus
Week 2	Review of Vector Calculus
Week 3	Experimental law of coulomb; Electric field intensity;
Week 4	Field of a continuous and volume charge distributions; line charge and sheet charge;
Week 5	Field of a continuous and volume charge distributions; line charge and sheet charge;
Week 6	Electric flux density; Gauss's law;
Week 7	Application of Gauss's law; some symmetrical charge distributions.
Week 8	Energy expanded in moving a point charge in an electric field;
Week 9	Definition of potential difference and potential;
Week 10	Potential field of a point charge and system of charges; Potential gradient.

Week 11	Conductor Properties and boundary conditions;
Week 12	Nature of Dielectric Materials; Boundary Conditions for Perfect dielectric Materials;
Week 13	Capacitance; Several Capacitance Examples.
Week 14	Poisson and Laplace's equations; Examples of the solution of Laplace equation
Week 15	Examples of the solution of Laplaceequation; Examples of the solution of Poisson's equation.
Week 16	Preparatory week before the final exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	1-ENGINEERING ELECTROSTATICES, Mc- Graw Hill, By WILLAIM H. HAYT. 2-Elements of electrostatic engineering, Prentice Hall, By Matthew NO SADIKU	No
Recommended Texts	1-Electrostatics (Schaum's Outlines), McGraw-Hill Education By Edminister, Joseph_ Nahvi, Mahmood.	No
Websites		

Grading Scheme

Group	**Grade**	Appreciation	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under (processing	(45-49)	More work is required, but credit is given.

	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information

Module Title	Human Physiology			**Module Delivery**	
Module Type	Support			☐**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	NVEEELM 213				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level			**Semester of Delivery**	1	
Administration Department	Electronics dept		**College**	Electronics engineering college	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		

Scientific Committee Approval Date		**Version Number**	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	This subject introduces engineering students to human anatomy and physiology, with direct application of the knowledge to considerations for designing and manufacturing medical devices and equipment to assist in overcoming physical disabilities.
Module Learning Outcomes	Upon To complete this unit, the student should be able to: 1. Demonstrate correct usage of the terminology used to describe anatomical structures. 2. Describe the organ zation of cells and tissues. 3. Describe the principles relating to the structure of connective tissues, skeletal muscle, bones and joints. 4. Describe the principles of excitable tissues. 5. Describe the structure and function of the human eye and ear and the mechanisms of vision and hearing. 6. Describe the principles of sensorimotor control. 7. Describe cardiac mechanics and cardiac biophysics. 8. Describe the application of technologies and techniques to investigate the structure and function of the body.
Indicative Contents	Anatomical terminology. The structure and appearance of cells and tissues.

	The appearance of bone and cartilage, the organi zation of dense connective tissues. Skeletal muscle structure and function. Principles of excitable tissues. The structure and function of sensory systems, including the eye and vision and the ear and hearing. Principles of sensory motor control. Cardiac mechanics and cardiac biophysics. Technologies, quantitative measurements and experimental techniques used to investigate the structure and function of different tissues, organs and organ systems.

Learning and Teaching Strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)		**Structured SWL (h/w)**	
Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	
Total SWL (h/sem)			

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**				
	Assignments				

	Projects / Lab.				
	Report				
Summative assessment	**Midterm Exam**				
	Final Exam				
Total assessment					

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Cells and their function
Week 2	Tissues, glands & membranes
Week 3	Muscle tissue
Week 4	The skeleton
Week 5	Nervous system
Week 6	Sensory
Week 7	Respiration
Week 8	The eye
Week 9	The joints
Week 10	The skin
Week 11	Digestive system
Week 12	The urinary system and body fluids
Week 13	The heart
Week 14	Blood
Week 15	Blood vessels Blood clotting
Week 16	Preparatory week before the final exam

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts		
Recommended Texts		

Websites		

Grading Scheme				
Group	**Grade**	Appreciation	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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.

Courses specification for Second class Medical Engineering (Second Course)

Module Information			
Module Title	Signals and Systems	**Module Delivery**	
Module Type	Core	☐ **Theory**	
Module Code	NEEM210	☒ **Lecture**	
ECTS Credits	6	☐ **Lab**	
SWL (hr/sem)	150	☐ **Tutorial**	
		☐ **X Practical**	
		☐ **Seminar**	
Module Level	1 1	**Semester of Delivery**	4

Administration Department	Type Dept. Code	**College**	Type College Code
Module Leader		**e-mail**	
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	Email
Peer Reviewer Name	Name	**e-mail**	Email
Scientific Committee Approval Date	06/25/2023	**Version Number**	1.0

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	Student will be able to: 25. identify systems concepts. 26. understand the properties of systems. 27. Understand the mathematical relationship between input and output of a system. 28. deal with Fourier and Laplace analysis of systems. 29. perform z-transform of discrete signals.
Module Learning Outcomes	53. Definition of the system concept. 54. Introduction of mathematical models. 55. Explain continuous time systems. Discrete time systems.

	56. Introduction of frequency response of systems. 57. Definition of filters. 58. Explain Ideal filters, Non ideal filters, and Butterworth filter design. 59. Define Z-transform of discrete signals. 60. Analyze of continuous system using Laplace Transform. System transfer function. 61. Definition of transfer function of a discrete system.
Indicative Contents	Indicative content includes the following. Introduction to systems: - Definition and mathematical models. - Properties of systems. Transformation used with continuous systems - Fourier transforms. - Filters. - Laplace transform. Z-transform: - Introduction of z-transform of discrete time signal. - Z-transform used with discrete systems. Convolution used for - Continuous systems. - Discrete systems

Learning and Teaching Strategies

Strategies	To make students interesting with both types of systems: continuous and discrete. Also with properties of systems and operations. To make them familiar with time and frequency domain and analysis of a system. Also to make them familiar with different types of transforms of systems. Also to make them have an experience with solving different problems and examples.

Student Workload (SWL)

Structured SWL (h/sem (	62	**Structured SWL (h/w)** A	4
Unstructured SWL (h/sem)	88	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	**150**		

Module Evaluation

		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	6	10% (10)	2, 5, 9, 12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	2, 5, 9, 12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20% (20)	2, 5, 9, 12,13,15	LO #3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO #1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Basic definitions. Mathematical models.
Week 2	Continuous time systems.
Week 3	Discrete time systems.
Week 4	System properties.
Weeks 5	Mathematical system representation in time domain: Convolution representation.
Week 6	Convolution properties.
Week 7	System description by linear constant coefficient differential equations.
Week 8	Frequency domain analysis of continuous system.
Week 9	Frequency response of a system.
Week 10	Frequency response of electrical circuits.
Week 11	Ffilters. Distortion less transmission.
Week 12	Ideal filters. Non ideal filters. Butterworth filter design.
Week 13	Analysis of continuous system using Laplace Transform.
Week 14	System transfer function.
Week 15	Analysis of discrete system using z-Transform. System transfer function.

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	**Signals and systems. Simon S. Haykin**	Yes
Recommended Texts	**Signals and linear systems. G. E. Carlson**	

Grading Scheme

Group	Grade	Appreciation	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under processing (	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Module Title	Engineering Analysis II	**Module Delivery**	
Module Type	Core		☐**Theory**
Module Code	NVEE209		☒**Lecture**
ECTS Credits	3		☐**Lab**
SWL (hr/sem)	75		☒**Tutorial**
			☐**Practical**
			☐**Seminar**

Module Level		**Semester of Delivery**	2
Administration Department	Electronics dept	**College**	Electronics engineering college
Module Leader	Dr. Omar B Mohammed	**e-mail**	omar.mohammed@uoninevah.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.

Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	This course covers the following topics: ordinary differential equations, sequences and series, solution of differential equations by power series, and matrix analysis. Those areas of mathematics which are most important in connection with practical problems for modeling different areas of science, computer can be easily utilized to find the properties of such systems.
Module Learning Outcomes	Upon successful completion, students will: 7. Improve their problem-solving skills. 8. Apply that knowledge toward practical problems in different areas of science. 9. Utilize the computer capabilities to solve such problems using proper methods. 10. Learn how to represent any function as a power series, then use computer to solve it. 11. Learn the importance of differential equations for modeling almost any system, and how to solve it to find the properties of that system. 12. Learn the linear algebra and its importance in science.

Indicative Contents	Ordinary Differential Equations. Sequences and Series. Solution of Differential Equations by Power Series. Matrix Analysis.

Learning and Teaching Strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)		**Structured SWL (h/w)**	
Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	
Total SWL (h/sem)			

Module Evaluation

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

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Ordinary Differential Equations: 1. First order (variables separable, homogeneous, linear and exact). 2. Second order homogeneous. 3. Second order nonhomogeneous; indeterminant coefficients, variation of parameters.
Week 2	
Week 3	
Week 4	
Week 5	Infinite Sequences and Series: 1. Limit laws, indeterminate forms and L'hospital rule. 2. Infinite series; convergence test. 3. Power series; Taylor and Maclaurin series.
Week 6	
Week 7	
Week 8	
Week 9	Solution of Differential Equations by Power Series: Power series method, Legendre's equation; Legendre's polynomials.
Week 10	
Week 11	
Week 12	
Week 13	Matrix Analysis: 1. Review of matrix theory, solving system of equations; Cramer's rule, inverse of the matrix method, Gauss elimination. 2. Eigen values and eigen vectors. 3. Diagonalization of matrices 4. Application of matrices to electrical circuits.
Week 14	
Week 15	
Week 16	Preparatory week before the final exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Advanced Engineering Mathematics By KREYSIK	Yes
Recommended Texts	Calculus By Finney& Thomas	Yes
Websites		

Grading Scheme

Group	Grade	Appreciation	Marks (%)	Definition

Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under (processing	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information

Module Title	**Electronic II**	**Module Delivery**	
Module Type	**Core**		**☐Theory**
Module Code	**NVEEELM221**		**☒Lecture**
ECTS Credits	**6**		**☐Lab**
SWL (hr/sem)	**150**		**☒Tutorial**
			☒Practical
			☐Seminar
Module Level		**Semester of Delivery**	2
Administration Department	Electronics	**College**	Electronic Engineering college

Module Leader		**e-mail**	
Module Leader's Acad. Title	Assistant Prof.	**Module Leader's Qualification**	PhD
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	Ahmad.younis@uoninevah,edu,iq
Scientific Committee Approval Date	12/06/2023	**Version Number**	1.0

Relation with other Modules

Prerequisite module	Electronic I	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	24. To understand the basic theory and operation of bipolar transistor 25. To be familiar with current mechanism in an npn and pnp transistors 26. To concentrate transistor physical and electrical characteristics 27. To illustrate and design different dc biasing circuits 28. To understand the biasing stability conditions 29. To be able to deal with the mathematical behavior of transistor model 30. To understand small signal analysis of transistor amplifier 31. To deal with different transistor amplifier configuration 32. To be able to deal with the frequency response of transistor amplifier 33. To understand the basic operation of field effect transistor and MOS device

	34. To understand the dc and ac behavior of FET and MOS amplifiers
Module Learning Outcomes	24. Understand and apply the basic theory and operation of transistor amplifiers 25. Define and explain the electrical characteristic of bipolar transistor 26. Understand the basic structure of npn and pnp transistors 27. Understand and analyze the electrical transistor model 28. Understanding the dc and ac analysis of transistor amplifier 29. Dealing with dc biasing and ac amplifiers 30. Understanding the effect of frequency on amplifier response 31. Familiar with other FET and MOS circuits

Indicative Contents	**Bipolar junction transistors,** Transistor construction, transistor operation, NPN & PNP Bipolar Transistor; Current Flow Mechanism in Transistor Junctions; Trans configurations; Current Gain Calculation [Alpha] and [Beta]; Transistor input/output characteristics; DC Load line; Operating point; Different DC circuit biasing. Bias circuit, voltage divider circuit, dc bias with feedback **DC biasing,** Operating point, fixed bias circuit, emitter bias circuit, voltage divider circuit, dc bias wit feedback. **Biasing stability** Stability factor analysis due to temperature variation (Effect of Ico, Vbe and Beta); Temperature compensation using diode biasing. **Small signal analysis,** Small signal equivalent circuit for CB, CE and CC configuration; Input/Output resistanc Calculation of current and voltage Gain in small signal amplifier; Graphical Analysis for voltage gain; Hybrid parameters to analyze transistor circuits. **Field Effect Transistor (FET) and MOS transistor:** **FET biasing configurations, Depletion and Enhanced mode operation,** Introduction to the theory and operations of JFFT & MOSFET; FET Transistor configurations; Transistors transfer characteristics; Amplifier Circuit Biasing; transisto Equivalent circuit; Small signal analysis of FET transistor. **FREQUENCY RESPONSE:** Definition and Concepts; Gain in decibel; Bode plot for the gain; The effect of the Coup capacitor; Low frequency analysis due to the RC Coupled amplifier in BJTs; the Effect emitter bypass capacitor **;** Calculation of the Low cut-off frequency. Transistor amplifier high frequencies; Hybrid PIE equivalent circuit at high frequency; High frequency beha of CB & CE amplifier; High cut-off frequency; Gain Band-Width products for the above circuits; FET at high frequencies; CD and CS amplifier at high frequency; .

