وزارة التعليم العالي والبحث العلمي
جهاز الاشراف والتقويم العلمي
دائرة ضمان الجودة والاعتماد الأكاديمي

استمارة وصف البرنامج الأكاديمي للكليات والمعاهد

اسم الجامعة: الجامعة التقنية الشمالية

الكلية/ المعهد: المعهد التقني كركوك

القسم العلمي:

اسم البرنامج الأكاديمي او المهني: دبلوم تقني

اسم الشهادة النهائية: دبلوم تقني

النظام الدراسي: مقررات

تاريخ اعداد الوصف: 2025/ /

تاريخ ملئ الملف: 2025/ /

التوقيع:

اسم رئيس القسم: م. ارشاد بكتاش حمالع

التاريخ:

التوقيع:

اسم المعاون العلمي: د. صواش شاهين

التاريخ:

دقق الملف من قبل
شعبة ضمان الجودة والأداء الجامعي
مسؤول شعبة ضمان الجودة والأداء الجامعي: م.م الاء عبدالوهاب عزيز
التاريخ:
التوقيع:

مصادقة السيدة العميد
أ.د. ناشتي مهدي عارف

Name of Final certificate	Technical Diploma / Study period is two calendar years equivalent to three academic years
Study system	Yearly
Accredited Academic Program	ABET
Other external influences	1-There Is A Close Relationship Between The Department's Output And The Labor Market, And A Market Opinion Is Taken To Create Curriculum Study . 2-Continuous Follow-Up Of The Curricula Of Industry Prep For The Purpose Of Matching Its Outputs To Fit The Continuity Of The Vocabulary Of The Section
Description creation date	30/5/2021
9- Academic Program Objectives:	
1- Preparing technical staff with high skills in the field of electricity capable of dealing with variables	
2- Enhancing the values of job affiliation and loyalty in the organization	
3- make a Bridge between traditional and modern scientific and training curricula to serve the current reality	
4- Enhancing the concepts of qualitative and quantitative excellence in order to achieve quality standards and scientific efficiency	
5- Create a scientific, research and applied environment that serves business organizations and find solutions to their problems	
6- Evaluating and developing the effectiveness of the annual educational and training programs to achieve better development	
7- Taking care of students and putting them on the right path that expresses their personal and professional aims and aspirations	
10- Required program outcomes and methods of teaching, learning and assessment	
A- Cognitive aims A1- Electrical circuits and measurements A2- Computer applications and programmable logic control A3- Electronics and digital electronics A4- Machines and electrical networks A5- Electrical installations and electrical drawings A6- Power Electronics	
b- The skill objectives of the program	
The topic aims to graduate qualified cadres to work in the operation, maintenance and construction: B1 - Various high- and low-voltage electrical circuits, and how to check and maintain them. B 2 - The electrical stations and the various measuring devices. B3 - Electrical network systems and installations. B4 - electrical control systems.	

B5 - electric motors and transformers.

11-Teaching and learning methods

The following methods are followed

1. Theoretical lecture (with a variety of explanations)
2. The practical lecture (with a variety of illustrations)
3. Workshops (with a variety of illustrations)
4. Showing scientific films, seminars for students
5. Student research, scientific reports, scientific visits
6. Summer training.

Evaluation methods

The work of the year, which includes:

1. The work of the year, which includes: (the exam at the beginning of the lecture using Google Forms and includes the topic of the previous lecture, oral exams during the lecture with the same topic of the lecture, scientific reports, student seminars, student research)
2. The first semester exam (integrated) on online and attendance method
3. The second semester exam (integrated) on online and attendance methods
4. The final exam periodically (integrated) on online and attendance methods

C- Emotional and value aims

C1- Dissemination of scientific and technical knowledge in the field of electrical engineering sciences.

C2- Graduating national cadres at a level of education

C3- Training the student to use electrical laboratory equipment for different measurements that he can practice in his working life.