Learning and Teaching Strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)	88	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	76	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	164		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10 % (10)	2, 5, 9, 12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10 % (10)	2, 5, 9, 12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20 % (20)	2, 5, 9, 12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1:30hr	20 % (20)	10	LO #1-4
	Final Exam	3 hours	4 0% (4 0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Transistor construction and operation
Week 2	Bipolar transistor current flow mechanism
Week 3	Transistor configurations, current gain calculation, and input and output resistances
Week 4	Dc biasing circuits, operating point calculation
Week 5	Biasing stability, stability factor calculation
Week 6	Temperature compensation using diode biasing
Week 7	Small signal equivalent circuit for CB, CC, CE configurations
Week 8	Calculation of voltage and current gains
Week 9	Hybrid model ac analysis of transistor amplifier

Week 10	FET and MOS transistors operation
Week 11	FET biasing configurations
Week 12	Depletion and enhancement mode operation
Week 13	Definition and analysis of amplifier frequency response
Week 14	Low frequency and high frequency analysis
Week 15	Hybrid-Pie equivalent circuit at high frequency
Week 16	**Subject review**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	**Practical experiments in transistor amplifiers to measure the current and voltage gains.** **To measure the input and output amplifier resistances** **To measure the amplifier frequency response.**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	**Textbook1: INTEGRATEDELECTRONICS"MCGRAWHILL;9THREPRINT,1995** . B yMILLMAN&HALKIES **2: "ELECTRONICS DEVICES AND COMPONENTS", PITMAN,** 1995 By MOTTERSHED **,** . ,	yes
Recommended Texts	**3: "SOLID STATE DIVICES", PHI; 4TH EDITION** , 1995.By STREETMAN, **4"SEMICONDUCTOR DEVICES & CIRCUITS", JOHN WILEY & SONS, 1992.By** : MS TYAGI	Yes
Websites	Electronic circuits	

Grading Scheme				
Group	**Grade**	Appreciation	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under (processing	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information

Subject information

Module Title	Programming			**Module Delivery**	
Module Type	Core			☒ **Theory**	
Module Code	NVEEELM222			☒ **Lecture**	
ECTS Credits	6			☒ **Lab**	
SWL (hr/sem)	150			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	UGx11 2		**Semester of Delivery**	2	
Administration Department	Dept. of Electronic Eng. (Med. Ele)		**College**	College of Electronic Engineering	
Module Leader	Qais Thanon		**e-mail**	Qais.najim @uoninevah.edu.iq	
Module Leader's Acad. Title	Porf.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	Email	
Peer Reviewer Name	Name		**e-mail**	Email	
Scientific Committee Approval Date	06/20/2023		**Version Number**	1.0	

Relation with other Modules

Relationship with other subjects

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Course objectives, learning outcomes and guiding content

Module Objectives Subject objectives	1. Learning about the algorithms types and how to build the algorithms.

	2. Learning how to command computers to perform tasks using C++ language (Programming/coding). 3. Become acquainted with the designed programming including sequencing, condition and iteration. 4. Learn about the 1d and 2d arrays in C++ language. 5. Learn about the functions in C++ language. 6 . Learn about the strings in C++ language.
Module Learning Outcomes Learning outcomes for the subject	1. Understanding the meaning of the algorithms in programming languages. 2. Understanding the basics concepts of C language programming such as variables, data types, operators, control 3. Understanding the utilities of each one of sequencing, condition, and loops, and basic input/output operations. 4. Understanding how to represent the data in 1d arrays and 2d arrays. 5. Learn about how the strings represented in C language. 6. Learn about divide any problem in sub-program and execute this problem by using function. 7. In advance practical experience by working on programming exercises and projects.
Indicative Contents Guidance Contents	Indicative content includes the following. • Visualization via flowchart and pseudocode [4 hrs] • Keyworks, identifier, format specifier, and naming variables and constants [8 hrs] • Use standard libraries to take input and display output [8 hrs] • Operators in C++ programming [10 hrs] • Priorities in C++ programming [4 hrs] • Math functions [4 hrs] • Conditional operations [8 hrs] • Iterations (Loop operators) [10 hrs] • Arrays [10 hrs] • Functions [8 hours] • Review classes and problem solving [8 hrs]

Learning and Teaching Strategies

Learning and teaching strategies

Strategies	The main strategy being focused on is developing conceptual programming thinking, meanwhile refining and expanding their mathematical thinking skills. This will be achieved through classes, online lectures, interactive tutorials. Additionally, working on complex projects that challenge students' skills and require to apply advanced concepts. Such projects would help students explore various aspects of C++ programming and gain hands-on experience in solving complex problems. Some sampling activities that are interesting to the students.

Student Workload (SWL)

The student's academic load is calculated for 15 weeks.

Structured SWL (h/sem) Regular student load during the semester	77	**Structured SWL (h/w)** Regular weekly student load	5.1
Unstructured SWL (h/sem) Irregular student load during the semester	73	**Unstructured SWL (h/w)** Irregular student load per week	4.8
Total SWL (h/sem)	**150**		

The student's total academic load during the semester	

Module Evaluation

Course material evaluation

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

Delivery Plan (Weekly Syllabus)

Theoretical weekly curriculum

Week	Material Covered
Week 1	Introduction to computer languages and the structure of C program
Week 2	Flowchart and Pseudo-code
Week 3	Introduction to C++ programming: Declare variables and constants
Week 4	Take input and print output
Week 5	Assignment and Increment, Decrement, Arithmetic, Logical, and Bitwise operators
Week 6	Standard math functions in math header <math.h>
Week 7	Priorities of operators in C++ programming
Week 8	Relational and conditional operators
Week 9	Mid-term Exam
Week 10	If statement versus switch case statement
Week 11	Examples of structured programming (sequencing and condition)
Week 12	Loop operators (For, while, do-while)
Week 13	Arrays
Week 14	Functions
Week 15	String of characters
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus)

Weekly lab schedule

Week	Material Covered
Week 1-2	Learn the C++ language program complier.
Week 3-4	Declare variables and constants and <iostream.h> including standard functions
Week 5-6	Arithmetic, logical, and bitwise operators
Week 7-8	Math header for math functions <math.h> and Assignment and increment & decrement operators
Week 9-10	Relational and conditional operators and Loop operators
Week 11-12	Examples about the Arrays
Week 13-14	Examples about Functions and string

Learning and Teaching Resources

Learning and teaching resources

	Text	Available in the Library?
Required Texts	C Programming Absolute Beginner's Guide, 3rd Edition 2014. BY: Greg Perry and Dean Miller.	Yes
Recommended Texts	C How to Program with an introduction to C++, 8th Edition 2016. *BY: Paul Deitel and Harvey Deitel.* Global Edition Contribution by Piyali Sengupta	No
Websites	1- https://www.programiz.com/c-programming 2- https://www.coursera.org/specializations/c-programming	

Grading Scheme

Grading chart

Group	Grade	Appreciation	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Module Title	Electromagnetic Fields II	**Module Delivery**	
Module Type	**Core**		☐**Theory**
Module Code	NVEE221		☒**Lecture**
ECTS Credits	**6**		☐**Lab**
SWL (hr/sem)	**150**		☒**Tutorial** ☐**Practical** ☐**Seminar**

Module Level		**Semester of Delivery**	2
Administration Department	Type Dept. Code	**College**	Type College Code
Module Leader	SINAN KHALID SHANSHAL	**e-mail**	**sinan.mohammed@uoninevah.edu.iq**
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	Email
Scientific Committee Approval Date	02/07/2023	**Version Number**	1.0

Relation with other Modules

Prerequisite module	None	**Semester**	

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	To develop knowledge of the laws governing the behavior of magnetic and electro-magnetic fields, and to relate the laws governing the fields to applications in a range of electrical and electronic engineering application.
Module Learning Outcomes	On completion of the course the students should be able: • to have detailed knowledge of the physical background and terminology of the electromagnetic field theory for electrical engineering problems • to understand the electromagnetic field behavior • to select and use appropriate theoretical models for analysis, problem solving and finding solutions related to the electrostatic, magnetostatic and electromagnetic fields • to understand how laws of electromagnetism can be applied to problems arising in engineering.
Indicative Contents	Magnetic field and Ampere's Law Magnetic flux and Gauss's Law for magnetic fields Faraday's Law Inductance Maxwell's equations Applications of Electromagnetics

Learning and Teaching Strategies

Strategies	Through the presentation of a theoretical explanation with the aid of white board and 'Data Show', to illustrate syllabus (examples and exercises) and using text books.

Student Workload (SWL)

Structured SWL (h/sem)	45	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	?	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	?		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	15 % (10)	5,8,10,12	LO #1-5,6-7, 9 and 11
	Assignments	4	15 % (10)	6,9,11,13	LO #1-5, 6, 10 and 12
	Projects	0	0 % (0)		
	Report	0	0% (0)		
Summative assessment	**Midterm Exam**	1.5hr	20 % (20)	10	LO #1-8
	Final Exam	3 hours	5 0% (4 0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Review of Vector Calculus
Week 2	Review of Vector Calculus
Week 3	Boit – Savart law
Week 4	Amperes law; Magnetic Flux & Magnetic Flux Density
Week 5	Inductance
Week 6	Force on Moving Charge; Force on Differential Current. Elements
Week 7	Force and Torque on a Closed Circuit
Week 8	Magnetization and Permeability; Magnetic Boundary Conditions; Magnetic Circuit.
Week 9	Faraday's Law;
Week 10	Maxwell's Equations
Week 11	Example of Maxwell's Equations
Week 12	Wave Equations; Wave Propagation in Lossy Dielectrics
Week 13	Plane Waves in Lossless Dielectrics; Plane Waves in Free Space
Week 14	Plane Waves in Good Conductors;
Week 15	Power and the Pointing Vector.
Week 16	Preparatory week before the final exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1-ENGINEERING ELECTROMAGNETICES, Mc- Graw Hill, By WILLAIM H. HAYT. 2-Elements of electromagnetic engineering, Prentice Hall, By Matthew NO SADIKU	No
Recommended Texts	1-Electromagnetics (Schaum's Outlines), McGraw-Hill Education, By Edminister, Joseph_ Nahvi, Mahmood.	No
Websites		

Grading Scheme

Group	Grade	Appreciation	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under (processing	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information
Subject information

Module Title	English		**Module Delivery**	
Module Type	Support		☒**Theory** ☐**Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	NVU11			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level	UGx11 1	**Semester of Delivery**	1	
Administration Department		**College**	NV	
Module Leader		**e-mail**		
Module Leader's Acad. Title	Noor Mothafar Hamid	**Module Leader's Qualification**	MS.D.	
Module Tutor	Name (if available)	**e-mail**	noorm.hame@duoninevah.edu.iq	
Peer Reviewer Name	Name	**e-mail**	Email	
Scientific Committee Approval Date	06/01/2023	**Version Number**	1.0	

Relation with other Modules
Relationship with other subjects

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
Course objectives, learning outcomes and guiding content

Module Aims Subject objectives	35. To develop skills, reading, writing and understanding of English language through the application of teaching techniques. 36. To understand scientific subjects and technical terms through reading and comprehension. 37. This course deals with the basic concepts of scientific subjects.

	38. This course handles how to write simple research and how to make a successful presentation. 39. To understand the scientific language in English.
Module Learning Outcomes Learning outcomes for the subject	32. Recognize parts of speech and tenses in English language. 33. List the various terms associated with scientific texts. 34. Summarize what is meant by a basic electric circuit. 35. Discuss Electric currents, series and parallel circuits. 36. Describe electrical power, charge, and current. 37. Discuss computers, communication and the future of computers.. 38. Identify the basic circuit elements and their applications. 39. Explain energy types and forms. 40. Discuss the various properties of radio waves and vacuum tubes. 41. Explain modulation. 42. Discuss Electromagnetism.
Indicative Contents Guidance Contents	Indicative content includes the following. 1.parts of speech _verb _ noun _ pronoun 2.Tenses _Past _Present _future 3. Electric currents and circuits _AC/DC _parallel, serious _Grounding, fuse, short circuit 4.Radio waves and vacuum tubes 5. Electromagnetism. 6. The future of computers, communication applications. _fiber optics. 7. Induction. _Electric generator _Electric transformer _self-induction _servomechanism 8. Incandescent lamp. 9. Energy. _types of energy _forms of energy 10. Introduction to electron and electricity. 11.Electricity and electronics.

Learning and Teaching Strategies
Learning and teaching strategies

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

Student Workload (SWL)
Student's academic load

Structured SWL (h/sem) Regular student load during the semester	30	**Structured SWL (h/w)** Regular weekly student load	2
Unstructured SWL (h/sem) Irregular student load during the semester	70	**Unstructured SWL (h/w)** Irregular student load per week	5
Total SWL (h/sem) The student's total academic load during the semester	100		

Module Evaluation
Course material evaluation

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	10 % (10)	4.6	LO #1, 2, 3,4,5and 6
	Assignments	2	10 % (10)	9, 12	LO # 7,8,9,10,11and 12
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 13,14
Summative assessment	**Midterm Exam**	2 hours	10 % (10)	7	LO#
	Final Exam	2 hours	5 0% (5 0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Theoretical weekly curriculum

Week	Material Covered
Week 1	Parts of speech
Week 2	Tenses
Week 3	Electric currents and circuit
Week 4	Radio waves and vacuum tubes
Week 5	The future of computers, communication applications.
Week 6	Induction -Electric generator -Electric transformer
Week 7	Mid-term Exam
Week 8	Induction -Self-induction -Servomechanism
Week 9	Incandescent lamp.
Week 10	Energy. -types of energy -forms of energy
Week 11	Introduction to electron and electricity.
Week 12	Electricity and electronics
Week 13	The cathode ray tube
Week 14	Propagation
Week 15	Modulation
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus)

Weekly lab schedule

Week	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

Learning and teaching resources

	Text	Available in the Library?
Required Texts	English in electrical engineering and electronics. The language of electrical and electronic engineering in English.	Yes
Recommended Texts	English for electrical engineering and computing.	No
Websites	https://www.askoxford.com/betterwriting/succesfulcv/application/?view=uk	

Grading Scheme

Grading chart

Group	Grade	Appreciation	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C – Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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.

Courses specification for Second class Industrial Electronic Engineering (Second Course)

Module Information					
Module Title	**DC Machines**			**Module Delivery**	
Module Type	**Core**			☒Theory ☐Lecture ☒Lab ☒Tutorial ☐Practical ☐Seminar	
Module Code	**NEEI2313**				
ECTS Credits	**6**				
SWL (hr/sem)	**114**				
Module Level	2 2		**Semester of Delivery**	1	
Administration Department	Electronic Dept.		**College**	Electronics collage	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules			
Prerequisite module	DC Circuit Analysis	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	40. Understanding DC Machine Principles 41. Analyzing DC Machine Behavior 42. Control Strategies 43. System Integration 44. Practical Applications 45. Problem-Solving Skills 46. Laboratory Skills 47. Teamwork and Communication 48. Professional Development
Module Learning Outcomes	43. Understand how voltage is induced in a rotating loop 44. Understand how curved pole faces contribute to a constant flux, and thus 45. More constant output voltages. 46. Understand how curved pole faces contribute to a constant flux, and thus More constant output voltages. 47. Understand the power flow diagram for de machines 48. Know the types of motors in general use. 49. Understand the equivalent circuit of a motor. 50. Understand how to derive the torque-speed characteristics of separately excited, shunt, series, and compounded de motors. 51. Understand how to control the speed of different types of motors. 52. Understand the special characteristics of series de motors, and their applications.

	53. Understand the methods of starting dc motors safely. 54. Understand the equivalent circuit of a dc generator. 55. Understand the purpose of a transformer in a power system. 56. Understand how real transformers approximate the operation of an ideal transformer 57. Be able to explain how copper losses, leakage flux, hysteresis, and eddy currents are modeled in transformer equivalent circuits.
Indicative Contents	Introduction - A Simple Rotating Loop between Curved Pole Faces. The Voltage Induced in a Rotating Loop / Getting DC Voltage Out of the Rotating Loop / The Induced Torque in the rotating loop.(12 hrs.).
	Commutation and Armature Construction in Real DC Machine. .(8 hrs.).
	Power Flow and Losses in DC Machines. (6 hrs.).
	Introduction to DC Motors. The Equivalent Circuit of a DC Motor. The Magnetization Curve of a DC Machine. Separately Excited and Shunt DC Motors.(10 hrs.).
	Permanent-Magnet DC Motor. The Series DC Motor. The Compounded DC Motor. (6 hrs.).
	Motor Starters. Solid-State Speed Controllers. (12 hrs.).
	DC Motor Efficiency Calculations. (4 hrs.).
	Mid-term Exam. .(3 hrs.).
	Introduction to DC Generators. The Separately Excited Generator. (12 hrs.).
	The Shunt DC Generator. The Series DC Generator.(4 hrs.).
	The Cumulatively Compounded DC Generator. The Differentially Compounded DC Generator. (4 hrs.).
	Types and Construction of Transformers. The Ideal Transformer. (10 hrs.).
	Theory of Operation of Real Single-Phase Transformers. The Equivalent Circuit of a Transformer. (18 hrs.).
	Transformer Voltage Regulation and Efficiency. (12 hrs.).
	Instrument Transformers. (4 hrs.).

Learning and Teaching Strategies	
Strategies	Visual Aids Problem-Solving Exercises Real-World Applications Group Projects Simulations and Virtual Labs

	Multimedia Resources Real-Life Examples

Student Workload (SWL)

Structured SWL (h/sem)	74	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	40	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	114		

Module Evaluation

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10 % (10)	5, 10	
	Assignments	2	10 % (10)	2, 12	
	Projects / Lab.	1	10 % (10)	Continuous	
	Report	1	10% (10)	13	
Summative assessment	**Midterm Exam**	2 hours	10 % (10)	7	
	Final Exam	2 hours	5 0% (5 0)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	Introduction - A Simple Rotating Loop between Curved Pole Faces. The Voltage Induced in a Rotating Loop / Getting DC Voltage Out of the Rotating Loop / The Induced Torque in the rotating loop.
Week 2	Commutation and Armature Construction in Real DC Machine.
Week 3	Power Flow and Losses in DC Machines.
Week 4	Introduction to DC Motors. The Equivalent Circuit of a DC Motor. The Magnetization Curve of a DC Machine. Separately Excited and Shunt DC Motors
Week 5	Permanent-Magnet DC Motor. The Series DC Motor. The Compounded DC Motor.
Week 6	Motor Starters. Solid-State Speed Controllers.
Week 7	DC Motor Efficiency Calculations.
Week 8	Mid-term Exam.
Week 9	Introduction to DC Generators. The Separately Excited Generator.

Week 10	The Shunt DC Generator. The Series DC Generator
Week 11	The Cumulatively Compounded DC Generator. The Differentially Compounded DC Generator.
Week 12	Types and Construction of Transformers. The Ideal Transformer.
Week 13	Theory of Operation of Real Single-Phase Transformers. The Equivalent Circuit of a Transformer.
Week 14	Transformer Voltage Regulation and Efficiency.
Week 15	Instrument Transformers.
Week 16	Preparatory week before the final exam

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	Electrical Machinery Fundamentals" edited by Stephen J. Chapman.	NO
Recommended Texts	electrical machines and transformer by: Ancieron and Macneiil	NO
Websites	https://www.coursera.org	

Grading Scheme				
Group	**Grade**	Appreciation	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information		
Module Title	**Electronic I**	**Module Delivery**

Module Type	**core**			☐**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☒**Practical** ☐**Seminar**	
Module Code	**NVEEELI212**				
ECTS Credits	**7**				
SWL (hr/sem)	**164**				
Module Level		1	**Semester of Delivery**		1
Administration Department		Electronics	**College**	Electronic Engineering college	
Module Leader			**e-mail**		
Module Leader's Acad. Title		Assistant Prof.	**Module Leader's Qualification**		PhD
Module Tutor			**e-mail**		
Peer Reviewer Name		Name	**e-mail**	Ahmad.younis@uoninevah,edu,iq	
Scientific Committee Approval Date		12/06/2023	**Version Number**	1.0	

Relation with other Modules

Prerequisite module	NEEI1223	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	49. To understand the basic theory and operation of bipolar transistor 50. To be familiar with current mechanism in an npn and pnp transistors 51. To concentrate transistor physical and electrical characteristics 52. To illustrate and design different dc biasing circuits 53. To understand the biasing stability conditions 54. To be able to deal with the mathematical behavior of transistor model 55. To understand small signal analysis of transistor amplifier 56. To deal with different transistor amplifier configuration 57. To be able to deal with the frequency response of transistor amplifier 58. To understand the basic operation of field effect transistor and MOS device 59. To understand the dc and ac behavior of FET and MOS amplifiers

Module Learning Outcomes	58. Understand and apply the basic theory and operation of transistor amplifiers 59. Define and explain the electrical characteristic of bipolar transistor 60. Understand the basic structure of npn and pnp transistors 61. Understand and analyze the electrical transistor model 62. Understanding the dc and ac analysis of transistor amplifier 63. Dealing with dc biasing and ac amplifiers 64. Understanding the effect of frequency on amplifier response 65. Familiar with other FET and MOS circuits
Indicative Contents	**Bipolar junction transistors,** Transistor construction, transistor operation, NPN & PNP Bipolar Transistor; Current Flow Mechanism in Transistor Junctions; Transistor configurations; Current Gain Calculation [Alpha] and [Beta]; Transistor input/output characteristi DC Load line; Operating point; Different DC circuit biasing. Bias circuit, voltage divider circuit, d with feedback **DC biasing,** Operating point, fixed bias circuit, emitter bias circuit, voltage divider circuit, dc bias with feedba **Biasing stability** Stability factor analysis due to temperature variation (Effect of Ico, Vbe and Beta); Temperature compensation using diode biasing. **Small signal analysis,** Small signal equivalent circuit for CB, CE and CC configuration; Input/Output resistanc Calculation of current and voltage Gain in small signal amplifier; Graphical Analysis for voltage gain; Hybrid parameters to analyze transistor circuits. **Field Effect Transistor (FET) and MOS transistor:** **FET biasing configurations, Depletion and Enhanced mode operation,** Introduction to the theory and operations of JFFT & MOSFET; FET Transistor configurations; Transistors transfer characteristics; Amplifier Circuit Biasing; transistor Equivalent circuit; Small analysis of FET transistor. **FREQUENCY RESPONSE:** Definition and Concepts; Gain in decibel; Bode plot for the gain; The effect of the Coupling capa Low frequency analysis due to the RC Coupled amplifier in BJTs; the Effect of emitter bypass capacitor **;** Calculation of the Low cut-off frequency. Transistor amplifier at high frequencies; Hy PIE equivalent circuit at high frequency; High frequency behavior of CB & CE amplifier; High cu frequency; Gain Band-Width products for the above circuits; FET at high frequencies; CD and C amplifier at high frequency; .

Learning and Teaching Strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)	88	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	76	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	164		

Module Evaluation

As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	6	10 % (10)	2, 5, 9, 12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10 % (10)	2, 5, 9, 12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20 % (20)	2, 5, 9, 12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1:30hr	20 % (20)	10	LO #1-4
	Final Exam	3 hours	4 0% (4 0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	**Material Covered**
Week 1	Transistor construction and operation
Week 2	Bipolar transistor current flow mechanism
Week 3	Transistor configurations, current gain calculation, and input and output resistances
Week 4	Dc biasing circuits, operating point calculation
Week 5	Biasing stability, stability factor calculation
Week 6	Temperature compensation using diode biasing
Week 7	

Week 8	Small signal equivalent circuit for CB, CC, CE configurations Calculation of voltage and current gains Hybrid model ac analysis of transistor amplifier
Week 9	
Week 10	FET and MOS transistors operation
Week 11	FET biasing configurations
Week 12	Depletion and enhancement mode operation
Week 13	Definition and analysis of amplifier frequency response
Week 14	Low frequency and high frequency analysis
Week 15	Hybrid-Pie equivalent circuit at high frequency
Week 16	**Subject review**

Delivery Plan (Weekly Lab. Syllabus)

Week	Material Covered
Week 1-15	**Practical experiments in transistor amplifiers to measure the current and voltage gains.** **To measure the input and output amplifier resistances** **To measure the amplifier frequency response.**

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	**Textbook1: INTEGRATEDELECTRONICS"MCGRAWHILL;9THREPRINT,1995.B yMILLMAN&HALKIES** **2: "ELECTRONICS DEVICES AND COMPONENTS", PITMAN,** 1995 By MOTTERSHED **,** . ,	yes
Recommended Texts	**3: "SOLID STATE DIVICES", PHI; 4TH EDITION** , 1995.By STREETMAN, **4"SEMICONDUCTOR DEVICES & CIRCUITS", JOHN WILEY & SONS, 1992.By** : MS TYAGI	Yes
Websites	Electronic circuits	

Grading Scheme

Group	Grade	Appreciation	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.

Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information

Module Title	**Fundementals of Electromagnetics**			**Module Delivery**	
Module Type	**Base**			☐**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	NVEEELI221				
ECTS Credits	4				
SWL (hr/sem)	45				
Module Level		2	**Semester of Delivery**		1
Administration Department		Type Dept. Code	**College**	Type College Code	
Module Leader	SINAN KHALID SHANSHAL		**e-mail**	**sinan.mohammed@uoninevah.edu.iq**	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		M.Sc.
Module Tutor			**e-mail**		
Peer Reviewer Name		Name	**e-mail**	Email	
Scientific Committee Approval Date		02/07/2023	**Version Number**		1.0

Relation with other Modules

Prerequisite module	None	**Semester**	

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	To develop knowledge of the laws governing the behavior of electric and electro-magnetic fields, and to relate the laws governing the fields to applications in a range of electrical and electronic engineering application.
Module Learning Outcomes	On completion of the course the students should be able: • to have detailed knowledge of the physical background and terminology of the electromagnetic field theory for electrical engineering problems • to understand the electromagnetic field behavior • to select and use appropriate theoretical models for analysis, problem solving and finding solutions related to the electrostatic, magnetostatic and electromagnetic fields • to understand how laws of electromagnetism can be applied to problems arising in engineering and biomedical sciences.
Indicative Contents	Electric charge and the electric field Electric flux density and Gauss's Law Electric scalar potential Electric field in matter and boundary conditions Capacitance Magnetic field and Ampere's Law Magnetic flux and Gauss's Law for magnetic fields Faraday's Law Inductance Maxwell's equations Applications of Electromagnetics

Learning and Teaching Strategies

Strategies	Through the presentation of a theoretical explanation with the aid of white board and 'Data Show', to illustrate syllabus (examples and exercises) and using text books.