C4- Absorbing modern technologies and supporting the process of scientific and technical development to keep pace with global developments

A5 - The student acquires the skill in the field of electrical appliance maintenance and fault diagnosis, through:Teaching the student on the methods used in maintenance and the importance of the components, then training the student with practical experiences on malfunctions of various electrical devices.

d- Transferred general and rehabilitative skills (other skills related to employability and personal development)

D1- Welding

D 2- Plumbing

D 3- Turning

D 4- The refrigerator

D 5- Search on the Internet

Teaching and learning methods

Lecture style, workshop, computer simulation, summer training

Evaluation methods

1. The work of the year, which includes: (the exam at the beginning of the lecture using Google Forms and includes the topic of the previous lecture, oral exams during the lecture with the same topic of the lecture, scientific reports, student seminars, student research),
2. the first semester exam (built-in) via the Internet And my attendance,
3. The second semester exam (combined),
4. The final exam is also integrated.

11-program structure

Educational level	Subject or course code	Name of department	Credit hours	
			theoretical	Practice
First stage		Department of Electrical Techniques	16	19
Second stage			11	19

12-Planning for personal development

Specialized courses, scientific symposium, seminars, scientific developments, research, scientific conferences

13- Acceptance standard (setting regulations related to college or institute enrollment)

1)The total degree that the student obtained after passing the general exams for the sixth grade.

2) To be a graduate of the scientific or industrial branch (specializing in electrical field).

3) The results of the medical examination that the student is healthy and fit to study in the department.

4)-Desire

14-The most important references of information about the program

- "Fundamentals of Electric Circuits", Charles K. Alexander, Matthew N. O. Sadiku, 4th ed.
- "A Textbook of Electrical Technology", B.L. Theraja and A.K. Theraja, 2005
- Robert Bolested, Louis Nashelsky " Electronic Devices and Circuit Theory".
- Jimmie J. Cathy" Electronic Device and Circuit"
- Mohammed Harunur Rashid " Power Electronics Circuits, Devices, and Applications'
- A. Chakrabarti, M. L. Soni, P. V. Gupya and U. S. Bhatnagar, "Power system Engineering"
- V. K. Mehta and Rohit Mehta "Principles of Power System".
- A textbook of electrical technology by theraja

Curriculum Skills Outline

Please check the boxes corresponding to the individual learning outcomes from the program being evaluated																			
Learning outcomes required from the program																			
year	code of course	name of subject	basic or optional	cognitive aims				skill aims related to the program				Emotional and value goals				OTHER SKILLS RELATED TO employability and personal development			
				A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	C 1	C 2	C 3	C 4	D 1	D 2	D 3	D 4
2019-2020		electronic	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Electrical circuits and measurements	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Electrical installation 1	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Maths	unessential	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Computer Applications 1	unessential	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Engineering and electrical drawing 1	unessential	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Human rights and democracy	unessential	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		occupational safety	unessential	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		digital electronics	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

		parameter 1	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		English 1	unessential	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		power electronics	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Electrical installations 2	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		electrical networks	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		electrical machines	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Maintenance laboratories workshops 2	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Computer Applications 2	unessential	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Electron drawing 2	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		Programmable Logic Control (PLC)	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		The project	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		English 2	unessential	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

COURSE DESCRIPTION FORM

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, demonstrating whether he has made maximum use of the available learning opportunities.

9. Educational Institution	Northern Technical University / Kirkuk Technical Institute
10.Scientific Department / Center	Electrical technology department
11.Name / subject	Power Electronics
12.Forms of attendance available	Google Meet online, on the theoretical side and on the practical side, in attendance, according to the blended education.
13.Semester/year	Annual (30 weeks)
14.Number of hours of study (total)	hours per year (5 hours per week) ١٥٠
15.The date this description was prepared	٢٠٢٠/٥/٣٠
16.Objectives of the course: Introduce the student to:	
Power Electronics	
electronics of electrical machines	
10-Course outcomes and methods of teaching, learning and assessment	
A- Cognitive aims	
A1- Identify the main components of power electronics	
A2- Understand the design of electronic control circuits	
A3- Identify the basic components of special electrical machines	
A4- Knowing the methods of working and controlling public and private electrical machines	
b- Subject-specific skill objectives	
B1- Optimum use of electronic circuits	
B2- Designing schematics for electronic control circuits	
B3- Maintenance and diagnosis of electrical and electronic faults	
10-Teaching and learning methods	
The theoretical lecture (with various means of explanation), the google classroom, the practical lecture (with various means of explanation), scientific reports. google meet. Department's YouTube.	