Student Workload (SWL)

Structured SWL (h/sem)	45	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	?	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	?		

Module Evaluation

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	15 % (10)	5,8,10,12	LO #1-5, 9 and 11
	Assignments	4	15 % (10)	6,9,11,13	LO #1-5, 6, 10 and 12
	Projects	0	0 % (0)		
	Report	0	0% (0)		
Summative assessment	Midterm Exam	1.5hr	20 % (20)	10	LO #1-8
	Final Exam	3 hours	5 0% (4 0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	Review of Vector Calculus
Week 2	Review of Vector Calculus
Week 3	Experimental law of coulomb; Electric field intensity;
Week 4	Field of a continuous and volume charge distributions; line charge and sheet charge;
Week 5	Electric flux law density; Gauss's law; Application of Gauss's law; Some symmetrical charge distributions.
Week 6	Energy expanded in moving a point charge in an electric field
Week 7	Definition of potential difference and potential
Week 8	Potential field of a point charge and system of charges; Potential gradient;
Week 9	Boit – Savart law
Week 10	Amperes law
Week 11	Magnetic Flux and Magnetic Flux Density
Week 12	Force on Differential Current Elements; Force and Torque on a Closed Circuit;
Week 13	Faraday's Law; Maxwell's Equations
Week 14	Example of Maxwell's Equations
Week 15	Wave Equations.
Week 16	Preparatory week before the final exam

Delivery Plan (Weekly Lab. Syllabus)

Week	Material Covered
Week 1-15	

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1-ENGINEERING ELECTROMAGNETICES, Mc- Graw Hill, By WILLAIM H. HAYT. 2-Elements of electromagnetic engineering, Prentice Hall, By Matthew NO SADIKU	No
Recommended Texts	1-Electromagnetics (Schaum's Outlines), McGraw-Hill Education, By Edminister, Joseph_ Nahvi, Mahmood.	No
Websites		

Grading Scheme

Group	Grade	Appreciation	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information

Module Title	Engineering analysisI	**Module Delivery**	
Module Type	Base		☐**Theory**
Module Code	NVEE208		☒**Lecture**
ECTS Credits	6		☐**Lab**
SWL (hr/sem)	150		☒**Tutorial**
			☐**Practical**
			☐**Seminar**
Module Level		**Semester of Delivery**	1
Administration Department	Electronics dept	**College**	Electronics engineering college
Module Leader	Dr. Omar B Mohammed	**e-mail**	omar.mohammed@uoninevah.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	

Relation with other Modules

Prerequisite module	Mathematics II	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	This course covers the following topics: Multiple Integrals, Vectors Functions, Numerical Analysis, Statistics and Probability. Those areas of mathematics which are most important in connection with practical problems for modeling different areas of science, computer can be easily utilized to find the properties of such systems.
Module Learning Outcomes	Upon successful completion, students will: 13. Improve their problem-solving skills. 14. Apply that knowledge toward practical problems in different areas of science. 15. Utilize the computer capabilities to solve such problems using proper methods. 16. Learn how to deal with geometry in 3D; Find areas and volumes. 17. Solve ordinary and differential equations numerically. 18. Learn the importance of probability and statistics in everyday use.
Indicative Contents	Vectors Functions Multiple Integrals Numerical Analysis Statistics Probability

Learning and Teaching Strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)		**Structured SWL (h/w)**	
Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	
Total SWL (h/sem)			

Module Evaluation

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

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Vectors: Vector in space, dot and cross product. Lines and planes in space. Vector functions valued and motion in space: position, velocity and acceleration, tangential vectors, curve and normal vector.
Week 2	
Week 3	
Week 4	
Week 5	Multiple Integrals: Double Integral in rectangular coordinates, areas and volumes. Double Integral in Polar Coordinates, areas and volumes. Triple Integrals in rectangular, cylindrical, and spherical coordinates, volumes.
Week 6	
Week 7	
Week 8	
Week 9	Numerical Analysis: Solution of non-linear equations by iteration; bisection and Newton-Raphson.
Week 10	

Week 11	Numerical Integration; trapezoidal rule. Numerical solution of 1st order ordinary differential equations; Euler's method.
Week 12	
Week 13	Statistics and Probability: Definitions, mutually exclusive and conditional probability, permutations and combinations Probability distribution: binomial, normal and Poisson distributions.
Week 14	
Week 15	
Week 16	Preparatory week before the final exam

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	Advanced Engineering Mathematics By KREYSIK	Yes
Recommended Texts	Calculus By Finney& Thomas	Yes
Websites		

Grading Scheme

Group	Grade	Appreciation	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under (processing	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information

Subject information

Module Title	Compute Programming		**Module Delivery**
Module Type	**Core**		☒ **Theory**
Module Code	NVEEELI214		☒ **Lecture**
ECTS Credits	**5**		☒ **Lab**
SWL (hr/sem)	**150**		☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Level	UGx11 2	**Semester of Delivery**	2
Administration Department	Dept. of Electronic Eng. (Med. Ele)	**College**	College of Electronic Engineering
Module Leader	Qais Thanon	**e-mail**	Qais.najim @uoninevah.edu.iq

Module Leader's Acad. Title	Porf.	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	Email
Peer Reviewer Name	Name	**e-mail**	Email
Scientific Committee Approval Date	06/20/2023	**Version Number**	1.0

Relation with other Modules

Relationship with other subjects

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Course objectives, learning outcomes and guiding content

Module Objectives Subject objectives	1. Learning about the algorithms types and how to build the algorithms. 2. Learning how to command computers to perform tasks using C++ language (Programming/coding). 3. Become acquainted with the designed programming including sequencing, condition and iteration. 4. Learn about the 1d and 2d arrays in C++ language. 5 . Learn about the functions in C++ language. 6. Learn about the strings in C++ language.
Module Learning Outcomes Learning outcomes for the subject	8. Understanding the meaning of the algorithms in programming languages. 9. Understanding the basics concepts of C language programming such as variables, data types, operators, control 10. Understanding the utilities of each one of sequencing, condition, and loops, and basic input/output operations. 11. Understanding how to represent the data in 1d arrays and 2d arrays. 12. Learn about how the strings represented in C language. 13. Learn about divide any problem in sub-program and execute this problem by using function. 14. In advance practical experience by working on programming exercises and projects.
Indicative Contents Guidance Contents	Indicative content includes the following. • Visualization via flowchart and pseudocode [4 hrs] • Keyworks, identifier, format specifier, and naming variables and constants [8 hrs] • Use standard libraries to take input and display output [8 hrs] • Operators in C++ programming [10 hrs] • Priorities in C++ programming [4 hrs]

	• Math functions [4 hrs] • Conditional operations [8 hrs] • Iterations (Loop operators) [10 hrs] • Arrays [10 hrs] • Functions [8 hours] • Review classes and problem solving [8 hrs]

Learning and Teaching Strategies

Learning and teaching strategies

Strategies	The main strategy being focused on is developing conceptual programming thinking, meanwhile refining and expanding their mathematical thinking skills. This will be achieved through classes, online lectures, interactive tutorials. Additionally, working on complex projects that challenge students' skills and require to apply advanced concepts. Such projects would help students explore various aspects of C++ programming and gain hands-on experience in solving complex problems. Some sampling activities that are interesting to the students.

Student Workload (SWL)

The student's academic load is calculated for 15 weeks.

Structured SWL (h/sem) Regular student load during the semester	77	**Structured SWL (h/w)** Regular weekly student load	5.1
Unstructured SWL (h/sem) Irregular student load during the semester	73	**Unstructured SWL (h/w)** Irregular student load per week	4.8
Total SWL (h/sem) The student's total academic load during the semester	**150**		

Module Evaluation

Course material evaluation

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

Delivery Plan (Weekly Syllabus)

Theoretical weekly curriculum

Week	Material Covered
Week 1	Introduction to computer languages and the structure of C program
Week 2	Flowchart and Pseudo-code
Week 3	Introduction to C++ programming: Declare variables and constants
Week 4	Take input and print output
Week 5	Assignment and Increment, Decrement, Arithmetic, Logical, and Bitwise operators
Week 6	Standard math functions in math header <math.h>
Week 7	Priorities of operators in C++ programming
Week 8	Relational and conditional operators
Week 9	Mid-term Exam
Week 10	If statement versus switch case statement
Week 11	Examples of structured programming (sequencing and condition)
Week 12	Loop operators (For, while, do-while)
Week 13	Arrays
Week 14	Functions
Week 15	String of characters
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus)

Weekly lab schedule

Week	Material Covered
Week 1-2	Learn the C++ language program complier.
Week 3-4	Declare variables and constants and <iostream.h> including standard functions
Week 5-6	Arithmetic, logical, and bitwise operators
Week 7-8	Math header for math functions <math.h> and Assignment and increment & decrement operators
Week 9-10	Relational and conditional operators and Loop operators
Week 11-12	Examples about the Arrays
Week 13-14	Examples about Functions and string

Learning and Teaching Resources

Learning and teaching resources

	Text	Available in the Library?
Required Texts	C Programming Absolute Beginner's Guide, 3rd Edition 2014. BY: Greg Perry and Dean Miller.	Yes
Recommended Texts	C How to Program with an introduction to C++, 8th Edition 2016. *BY: Paul Deitel and Harvey Deitel.* Global Edition Contribution by Piyali Sengupta	No

Websites	1- https://www.programiz.com/c-programming 2- https://www.coursera.org/specializations/c-programming

Grading Scheme

Grading chart

Group	Grade	Appreciation	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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.

Courses specification for Second class Industrial Engineering (Second Course)

Module Information					
Module Title	**AC Machines**			**Module Delivery**	
Module Type	**Support or related learning activity**			**☒Theory**	
Module Code	**NVEEELI223**			**☐Lecture**	
ECTS Credits	**6**			**☒Lab**	
SWL (hr/sem)	**175**			**☒Tutorial**	
				☐Practical	
				☐Seminar	
Module Level	2	**Semester of Delivery**	2		
Administration Department	Electronic Dept.	**College**	Electronics Collage		
Module Leader		**e-mail**			
Module Leader's Acad. Title		**Module Leader's Qualification**			
Module Tutor		**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date		**Version Number**			

Relation with other Modules			
Prerequisite module	DC Machine	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	60. AC Understanding Machine Principles 61. Analyzing AC Machine Behavior 62. Control Strategies 63. System Integration 64. Practical Applications 65. Problem-Solving Skills 66. Laboratory Skills 67. Teamwork and Communication 68. Professional Development
Module Learning Outcomes	66. Understand how voltage is induced in a rotating loop 67. Understand how curved pole faces contribute to a constant flux, and thus 68. More constant output voltages. 69. Understand how curved pole faces contribute to a constant flux, and thus More constant output voltages. 70. Understand the power flow diagram for Ac machines 71. Know the types of Ac machines in general use. 72. Understand the equivalent circuit of a three phase induction motor. 73. Understand how to derive the Torque speed characteristic of three phase induction motor. 74. Understand how to control the speed of different types of AC motors. 75. Understand the starting torque, condition for maximum torque, condition for maximum starting torque of the Ac motors. 76. Understand the methods of starting AC motors safely. 77. Understand the equivalent circuit of an AC generator.

	78. Understand of Single phase Induction motor. Construction, theories of operation, torque speed characteristic, Equivalent circuit . 79. Understand how Test of single phase induction motor, no load test, blocked rotor test, power flow diagram, applications. 80. Understand how Three phase synchronous generator, Construction, Equivalent circuit, applications. 81. Understand how Single phase synchronous motors, Reluctance motor, Construction of motor reluctances, applications. 82. Understand how Hysteresis motor, Construction of Hysteresis motor, application . 83. Be able to explain how copper losses, leakage flux, hysteresis, and eddy currents are modeled in Ac machines circuits.
Indicative Contents	Introduction - The module further develops students' understanding of electrical machines by introducing the operational principles and characteristics of AC machines, three phase circuits and complex power. It introduces the principles, operation and design of common electronic power converter circuits.(12 hrs.)
	Commutation and Armature Construction in Real Tree phase induction motor.(8 hrs.)
	Introduction of The Equivalent Circuit of a Tree phase induction motor. (10 hrs.).
	Power Flow and Losses in Tree phase induction motor. (6 hrs.)
	Torque speed characteristic, starting torque, condition for maximum torque, condition for maximum starting torque.(12 hrs.)
	Test of three phase induction motor, no load test, blocked rotor test, power flow diagram, applications.(12 hrs.)
	Mid-term Exam. .(3 hrs.).
	Single phase induction motor.(4 hrs.).
	Introduction of Single phase Induction motor. Construction, theories of operation, torque speed characteristic, Equivalent circuit, (12 hrs.).
	Test of single phase induction motor, no load test, blocked rotor test, power flow diagram, applications.(12 hrs.).

	Three phase synchronous generator, Construction, Equivalent circuit, applications. (12 hrs.).
	Single phase synchronous motors, Reluctance motor, Construction of eluctance motor, applications.(10 hrs.).
	Hysteresis motor, Construction of Hysteresis motor, application.(9 hrs.).
	AC Commutator machine, Universal motor.(12 hrs.).

Learning and Teaching Strategies

Strategies	Visual Aids Problem-Solving Exercises Real-World Applications Group Projects Simulations and Virtual Labs Multimedia Resources Real-Life Examples

Student Workload (SWL)

Structured SWL (h/sem)	74	**Structured SWL (h/w)**	5
Unstructured SWL (h/sem)	101	**Unstructured SWL (h/w)**	4.64
Total SWL (h/sem)	175		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10 % (10)	5, 10	
	Assignments	2	10 % (10)	2, 12	

	Projects / Lab.	1	10 % (10)	Continuous	
	Report	1	10% (10)	13	
Summative assessment	**Midterm Exam**	2 hours	10 % (10)	7	
	Final Exam	2 hours	5 0% (5 0)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction - The module further develops students' understanding of electrical machines by introducing the operational principles and characteristics of AC machines, three phase circuits and complex power.
Week 2	Commutation and Armature Construction in AC Machine.
Week 3	Introduction of The Equivalent Circuit of a Tree phase induction motor.
Week 4	Power Flow and Losses in Tree phase induction motor.
Week 5	Torque speed characteristic, starting torque, condition for maximum torque, condition for maximum starting torque in Tree phase induction motor.
Week 6	Test of three phase induction motor, no load test, blocked rotor test . , **applications**
Week 7	Mid-term Exam.
Week 8	Introduction of Single phase Induction motor. Construction, theories of operation .
Week 9	Torque speed characteristic, Equivalent circuit , of single phase induction motor .
Week 10	Power flow diagram of single phase induction motor & applications .
Week 11	Test of single phase induction motor, no load test, blocked rotor test of single phase induction motor .
Week 12	Three phase synchronous generator, Construction, Equivalent circuit, applications.
Week 13	Single phase synchronous motors, Reluctance motor, Construction of reluctances motor, applications.
Week 14	Hysteresis motor, Construction of Hysteresis motor, application
Week 15	AC Commutator machine, Universal motor

Week 16	Preparatory week before the final exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Electrical Machinery Fundamentals" edited by Stephen J. Chapman.	NO
Recommended Texts	electrical machines and transformer by: Ancieron and Macneiil	NO
Websites	https://www.coursera.org	

Grading Scheme

Group	Grade	Appreciation	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Module Title	**Electronics II**	**Module Delivery**	
Module Type	**core**		☐**Theory**
Module Code	**NVEEELI222**		☒**Lecture**
ECTS Credits	**7**		☐**Lab**
SWL (hr/sem)	**175**		☒**Tutorial** ☒**Practical** ☐**Seminar**

Module Level		**Semester of Delivery**	1
Administration Department	Electronics	**College**	Electronic Engineering college
Module Leader		**e-mail**	
Module Leader's Acad. Title	Assistant Prof.	**Module Leader's Qualification**	PhD
Module Tutor		**e-mail**	
Peer Reviewer Name	Name	**e-mail**	Ahmad.younis@uoninevah,edu,iq
Scientific Committee Approval Date	12/06/2023	**Version Number**	1.0

Relation with other Modules			
Prerequisite module	NEEI2212	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	69. To understand the basic analysis of bipolar transistor amplifier 70. To be familiar with the dc and ac analysis of transistor amplifier 71. To understand the dc and ac analysis of FET amplifier 72. To illustrate and to understand the frequency response of the amplifier 73. To understand the basic concept of feedback concept 74. To be able to deal with different feedback amplifier topologies 75. To study the advantages of negative feedback on amplifier performance 76. To be familiar with feedback amplifier ac analysis 77. To understand the construction and ideal characteristic of operational amplifier 78. To study and analyze op-amp equivalent circuit 79. To be familiar with basic op-amp applications 80. To start with studying power electronic devices
Module Learning Outcomes	84. Understand and apply the basic theory and operation of transistor amplifiers 85. Define and explain the frequency response of bipolar transistor amplifier 86. Understand the basic concept of negative feedback 87. Understand and analyze the feedback amplifier 88. Understanding the operation of ideal operational amplifier 89. Dealing with dc and ac op-amp equivalent circuit

	90. Understanding the basic application of op-amp 91. Power electronic devices principle overview
Indicative Contents	**Transistor and FET amplifier analysis:** Small signal model analysis, low frequency and high frequency analysis, hybrid model, hybrid-Pi model analysis. **Amplifier with negative feedback:** Basic concept, feedback analysis, feedback configurations, Feedback effects on gain, bandwidth, input and output resistances **Operational amplifier:** Ideal Op-amp equivalent circuit; Operational Amplifier Specification; Circuit analysis of an Op-amp; Closed loop Op-amp Circuit (Inverting and Non-Inverting Circuit). **Op-amp Applications:** Summation & subtraction Circuit, Differential circuit Buf circuit, Ideal and practical Integrator circuits, ideal and practical Differentiator circuits, Examples . **Power electronic devices:** UJT Construction, operation and characteristics; Thyrsistor Equivalent Circuit; Thyrsistor Characteristics and operation; Application of the devices.

Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their

	critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)	74	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	101	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	175		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	6	10 % (10)	2, 5, 9, 12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10 % (10)	2, 5, 9, 12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20 % (20)	2, 5, 9, 12,13,15	LO # 3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1:30hr	20 % (20)	10	LO #1-4
	Final Exam	3 hours	4 0% (4 0)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Small signal model analysis
Week 2	Low and high frequency response of transistor amplifier
Week 3	Hybrid and hybrid-Pie equivalent circuit analysis
Week 4	Negative feedback concept and analysis
Week 5	Advantages of negative feedback on amplifier
Week 6	

Week 7	Amplifier feedback topologies
Week 8	Feedback effect on amplifier gain, bandwidth, and on input-output resistances
Week 9	operational amplifier construction and operation ideal and practical op-amp equivalent circuit
Week 10	Inverting and non-inverting closed loop amplifier
Week 11	Integration and differentiation active circuits
Week 12	Summation and subtraction op-amp circuits
Week 13	UJT transistor construction
Week 14	Thyristor equivalent circuit and characteristics
Week 15	Subject review
Week 16	**Subject review**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1-15	**Practical experiments in transistor amplifier frequency response at low and high frequency** **To measure the effect of feedback on amplifier performance** **To measure the performance of different op-amp circuits.**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	Electronic Devices By Millmann Electronic Devices By Floyd	yes
Recommended Texts	**SOLID STATE DIVICES", PHI; 4TH EDITION** , 1995.By STREETMAN, **SEMICONDUCTOR DEVICES & CIRCUITS", JOHN WILEY & SONS, 1992.By** : MS TYAGI	Yes
Websites	Electronic circuits	

Grading Scheme

Group	Grade	Appreciation	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under (processing	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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 Information

Subject information

Module Title	Digital Design		**Module Delivery**	
Module Type	**Base**		☒ **Theory**	
Module Code	**NVEE223**		☒ **Lecture**	
ECTS Credits	3		☐ **Lab**	
SWL (hr/sem)	60		☒ **Tutorial**	
			☐ **Practical**	
			☐ **Seminar**	
Module Level		**Semester of Delivery**	1	
Administration Department	Electronic Eng. Dep.	**College**	Electronics Engineering	
Module Leader	Amer Talal Ali	**e-mail**		
Module Leader's Acad. Title	Lecturer assistant	**Module Leader's Qualification**		
Module Tutor	Amer Talal Ali	**e-mail**		
Peer Reviewer Name	Name	**e-mail**		
Scientific Committee Approval Date	06/01/2023	**Version Number**		

Relation with other Modules

Relationship with other subjects

Prerequisite module		**Semester**	

Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents Course objectives, learning outcomes and guiding content	
Module Objectives Subject objectives	30. To understand Advanced Minimization techniques for large numbers of bits to simplify the large designs. 31. Understand how to Design an Arithmetic and Logic unit. 32. Understand how to Design using programmable logic device. 33. To understand the sequential Logic Circuits. 34. To understand how to Design synchronous and asynchronous counters. 35. To understand the Design of Registers.
Module Learning Outcomes Learning outcomes for the subject	1. Using Advanced Minimization techniques for large numbers of bits to simplify the large designs. 2. Design an Arithmetic and Logic unit. 3. Design using programmable logic device. 4. Design sequential Logic Circuits synchronous and asynchronous. 5. Design Registrations. 6. Design synchronous and asynchronous counters.
Indicative Contents Guidance Contents	Indicative content includes the following. Part A – minimization techniques for large numbers of bits [14 hrs] Part B – Initialization to design and Design an Arithmetic and Logic unit . [14 hrs] Part C – Design using programmable logic device . [6 hrs]

	Part D – sequential Logic Circuits. [18 hrs]

Learning and Teaching Strategies

Learning and teaching strategies

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking and digital designing skills. This will be achieved through classes and interactive tutorials.

Student Workload (SWL)

The student's academic load is calculated for 15 weeks.

Structured SWL (h/sem) Regular student load during the semester	60	**Structured SWL (h/w)** Regular weekly student load	4
Unstructured SWL (h/sem) Irregular student load during the semester	60	**Unstructured SWL (h/w)** Irregular student load per week	4
Total SWL (h/sem) The student's total academic load during the semester	**120**		

Module Evaluation

Course material evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
	Quizzes	2	20% (20)	[3,6,9,12]	LO (#1- #12)

Formative assessment	**Assignments**	1	10% (10)	14	LO #4, #7, #(10-13)
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	12	LO #11
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	10	LO #(1-8)
	Final Exam	2 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Theoretical weekly curriculum

	Material Covered
Week 1	Introduction to Digital Design
Week 2	The 5-Variable Karnaugh Map; The 5-Variable Karnaugh Map with don't care conditions
Week 3	Map Entered variable Karnaugh Map
Week 4	ADDITIONAL MINIMAZATION TECNHNIQUES: Tabular method; Quine-McCluskey
Week 5	Design using multiplexer: - Shannon Expansion
Week 6	top-down design of combined CIRCUITS: - Gate Level: Adders; Subtractor
Week 7	Design an Arithmetic and Logic unit
Week 8	memory and type of memories
Week 9	Design using programmable logic device (PLD): - PROM; PAL; PLA;
Week 10	sequential LOGIC: - Type of flip-flops; Timing Diagram; Basic concepts of counters; Binary counters; BCD counters; Up down counter
Week 11	sequential LOGIC: -Design of counters using state diagrams and tables;
Week 12	sequential LOGIC: -Mealy and Moore Circuits;

Week 13	synchrous CIRCUITS: Shift left and right register; Registers with parallel load; Serial –in parallel-out (SIPO) and parallel-in-serial-out (PISO).
Week 14	synchrous CIRCUITS: Shift Registers; Twisted Ring Counter; Maximum Length Shift Counter.
Week 15	Preparatory week before the final exam

Learning and Teaching Resources

Learning and teaching resources

	Text	**Available in the Library?**
Required Texts	"Digital and analog communication" 2001 By LW Couch Sixth Edition	Yes
Recommended Texts	- Digital Communications Fifth Edition, 2008, John G. Proakis, and Masoud Salehi. Introduction to Communication Systems" 1992 By F. Stremler. -ELEMENTS OF INFORMATION THEORY" 2006 By THOMAS M. COVER and JOY A. THOMAS -Digital Communication, 2004 by Abbas Kattoush.	Yes
Websites		

Grading Scheme

Grading chart

Group	**Grade**	Appreciation	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria

Fail Group **(0 – 49)**	**FX –** Fail	) Precipitate under processing (	(45-49)	More work required but credit awarded
	F – Fail	Failed	(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 Information

Module Title	Signals and Systems			**Module Delivery**	
Module Type	Core			☐ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐**X Practical** ☐ **Seminar**	
Module Code	NVEE210				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UGx11 1	**Semester of Delivery**		4
Administration Department		Type Dept. Code	**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	Email	
Peer Reviewer Name		Name	**e-mail**	Email	
Scientific Committee Approval Date		06/25/2023	**Version Number**		1.0

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	Student will be able to: 36. identify systems concepts. 37. understand the properties of systems. 38. Understand the mathematical relationship between input and output of a system. 39. deal with Fourier and Laplace analysis of systems. 40. perform z-transform of discrete signals.
Module Learning Outcomes	62. Definition of the system concept. 63. Introduction of mathematical models. 64. Explain continuous time systems. Discrete time systems. 65. Introduction of frequency response of systems. 66. Definition of filters. 67. Explain Ideal filters, Non ideal filters, and Butterworth filter design. 68. Define Z-transform of discrete signals. 69. Analyze of continuous system using Laplace Transform. System transfer function. 70. Definition of transfer function of a discrete system.
Indicative Contents	Indicative content includes the following. Introduction to systems: - Definition and mathematical models. - Properties of systems. Transformation used with continuous systems - Fourier transforms. - Filters. - Laplace transform. Z-transform: - Introduction of z-transform of discrete time signal. - Z-transform used with discrete systems. Convolution used for - Continuous systems. - Discrete systems

Learning and Teaching Strategies	
Strategies	To make students interesting with both types of systems: continuous and discrete. Also with properties of systems and operations. To make them familiar with time and frequency domain and analysis of a system. Also to make them

	familiar with different types of transforms of systems. Also to make them have an experience with solving different problems and examples.