Evaluation methods
The year's work, including: (the daily exam at the beginning of the meeting, .1 including the topic of the previous lecture, oral exams during the lecture with the same topic as the lecture, scientific reports First term exam .2 The second semester exam .3 .Final exam .4
Emotional and value aims
C1- Understand the working methods and installation of special machines C2- Understand the beneficial methods of treating control boards C3- Understand advanced power electronics and how it works C4- Understand modern methods of controlling machines
Teaching and learning methods Theoretical lecture (with various explanations) google classroom, practical lecture (with various explanations), scientific reports. googlemeet. youtube
Evaluation methods The work of the year, which includes: (the daily written exam at the beginning (1 of the lecture, including the topic of the previous lecture, oral exams during the lecture with the same topic as the lecture, scientific reports, 2) the first semester exam, 3) the second semester exam, 4) the final exam

11- structure of subject

Week	Theoretical syllabus
1st	Power electronic ,electronic compents which used in high power control(power diodes, thyristor and power transistors)pevison of single phase rectifier circuites by using diodes.
2nd	Three phase rectifier circuites by using diodes, output voltage waveform, diode current waveform, output voltage equation in case of resistance lode.
3rd	Using the transistor as switch, regions of operation, transistor as a switch(cut off and saturation)
4th	Power transistor in (off)and (on)state, improvement of(off)and(on)time by usenig speed up capacitance, practical problems.
5th	Uniplolor junction transistor , construction , theoretical operation , using the transistor as relaxation oscillator practical example
6th	operational amplifier , discription of operational amplifier (op-amp) as asparate components , zero detector , comparator
7th	The use of op-amp as astable multivibrator and a monostable multivibrator , photo conduction cells , photo diodes
8th	Light – emitting diodes (LED), photo transistors , the use of optical comparator in power Electronic circuits
9th	Thyristor , construction , characteristic , curves for a thyristor , thyristor conduction in forward biasing , thyristor family , thyristor representation as a double transistor circuit.
10th	Thyristor conduction methods , conduction throw the gate minimum gate current causing conduction , conduction time , conduction due to high forward voltage rectifire (dv/dt)
11th	DIAC , TRIAC characteristics , practical applications , thyristor ,triggering methods , triggering on DC and AC current , pluse

	triggering types
12th	thyristor triggering circuit , DC and AC triggering circuits
13th	Pluse current triggering circuit , relaxation oscillator ,zero detector , comparator with astable and monostable multivibrators(operational amplifiers and timer)
14th	Thyristor general application introductory , AC to DC inverter DC to AC inverter , DC to DC inverter , AC to AC inverter , phase controlled halfwave rectifire with resistance and indctormce load out put current and voltage waveform , output voltage equations
15th	Half controler full wave rectifire fully controlled ,resistance and inductance load , generated wave forms , out put voltage equation for free wheeling diode.
16th	Regenrating fully controlled inverters , examples , DC motor speed control
17th	Three face inverters , out put voltage wave form with ,triggering pulses and equations
18th	Thyristor protection from the high rate change in current and voltage , protection from the transient change in source voltage , fully protection circuit from all possible faults due to current and voltage.
19th	DC to AC inverters methods of forcing the thyristor to get off
20th	Parallel and senies inverter , single and three phase , control methods in charging frequency and voltage , out put wave forms1
21 th	Inverter application , emergency power supply , single phase DC motor speed control
22 th	Three phase motor control by using a constant ratio of variation frequency and voltage
23 th	Choppers , DC to DC inverter frequency constant , line constant
24 th	Types of choppers , DC motor speed control
25 th	AC to AC inverter , single phase voltage requlator , three phase voltage requlator
26 th	General application on single and three induction motor speed control due to the change in stat or voltage , using the closed loop feedback circuit to control the slippery rings of AC motor
27 th	Cyclic inverter , AC to DC cyclic inverter , DC to DC cyclic inverter
28 th	AC to AC cyclic inverter control block diagram
29 th	Using amplitude modulation for speed control
30 th	Using polar transistor for AC motor speed control

12-Infrastructure	
١-Required references books	Power electronics circuits, devices, and - applications by Muhammad harunurrashid

2- Main References (Sources)	• Power electronics: converters, applications, anddesign by nedmohan
A- Recommended books and references (scientific journals, reports)	1-The virtual library of the Ministry of Higher Education and Scientific Research
13- Study course development plan: The development plan is carried out through studies submitted annual scientific plan for the development of the study course	