Student Workload (SWL)

Structured SWL (h/sem (	62	**Structured SWL (h/w)** A	4
Unstructured SWL (h/sem)	88	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	**150**		

Module Evaluation

As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	6	10% (10)	2, 5, 9, 12,13,15	LO #1, 2, 10 and 11
	Assignments	6	10% (10)	2, 5, 9, 12,13,15	LO # 3, 4, 6 and 7
	Projects / Lab.	6	20% (20)	2, 5, 9, 12,13,15	LO #3, 4, 6 and 7, 5, 8 and 10
	Report	0	0% (0)	0	
Summative assessment	**Midterm Exam**	1.5hr	20% (20)	10	LO #1-4
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	**Material Covered**
Week 1	Basic definitions. Mathematical models.
Week 2	Continuous time systems.

Week 3	Discrete time systems.
Week 4	System properties.
Weeks 5	Mathematical system representation in time domain: Convolution representation.
Week 6	Convolution properties.
Week 7	System description by linear constant coefficient differential equations.
Week 8	Frequency domain analysis of continuous system.
Week 9	Frequency response of a system.
Week 10	Frequency response of electrical circuits.
Week 11	Ffilters. Distortion less transmission.
Week 12	Ideal filters. Non ideal filters. Butterworth filter design.
Week 13	Analysis of continuous system using Laplace Transform.
Week 14	System transfer function.
Week 15	Analysis of discrete system using z-Transform. System transfer function.

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	**Signals and systems. Simon S. Haykin**	Yes
Recommended Texts	**Signals and linear systems. G. E. Carlson**	

Grading Scheme

Group	**Grade**	Appreciation	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance
	B - Very Good	very good	80 - 89	Above average with some errors
	C - Good	good	70 - 79	Sound works with notable errors
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Precipitate (in (process	(45-49)	More work required but credit awarded
	F – Fail	Failed	(0-44)	Considerable amount of work required

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Module Information

Module Title	Engineering Analysis II	**Module Delivery**	
Module Type	Core		☐**Theory**
Module Code	NVEE209		☒**Lecture**
ECTS Credits	3		☐**Lab**
SWL (hr/sem)	75		☒**Tutorial** ☐**Practical** ☐**Seminar**
Module Level		**Semester of Delivery**	2
Administration Department	Electronics dept	**College**	Electronics engineering college
Module Leader	Dr. Omar B Mohammed	**e-mail**	omar.mohammed@uoninevah.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	

Scientific Committee Approval Date		**Version Number**	

Relation with other Modules

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	This course covers the following topics: ordinary differential equations, sequences and series, solution of differential equations by power series, and matrix analysis. Those areas of mathematics which are most important in connection with practical problems for modeling different areas of science, computer can be easily utilized to find the properties of such systems.
Module Learning Outcomes	Upon successful completion, students will: 19. Improve their problem-solving skills. 20. Apply that knowledge toward practical problems in different areas of science. 21. Utilize the computer capabilities to solve such problems using proper methods. 22. Learn how to represent any function as a power series, then use computer to solve it.

	23. Learn the importance of differential equations for modeling almost any system, and how to solve it to find the properties of that system. 24. Learn the linear algebra and its importance in science.
Indicative Contents	Ordinary Differential Equations. Sequences and Series. Solution of Differential Equations by Power Series. Matrix Analysis.

Learning and Teaching Strategies

Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

Student Workload (SWL)

Structured SWL (h/sem)		**Structured SWL (h/w)**	
Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	
Total SWL (h/sem)			

Module Evaluation

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

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Ordinary Differential Equations: 4. First order (variables separable, homogeneous, linear and exact). 5. Second order homogeneous. 6. Second order nonhomogeneous; indeterminant coefficients, variation of parameters.
Week 2	
Week 3	
Week 4	
Week 5	Infinite Sequences and Series: 4. Limit laws, indeterminate forms and L'hospital rule. 5. Infinite series; convergence test. 6. Power series; Taylor and Maclaurin series.
Week 6	
Week 7	
Week 8	
Week 9	Solution of Differential Equations by Power Series: Power series method, Legendre's equation; Legendre's polynomials.
Week 10	
Week 11	
Week 12	
Week 13	Matrix Analysis: 5. Review of matrix theory, solving system of equations; Cramer's rule, inverse of the matrix method, Gauss elimination. 6. Eigen values and eigen vectors. 7. Diagonalization of matrices 8. Application of matrices to electrical circuits.
Week 14	
Week 15	
Week 16	Preparatory week before the final exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Advanced Engineering Mathematics By KREYSIK	Yes
Recommended Texts	Calculus By Finney& Thomas	Yes
Websites		

Grading Scheme

Group	Grade	Appreciation	Marks (%)	Definition

Success Group (50 - 100)	**A -** Excellent	privilege	90 - 100	Outstanding Performance.
	B - Very Good	very good	80 - 89	Above average with some errors.
	C - Good	good	70 - 79	Sound works with notable errors.
	D - Satisfactory	middle	60 - 69	Fair but with major shortcomings.
	E - Sufficient	acceptable	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	**FX –** Fail	) Precipitate under (processing	(45-49)	More work is required, but credit is given.
	F – Fail	Failed	(0-44)	A significant amount of work is 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.

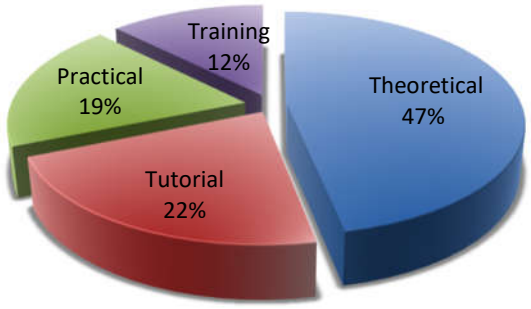
Courses Table For Third Class

Electronic Engineering Deparatement								
Undergraduate Third Class								
Code	**Subject**	**Hours/Week**						**Units**
		First Term			**Second Term**			
		Th	**Pr.**	**Tut**	**Th**	**Pr**	**Tut**	
EE3301	**Electronic – II**	**2**	**-**	**1**	**2**	**-**	**1**	**4**
EE3201	**Digital Signal Processing**	**2**	**-**	**1**	**2**	**-**	**1**	**4**
EE3302	**Control engineering**	**3**	**-**	**1**	**3**	**-**	**1**	**6**
EE3303	**Microprocessor**	**2**	**-**	**1**	**2**	**-**	**1**	**4**
EE3304A	**Digital System Design I**	**2**	**-**	**1**				**2**
EE3304B	**Digital System Design II**				**2**	**-**	**1**	**2**
EE3305	**Communication**	**2**	**-**	**1**	**2**	**-**	**1**	**4**
EE3306	**Electronic Instrumentation**	**2**	**-**	**1**	**2**	**-**	**1**	**4**

EE3307	Laboratory	-	6	-	-	6	-	4
Total		15	6	7	15	6	7	34
		28			28			

Total Theoretical: 15 Hour/Week
Total Practical :6 Hour/Week
Total Summer Training 4 Hour/Week
Total Tutorial :7 Hour/Week
Total Units:34

Weekly classes categories for the department



Third Year

- **Course Number: EE3301**
- **Course Name: Electronics II**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: The electronics course covers the area of analog electronic circuit design: Non linear application of op-amp, Filter design theory and approximation, Active filter design, Waveform generator theory and classification, Power amplifier classification.

- **Course Number: EE3201**
- **Course Name: Digital signal processing**
- **Credit Hours: (4,3,0,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: review of discrete signals and systems, discrete fourier series, dicsretefourier transform, convolution and correlation, discrete and fast fourier transform, z-transform, framework for digital filter design, realization of digital filter, finite impulse response digital filter design, infinite impulse response digital filter design

- **Course Number: EE3302**
- **Course Name: Control Eng.**
- **Credit Hours: (6,3,0,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: i-continuous control system (System representation, Time domain analysis, State space analysis, Stability of system, Frequency response analysis, Design of control system) II-DIGITAL CONTROL SYSTEM (Z-transform, Sampled data control system, Time response analysis, Stability of system).

- **Course Number: EE3303**
- **Course Name: Microprocessor I**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following, Studying the 8086 microprocessor from software point of view, Studying the 8086 microprocessor from hardware point of view.

- **Course Number: EE3304A**
- **Course Name: Digital system design I**
- **Credit Hours: (2,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: Standard buses, programmable logic devices, PLC . Inductive proximity sensors: ultrasonic, optical, Basic Elements of PLC, PLC inputs and outputs interfaces, Ladder programming, PLC Instructions: Latching, Comparisons, Timers, Counters, Sequencers, Shift Registers

- **Course Number: EE3304B**
- **Course Name: Digital system design II**
- **Credit Hours: (2,2,1,0) (Units, Theory, Tutorial, Practical)**
- Course Content:Programmable Logic Devices, GAL, SPLD, CPLD, OLMC, ISP, FPGA
- Introduction to VHDL, Modeling flip-flops using VHDL process, Compilation and simulation of VHDL code, Modeling a sequential machine , Variables, Signals and Constants , Arrays

- **Course Number: EE3305**
- **Course Name: Communication**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: the course cover transmission lines, Analog input analog output schemes, Digital input analog output schemes, analog input digital output schemes, Digital input Digital output schemes.

- **Course Number:EE3306**
- **Course Name: Electronic Instrumentation**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: instrumentation errors, transducers, signal conditioning, signal conversion, instrumentation amplifier, analog electronic instruments, digital instruments, and interface buses.

- **Course Number: EE3307**
- **Course Name: Laboratory**
- **Credit Hours: (4,0,0,6) (Units, Theory, Tutorial, Practical)**

Course Content: The objective principle is to ensure that the student has the ability to integrate concepts and achieve the practical works for the different topics he attends in the theoretical classes. Each student should submit a written technical report for each experiment.

University of Ninevah
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Electronic Engineering Department

Class	**Third**			**Theory:**	**2Hrs/wk**
Subject	**Electronic II**			**Tutorial**	**1 hour/week**
Code	**EE3301**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
OP-AMP Applications:	**12**

inverting, non-inverting amplifier, buffer, summing amplifier, difference amplifier, integrator and differentiator, comparator, sample and hold, zero crossing detector, peak detector, precision diode and fast rectifier, analog computation.	
Filters: Filter approximations, passive RLC design, active filter design methods (ladder, and cascaded design technique).	**9**
Oscillators: BarkHausen´s criteria for oscillators; Satiability concept Three pole amplifier ; Nyquist criteria; Stabilizing networks ; frequency compensation and sinusoidal oscillator ; Phase shift, Wien bridge, Colpitts, Hartley, Crystal and Tune circuit type oscillator (AF & RF Range).	**9**
Tuned Amplifier : Introduction to single tuned amplifier; GB response calculations & design ; cascade amplifier; Neutralization methods; Synchronously tuned amplifier ; Elementary treatment of stagger tuned and double tuned amplifiers.	**9**
Audio Frequency Linear Power Amplifiers: Introduction to Class A, B, AB, a, C operation, Class A – common – emitter power amplifier; Transformer coupled amplifier ; Class push -pull power amplifier ; Amplifiers using complementary symmetry ; Class C amplifier.	**12**
Comparators and Converters : Zero crossing detector, Schmitt trigger, Comparator, Voltage limiters and window detector, Clippers and clampers, Peak detector, introduction to A/D and D/A converters and sample and hold circuit.	**9**
Multivibrators: Astable, monostable, 555 timer, and bistable	**12**
Integrated Circuits and Devices: Introduction of IC families; Fabrication Steps and evolving transistor, diode and resistor; capacitors families.	**9**
Specialized ICApplications : phase locked loops, ICL 8038 function generator, Voltage Controlled Oscillator, XR 2240 programmable timer / counter.	**9**
Total	**90**

Text book:
1: Integrated electronics by Milmann
2: Microelectronics by Milma

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Class	**Third**			**Theory:**	**2 hours/week**
Subject	**Digital Signal Processing**			**Tutorial**	**1 hour/week**
Code	**EE3201**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	**Hrs**

Review of Discrete Signals and Systems		**6**
Discrete Fourier Series: Spectra of periodic digital signals ,Properties of series.		**9**
Direct Fourier Transform: Properties ,Frequency response of LTI systems **.**		**9**
Convolution and Correlation		**6**
DISCRETE AND FAST FOURIER TRANSFORM		**9**
Z-Transform: Review ,Z-plane poles and zeros **.**		**9**
Framework for Digital Filter Design		**6**
Finite Impulse Response Digital Filter Design: window method ,frequency sampling method ,realization of FIR.		**12**
Infinite Impulse Response Digital Filter Design: Pole-zero method ,Bilinear Z-transform ,Realization of IIR **.**		**12**
Applications of Filter Banks in DSP		**12**
	Total	**90**

Text book:
1: "Digital Signal Processing ", by Emmanuel and Barrie
2: " **Digital Signal Processing with Computer Applications", John Wiley & Sons, 1997** By P AUL A. L YNN

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Class	Third			Theory:	3 hours/week
Subject	Control Engineering			Tutorial	1 hour/week
Code	EE3201	Unit	6	Practical	Hrs/wk

Article	Hrs
Introduction And Basic Definition: Closed Loop And Open Loop, Control Systems	3
Transfer Function : Electrical System; Mechanical System; Servo System.	6
Block Diagram: Block Diagram Reductioin Algebra.	3
Signal Flow Graph: Mason Gain Rule.	6
Time Response: Typical Test Signals &Types Of System; Steady StateErrors; Transient Responseof 1st and 2nd Order System.	9
Stability Of Control System : Routh-Hurwtiz Criterion:	3
Root Locus Analysis: Root Locus Plot;General Rules Of Constructing Root Loci; Root Locus Analysis Of Control Systems	9
Frequency Response : Introduction To Frequency Response.	3
Bode Plot: Bode Analysis ; Rules For Sketching The Bode Plots;Phase And Gain Margins; Relative Stability.	9
Controll System Design By Frequency Response: Proportional Gain Only; Lead Compensation; Lag Compensation.	12
The PID Controller; Definition; Tuning By Ziegler-Nichols Methods.	6
Digital Control Systems: Z-Trans Form &Inrevse Z-Transfrom; PulseTransferFunction ; Open Loop And Closed Loop Responses Of Discrete-TimeSystems;Decretization Methods; Stability Test For Digital Control System (Jury's Test).	15
State-Space Analyses: State Equation; Solution Of State Equation;Controlabilityand Observability.	6
Total	**90**

Text book:
1: "AUTOMATIC CONTROL SYSTEM" By B. KUO 2001
2: "MODERN CONTROL SYSTEM" ByK.OGATA 2001

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Class	Third			Theory:	2 hours/week
Subject	Microprocessors I			Tutorial	1 hour/week
Code	EE3303	Unit	4	Practical	Hrs/wk

Article	Hrs
Introduction to 16bit Microprocessor : 8086 /8088 Architecture, Machine language, instruction, Internal execution and timing.	**6**
8086/8088 Family Assembly Language Programming : Data Transfer instructions;Arithmetic instructions, logical, shift and rotate instructions; Branch instructions ; Loop instruction;NOP; HLT and flag manipulation instructions; Assembler directives.	**12**
8086System Connections and Timing : 8086 Hardware overview; Basic Signal flow on 8086 buses;Analyzing a minimum mode system; 8086 addressing and address decoding; 8086 timing parameter.	**12**
Interrupts and Interrupt Service Procedure : 8086 interrupts and interrupt response; 8086 interrupt types ; Hardware and software consideration for using interrupt.	**12**
I/O Programming : Fundamentals I/O consideration ;Programmed and interrupted I/O ; Block transfers and DMA, I/O design example.	**12**
Interfacing : Programmable Parallel ports and handshake input/output ; Interfacing microprocessors to keyboard and display ; D/A converter operation; Interfacing and applications ;A/D converter ; Specifications and interfacing; Serial communication interfaces.	**12**
Parallel I/O and Interfacing Application : Basic interfacing concepts 8255 Program Peripheral Interface ; Interfacing displays ; Keyboards;, 8279 Programmable keyboard interface;, interfacing memory; Memory ; Mapped I/O.	**12**
General Purpose Programmable Peripheral Devices : 8253 Programmable Timer 8257 controller, 8259 interrupt controller.	**12**
Total	**90**

Text book:
1: "The Intel Microprocessor " By B ARRY B. B REY,
2: " **The 8088 & 8086 mp`s programming, interfacing S/W, H/W & applications", PrenticeHall, 2003** ByW. A. Triebel& A. Singh

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Class	Third			Theory:	2 hours/week
Subject	Digital System Design I			Tutorial	1 hour/week
Code	EE3304A	Unit	2	Practical	Hrs/wk

Article		Hrs
Programmable Logic Controller PLC Basic Components & Their symbols		3
Control Transformer switches, relays, time delay relays		1
References Designators: on, off, Run, stop, cycle		3
Inductive proximity sensors: ultrasonic, optical		1
Analog Input / Output		3
Basic Elements of PLC		3
PLC inputs and outputs interfaces		3
Ladder programming		6
PLC Instructions: Latching, Comparisons,		6
Timers, Counters,		6
Sequencers, Shift Registers		2
Math Instructions: ADD, SUB, MUL, DIV, CLV, CLR, SQR Move & Logic Instructions: MOV, MVM, AND, OR, NOR, NOT, CLR		2
Standard Buses		3
Internal, External buses, Serial, Parallel buses		3
	Total	45

Text book:
1: Digital Fundamental, Floyd
2: PLC Software Manual

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Class	**Third**			**Theory:**	**2 hours/week**
Subject	**Digital System Design II**			**Tutorial**	**1 hour/week**
Code	**EE3304B**	**Unit**	**2**	**Practical**	**Hrs/wk**

Article		**Hrs**
Programmable Logic Devices GAL, SPLD, CPLD, OLMC, ISP, FPGA		9
V-Hardware Description Language (VHDL)		3
Introduction to VHDL		3
VHDL description of combined network		3
Modeling flip-flops using VHDL process		3
Compilation and simulation of VHDL code		3
Modeling a sequential machine		3
Variables, Signals and Constants		3
Arrays		3
VHDL operators, functions, procedures Packages and Libraries		3
Memory Expansion, RAM, ROM		3
System Projects		6
	Total	45

Text book:
1: Digital Fundamental, Floyd
3: Digital System Design using VHDL By Charles H

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Class	**Third**			**Theory:**	**2 hours/week**
Subject	**Communication**			**Tutorial**	**1 hour/week**
Code	**EE3305**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Transmission lines: Equivalent circuit, characteristic impedance, phase velocity, reflection coefficient, standing waves, quarter – wave transformer, smith chart calculation and stub matching.	**15**
Analog Input Analog Output Schemes: AmplitudeModulation; Equation for AM, modulation index, spectrum of AM, DSB transmission with and without carriers, VSB transmission, DSB, C amplitude modulators, Envelope detectors, Balanced Modulator, SSB signal generation and Demodulation schemes.	**15**
Frequency modulation: Equations for FM, modulation Index, spectrum calculation for sinusoidal waveform and Bessels function table, phase modulation, relationship between FM and PM, NBFM, frequency modulators (Armstrong method) Types of noise in AM and FM systems.	**15**
Digital Input Analog Output Schemes: ASK, FSK, QAM, BPSK, QPSK, Transmitter and receiver block diagrams.	**15**
Analog Input Digital Output Schemes: Various pulse modulation methods, pulse code modulation PCM, Delta modulation DM. Comparison between PCM and DM, Compounding method, Noise in digital systems.	**15**
Digital Input Digital Output Schemes: Line encoding methods: NRZ, RZ, Manchester, and multilevel encoding methods and comparison of these schemes	**15**
Total	**90**

Text book:
1: Principle of communication engineering by Anokh Singh

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Class	**Third**			**Theory:**	**2 hours/week**
Subject	**Electronic Instrumentation**			**Tutorial**	**1 hour/week**
Code	**EE3306**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
INSTRUMINTATION ERRORS	**6**
TRANSDUCERS: Resistive, Capacitive, Inductive. Active Transducers.	**9**
SIGNAL CONDITIONING: Input signal modification, scaling of measuring variables, delay lines, noise, signal averaging, interference, grounding, shielding, signal filtering, signal correlation, current-mode amplifier.	**12**
SIGNAL CONVERSION: Conversion by transducer bridge, electronic multipliers, signal generator, ac to dc signal conversion, logic elements, sample & hold, A/D and D/A signal conversion, isolation amplifier	**12**
INSTRUMENTATION AMPLIFIER: Circuit design, characteristics, CMMR	**9**
ANALOG ELECTRONIC INSTRUMENTS: Analog (voltmeter, multi-meter, vector impedance meter, frequency meter, distortion analyzer, spectrum analyzer.	**15**
DIGITAL INSTRUMENTS: Digital indicator, voltmeter (dual slop, multi-slop, successful approximation, and voltage to frequency converter, ammeters, ohmmeters, multi-meters, counters (frequency, frequency ratio meter, time-interval meter, energy meter), digital multiplexers, microprocessor-based meters	**15**
INTERFACE BUSES: Parallel port, RS-232, GPIB.	**12**
Total	**90**

Text book:
1: “Electronic Instrumentation and Measurement Techniques” ByWilliam David Cooper and Albert D. Helfrick.
2: Principles of Measurement systems By John P. Bentley
3: Electrical and Electronic Measurement By Ahmed A.Montaser and Karam A.sharshar

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Class	**Third**			**Theory:**	**Hrs/wk**
Subject	**Laboratory**			**Tutorial**	**Hrs/wk**
Code	**EE2307**	**Unit**	**4**	**Practical**	**6 hours/week**

Article		**Hrs**
The main objective is to ensure that students have a good quality capstone design & experience to integrate concepts from a range of classes in the core. The students are to apply modern engineering practices and techniques. Each student should submit a written technical report for each experiment. The experiments cover the related topics in electronic circuit analysis, communication system and microprocessor technology.		
	Total	**180**

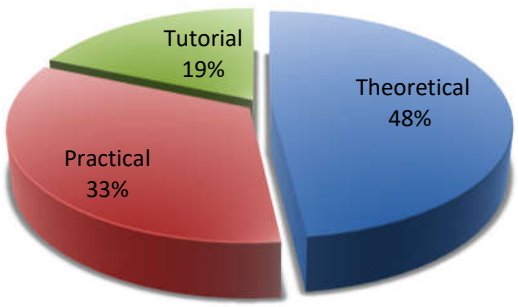
Text book:
1:
2:
3:

Courses Table for Fourth Class

Electronic Engineering Deparatement								
Undergraduate Fourth Class								
Code	**Subject**	**Hours/Week**						**Units**
		First Term			**Second Term**			
		Th	**Pr.**	**Tut**	**Th**	**Pr**	**Tut**	
EE4301	**Industrial Electronic**	**2**	**-**	**1**	**2**	**-**	**1**	**4**
EE4302	**Data Transmission&ComputerNetwork**	**2**	**-**	**1**	**2**	**-**	**1**	**4**
EE4303	**MicroController(*)**	**2**	**-**	**1**				**2**
EE4309	**Microprocessor II(*)**				**2**	**-**	**1**	**2**
EE4304	**Microelectronics**	**2**	**-**	**-**	**2**	**-**	**-**	**4**
EE4308	**Antenna & Propagation(*)**				**2**	**-**	**1**	**2**
EE4305	**Radiation(*)**	**2**	**-**	**1**				**2**
EE4306	**Computer aided design**	**2**	**-**	**1**	**2**	**-**	**1**	**4**
EE4201	**Engineering Project**	**1**	**3**	**-**	**1**	**3**	**-**	**4**
EE4307	**Laboratory**	**-**	**6**	**-**	**-**	**6**	**-**	**4**
Total		**13**	**9**	**5**	**13**	**9**	**5**	**32**
		27			**27**			

Theoretical: 13 Hour/Week
Total Practical :9 Hour/Week
Total Tutorial :5 Hour/Week
Total Units:32

Weekly classes categories for the department



Fourth Year

- **Course Number: EE4301**
- **Course Name: Industrial Electronic**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the power semiconductor devices, Phase control converters, Thyristor commutation techniques, Inverters, PWM and speed control.

- **Course Number: EE4302**
- **Course Name: Data Transmission and Computer Networks**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: Definitions and standards, Transmission media, OSI and TCP/IP models, Connecting devices. Data link control and data link protocols, LAN technologies, WLAN standards and devices, WAN and Wireless WAN.

- **Course Number: EE4309**
- **Course Name: Microprocessor II**
- **Credit Hours: (2,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: Introduction to Advanced Microprocessors, The 80386 and 80486 Microprocessor, Assembly language and Programming,

- **Course Number: EE4303**
- **Course Name: Microcontroller**
- **Credit Hours: (2,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: Microprocessors and Microcontrollers, The MCS-51 Architecture, Basic Assembly Language Programming Concept, An MCS-51 Microcontroller Design

- **Course Number: EE4304**
- **Course Name: Microelectronics**
- **Credit Hours: (6,3,0,0) (Units, Theory, Tutorial, Practical)**

Course Content : The microelectronics course covers the area of integrated circuit design. The fabrication of electronic devices, and design and analysis of analog and digital integrated circuits.

- **Course Number: EE4305**
- **Course Name: Radiation**
- **Credit Hours: (2,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: Give the students an overview of microwave technology and introduction to Microwave devices.

- **Course Number: EE4308**
- **Course Name: Antenna and Propagation**
- **Credit Hours: (2,2,1,0) (Units, Theory, Tutorial, Practical)**
- **Course Content:** Antenna Theory (Principles of radiation and equivalent circuit)
, Dipole antenna, Array antenna, Reflector Antenna (Parabolic antenna), Ground wave propagation (Direct and Reflected), Ionspheric Propagation, Radar theory (Circuits and equations)

- **Course Number: EE4306**
- **Course Name: Computer aided design**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: Numerical solution for Linear and nonlinear circuit, DC and AC matrix analysis, two port analysis, graph theory, Simulation, State variable analysis, Sensitivity , Optimization, CAD for integrated circuits, Genetic Algorithm.

- **Course Number: EE4201**
- **Course Name: Engineering Project**
- **Credit Hours: (4,1,0,3) (Units, Theory, Tutorial, Practical)**

Course Content: Collaboration team work in research environment is expected including extensive interaction with other students. Each group should submit a written report and should attend the final oral examination.

- **Course Number: EE4307**
- **Course Name: Laboratory**
- **Credit Hours: (4,0,0,6) (Units, Theory, Tutorial, Practical)**

Course Content: The objective principle is to ensure that the student has the ability to integrate concepts and achieve the practical works for the different topics he attends in the theoretical classes. Each student should submit a written technical report for each experiment.

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Class	**Fourth**			**Theory:**	**2Hrs/wk**
Subject	**Data Transmission & Computer Networks**			**Tutorial**	**1 hour/week**
Code	**EE4302**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Introduction and Definitions: Data Communication ,Networks ,Protocols ,Standards ,and Standard organizations.	**3**
BASIC CONCEPTS:- Line configuration ,Topology ,Categories of networks.	**6**
Transmission Media: Electromagnetic spectrum.,Guided media: Unshielded Twisted Pair (UTP) Cable., Shielded Twisted Pair (STP) Cable., Coaxial Cable., Optical Fiber., Unguided media: Radio Transmission., Microwave Transmission., Satellite Microwave **.**	**9**
Interfaces and Modems: Data transmission: parallel ,serial ,synchronous and asynchronous.,DTE-DCE interface and standards., Modems.	**6**
The OSland TCP/IP Models	**6**
Networking and Internetworking Devices: Networking devices: NICs ,Hubs ,Repeaters ,Bridges and Switches.,Internetworking devices: Router and Gateways.	**6**
Data Link Control: Link Discipline ,Flow control ,Error control.	**6**
Data Link Protocols: Asynchronous protocols ,Synchronous protocols.	**3**
Local area network (LAN): Ethernet, Token Bus, project 802, Token Ring, FDDI.	**12**
TCP/IP Model and Protocols	**9**
Wireless LAN (WLAN): Introduction and history of (WLANs) ,Standardization and frequency bands , IEEE 802.11 standard ,WIFI ,WIMAX ,Bluetooth.	**9**
Wide Area Network (WAN)	**6**
Wireless WAN	**6**
Internet Working and Internet	**3**
Total	**90**

Text book:
1: "Introduction to Data Comm. And Networking" ,By PehrouzForouzan.
2: "Computer Networks and Internets" ,Douglas By E. Comer (4th edition)

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Class	**Fourth**			**Theory:**	**2 hours/week**
Subject	**Industrial Electronic**			**Tutorial**	**1 hour/week**
Code	**EE4301**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Introduction: Scope of power electronics, power converter specification. **Power Semiconductor Devices:** Thyristor families, VI characteristics of SCR, Triac, GTO, Diac, Source of thyristor triggering, turn On \ turn Off characteristic and Gate triggering requirements, series/parallel operation, device ratings.	**12**
Power Transistor devices: Basic structure and VI characteristics of power MOSFET,IGBT,SIT. Switching characteristic, Gate/Base drive circuits, Safe operating area, di/dt / dv/dt limitation, series/parallel operation, ratings.	**12**
Phase Control Converters: Signal phase central taped transformer connection, half controlled and fully controlled Bridge configuration, three phase half controlled Bridge converters, Use of flywheeling diode operation with resistive, inductive and Back EMF load, line commutated inverter, effect of source inductance on converter performance, power factor , ripple factor calculation , firing scheme , linear alpha and cosine angle control , application of DC motor speed control , regulated power supply , battery charger	**18**
ThyristorCommutation Techniques: Natural commutation, Force commutation, Voltage / Current commutation, DC chopper, Principle of Voltage control, analysis of Morgan chopper circuit, Johns chopper circuit, regenerative chopper circuit.	**15**
Inverters: Single phase series and parallel inverters, classification of CSI and VSI inverters, single phase and three phase inverter circuit, methods of voltage controlled inverter circuits, comparison of thyristor and transistor, based inverters, application to speed control of AC motors, uninterrupted power supply, Induction melting, heating furnaces.	**15**
Industrial Applications: DC Motor Control, Induction Motor Control, Pulse width Modulation & Speed Control, Static Relays & Contactors.	**12**
Total	**90**

Text book:
1: Power Electronics by: Muhammad Rashid

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Class	Fourth			Theory:	2 hours/week
Subject	Microprocessor II			Tutorial	1 hour/week
Code	EE4309	Unit	2	Practical	Hrs/wk

Article	Hrs
• **Introduction to Advanced Microprocessors:** Overview of 80186,80286, 80386, 80486 Architecture, Descriptor table, Privilege levels, paging. Detail study of Pentium, Pentium MMX architecture, Pentium II, Memory and Microprocessor, The Programming Model, Real mode and protected mode Memory addressing, Data formats.	**12**
• **The 80386 and 80486 Microprocessor:** Architecture – Real mode and Protected mode, 80386 Memory Management, Memory segmentation, Memory paying Mechanism, On chip cache organization.	**12**
Assembly language and Programming concepts: The instruction set, Addressing modes, Data movement instructions, Arithmetic and logic instructions, programming the Microprocessor.	**12**
• **Interfacing and Applications:** Memory interfacing, Basic **I/O** interfacing.	**9**
Total	**45**

Text book:
1: “The 80386-80486 and Pentium processor” By Walter A. Tribel;
2: “The Intel Microprocessors” By Barry B. Bery
3: “The 8051 micro-controller” By I. Scott Mackenzie.

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Class	**Fourth**			**Theory:**	**2 hours/week**
Subject	**Microcontroller**			**Tutorial**	**1 hour/week**
Code	**EE4303**	**Unit**	**2**	**Practical**	**Hrs/wk**

Article		Hrs
Microprocessors and Microcontrollers: Comparing Microprocessors and Microcontrollers, The Z80 and MCS 51, Microcontroller survey.		**6**
Microprocessor & Micro Controller: Comparing Microprocessors and Microcontrollers, Micro Controller survey.		**9**
The MCS-51 Architecture: Introduction, MCS-51 family microcontrollers hardware, Input/output pin, ports and circuits, external memory interfacing, counter, timer, serial data input/output, Interrupts.		**9**
Basic Assembly Language Programming Concept: Addressing mode, External data, move, Code memory read – only data moves, Push and Pop opcodes, Data Exchanges, Logical operations, Arithmetic operations, Branching Instructions, Interrupts and Returns.		**12**
An MCS-51 Microcontroller Design: Microcontroller Specification, External memory and Memory space Decoding, Expanding I/O, Memory map I/O, Memory address decoding, Testing the Design, Lookup table for the 8051, Serial data Transmission.		**9**
	Total	**45**

Text book:
1: "The 80386-80486 and Pentium processor" By Walter A. Tribel;
2: "The Intel Microprocessors" By Barry B. Bery
3: "The 8051 micro-controller" By I. Scott Mackenzie.

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Class	Fourth			Theory:	3 hours/week
Subject	Microelectronics			Tutorial	Hrs/wk
Code	EE4304	Unit	6	Practical	Hrs/wk

Article	Hrs
Semiconductor Fundamental: Energy band model of solid, intrinsic and extrinsic semiconductor, free carrier density in semiconductor, carrier concentration and Fermi level. Carrier transport and recombination, carrier diffusion, the drift current, Hall effect. MIS, MOS, Schottky barriers, magnetic effect, bipolar junction, pn junction, FET.	6
IC fabrication processes: Crystal growth, diffusion, doping, evaporations, and photo masking, Ion implementation, Thin and thick film fabrication, sputtering, mounting, package, and hybrid integrated circuits **.**	12
LSI and VLSI Design and Application: Discrete device design, bipolar transistor fundamentals, technology, and miniaturization. Linear I.C's: fabrication, and general consideration. Current sources,. LSI oriented bipolar technology. Logic Families based on bipolar transistor (RTL, DTL, TTL, ECL, TRL, I^2L). TTL gate circuit analysis. Metal-Semiconductor junction, Metal-Oxide Semiconductor junction. FET theory and analysis.	18
MOS Transistor Fundamentals and MOS IC Technology: MOS capacitor, static characteristics of the MOS transistor, MOS device fabrication. MOSFET's. Logic circuits based on MOSFET, PMOS, NMOS, CMOS,DMOS, SOS, VMOS. NMOS inverter and gate circuit analysis. CMOS inverter and gate circuit analysis. Charge-coupled devices and non-volatile memory devices, software applications.	18
ASIC Design methodologies and system design consideration	9
LCA, Standard cell, Gate array, Structured array]	9
Full-Custom and Semi-Custom Design :Design motivations; design either discrete component, full-custom and semi-custom design approaches **.**	9
Field programmable gate arrays FPGA and Field programmable analog arrays FPGA	9
Total	90

Text book:
1: Microelectronic By Millmann
2:Principle of CMOS VLSI Design By Neil Weste and KarmranEshrahian

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Class	**Fourth**			**Theory:**	**2 hours/week**
Subject	**Radiation**			**Tutorial**	**1 hour/week**
Code	**EE4305**	**Unit**	**2**	**Practical**	**Hrs/wk**

Article		Hrs
Various applications of Microwaves, Review of Maxwell's Equations		**3**
Review of Electromagnetic Theory: (Plane wave incidence on boundaries, Reflection & transmission)		**3**
Waveguide Theory		**3**
Rectangular Waveguides		**3**
Circular Waveguides		**3**
S-parameters and the scattering matrix		**3**
Tee junctions & Magic Tee		**3**
Attenuators, Directional couplers		**3**
Propagation into Ferrites, Ferrites Devices		**3**
Active Microwave Device, Two cavity Klystron		**3**
Velocity Modulation, Power and Efficiency		**3**
The Reflex Klystron, Power and frequency characteristics, Magnetron		**3**
Passive Microwave Devices, Detector Diodes, power sensing diode,		**3**
Varactor diodes, PIN diodes, BARITE & IMPATT diodes		**3**
Microwave Transistor circuit		**3**
	Total	**90**

Text book:
1: "Microwave Circuits and devices" by Liao
2: Microwave Engineering" by Pozar

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Class	**Fourth**			**Theory:**	**2 hours/week**
Subject	**Antenna and Propagation**			**Tutorial**	**1 hour/week**
Code	**EE4308**	**Unit**	**2**	**Practical**	**Hrs/wk**

Article		Hrs
Antenna Theory (Principles of radiation and equivalent circuit)		**3**
Antenna Parameters (Gain, Directivity, Bandwidth, Beam width, and Radiation Pattern)		**3**
Radiation Intensity and Power Density of Antennas		**3**
Monopolar antenna		**3**
Dipole antenna		**3**
Array antenna		**3**
Reflector Antenna (Parabolic antenna)		**3**
Microstrip antenna		**3**
Free space propagation		**3**
Friis Transmission Formula		**3**
Ground wave propagation (Direct and Reflected)		**3**
Ionspheric Propagation		**3**
Radar theory (Circuits and equations)		**3**
Satellite communication		**3**
Mobile and 2-Ray model		**3**
	Total	**90**

Text book:
1: “Microwave Circuits and devices” by Liao
2: Microwave Engineering” by Pozar

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Class	Fourth			Theory:	2 hours/week
Subject	Computer Aided Design			Tutorial	1 hour/week
Code	EE4306	Unit	4	Practical	Hrs/wk

Article	Hrs
Introduction Linear circuits, AC circuits, AC circuits matrix analysis, two port analysis, graph theory. Numerical solution for nonlinear network simple search algorithm convergence properties, secant method.	**12**
Simulation Algorithms, stability and accuracy in Eulers methods, higher-order, Runge-cut Algorithms.	**15**
State variable analysis Generation of state equation from topological data, finding a tree, solution of state equations.	**18**
Sensitivity analysis Sensitivity measures, sensitivity calculation tolerance analysis.	**9**
Optimization Gradient algorithms, numerical solution of gradient algorithm, stability, search methods.	**12**
CAD for integrated circuits Layout algorithm routing algorithm, testability analysis.	**15**
Genetic algorithms Application of GA in electronics.	**9**
Total	**90**

Text book:
1: Computer Assisted Network and System Analysis by: by Mastacusa

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Class	**Fourth**			**Theory:**	**1 hour/week**
Subject	**ENGINEERING PROJECT**			**Tutorial**	**Hrs/wk**
Code	**EE4201**	**Unit**	**4**	**Practical**	**3 hours/week**

Article		**Hrs**
Collaborative team work of the nature in a research environment is expected, including extensive interaction with other students. Each student should submit a written technical report and should attend the final oral examination. The students apply verbal written and oral technical skills to document the design process .		
	Total	**120**

Text book:
1:

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Class	**Fourth**			**Theory:**	**Hrs/wk**
Subject	**Laboratory**			**Tutorial**	**Hrs/wk**
Code	**EE4307**	**Unit**	**4**	**Practical**	**6 hours/week**

Article		**Hrs**
The objective principle is to ensure that students have a good quality capstone design & experience to integrate concepts from a range of classes in the core. The students are to apply modern engineering practices and techniques. Each student should submit a written technical report for each experiment.		
	Total	**180**

Text book:
1:

Course description for the first and second stages according to the Bologna system and the third and fourth stages annually

Courses specification for second, third, and fourth class

For the academic year 2023-2024

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