Republic of Iraq
Ministry of Higher Education & Scientific Research
Supervision and Scientific Evaluation Directorate
Quality Assurance and Academic Accreditation

Academic Program Specification Form For The Academic

Universitiy:
College : AlRafidain University College
Refrigeration and air conditioning Techniques
Engineering Department
Date Of Form Completion : *21/ 6 /2023*

Head of Department Ass.Prof.*Dr.Wajeeh Kamal Hasan*

Signature

Date : 11/ 10 /2023

Quality Assurance And University Performance Manager
Prof.Dr.Anwar Jaffer
Signature
Date : / /

TEMPLATE FOR PROGRAM SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

PROGRAMME SPECIFICATION

This Program Specification provides a concise summary of the main features of the Program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the Program.

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Program Title	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
4. Title of Final Award	Bachelor of Engineering
5. Modes of Attendance offered	Annual
6. Accreditation	ABET
7. Other external influences	Labor market: where many seminars and meetings held to discuss academic and applied content with employers Universities and colleges that have majors debate: through the joint mechanisms work allows communication between the teaching staff and students for the purpose of going out a shared vision for the development and the development of academic content plans
8. Date of production	15/ 6 /202٣

9. Aims of the Program

The main objectives of the department are distributed:

1) Create and graduate engineering staff investigator for the kits and technical knowledge to be the main high-quality in the field of refrigeration and air conditioning engineering and technical resource

2) Establishing the principle of participation in society to promote a culture of technical education and its applications

3) Graduation confident skill and understanding of scientific teams in the field of thermal loads (analysis and calculations) as well as in the manufacture, repair and maintenance of control and related services activities

4) Organizing training courses and qualification of staff with efficient post section students to engage in the labor market

5) Strengthen the scientific and administrative ties with the scientific and engineering colleges corresponding to the body as well as the ministry's industrial companies and other relevant institutions on training needs, rehabilitation and development of education programs

6) Continuing social contribution and research to ensure the highest levels of understanding of students in summer training plan and follow-up after graduation

7) Establish and develop all plans scientific, administrative and curriculum required to achieve the paragraphs above and as required

10. Learning Outcomes, Teaching, Learning and Assessment Methods

The Department of Refrigeration Techniques Engineering seeks to qualify its graduates to be applied engineers who have the ability to prepare initial designs for refrigeration, air conditioning and freezing systems of all kinds and to be able to implement, design and supervise the installation of refrigeration systems of various types.

A. Knowledge and Understanding

1) A thermal loads accounts and choosing the right system and the economic feasibility of the various projects in the field of jurisdiction study

2) Fault Diagnosis and supervise the maintenance and repair of various systems and separate air conditioning units and central and keeping food stores of all kinds

3) The development of air-conditioning systems and freezing in line with environmental and climatic conditions to keep pace with technical development

4) Installation and operation and maintenance management complexes and reform the relevant jurisdiction

5) The participation of specialists in conducting research in the field of energy efficiency and find alternatives in the field of jurisdiction

B. Subject-specific skills

B1 To learn about the concept of engineering refrigeration and air conditioning technologies

B2. To classify the needs for developing engineering technologies in the field of refrigeration and air conditioning.

B3. To learn how to use air conditioning and freezing systems in accordance with climatic and environmental conditions.

Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which the development of the students knowledge

Laboratory and practical workshops: that provide everything he needs from the student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to persons and property

Systematic training: systematic training aims to provide the experience the student and the labor market to enable the student to understand the practical application of curricula he studied.

Assessment methods

Interactive Rating: Rating process where the ditch directly between the student and teaching and be one of the fundamentals of feedback upon which faculty members evaluate the teaching and learning process.

Periodic tests editorial: The availability of these tests the knowledge of a faculty member for over a follow-up to the students to content academy and how to interact with information and observations given by teaching students.

Quarterly exam: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester, both academic and skill

The final exam: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year, both academic and skill.

C. Thinking Skills

C1. Planting the spirit of creativity among students and to ensure that find them innovative solutions to various problems

C2. Students develop the ability to work together effectively as teams graduated distinct results.

C3. Sense of responsibility among students and psychological configuration to carry the burden on their shoulders development.

C4. Development to ensure the values and perseverance to get the job done to reach satisfactory results.

Teaching and Learning Methods

Ask a scientific problems and the demand of the students to find more than a solution to it different scientific methods to stimulate creative side of the students.

Form working groups are evaluating the results of its work and change their structure periodically to develop a spirit of cooperation and stimulate students to instead of all the efforts the crisis of the work of the various conditions and with several people.

Assessment methods

Direct assessment: Where is this Rating by faculty members directly and through observation of the interaction of students and their application of section sentimental ad valorem targets and record their observations about it Operation projects and graduation projects: is assessing the student's ability to ACCT and to work in teams, consequences and solutions to various scientific problems facing students.

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

D1. Develop the student's ability to deal with technical means
D2. Develop the student's ability to deal with the Internet.
D3. Develop the student's ability to deal with multiple media.
D4. Develop the student's ability to dialogue and discussion

Teaching and Learning Methods

Laboratory and practical workshops: which provides everything a student needs from the expertise to help him develop the skills and practical side and the consolidation of the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to persons and property

Systematic training: systematic training aims to provide the experience the student and the labor market to enable the student to understand the practical application of curricula he studied.

Assessment Methods

Interactive Rating: Rating process where the ditch directly between the student and teaching and be one of the fundamentals of feedback upon which faculty members evaluate the teaching and learning process.

Periodic tests editorial: The availability of these tests the knowledge of a faculty member for over a follow-up to the students to content academy and how to interact with information and observations given by teaching students.

Quarterly exam: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester, both academic and skill

The final exam: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year, both academic and skill.

11. **Program Structure**

The curricula of the department were developed by specialized committees, in accordance with modern technologies in this field, to prepare technical engineering cadres capable of production and development to serve the country.

The department is subject to the twinning system with government colleges and the same specialization, with the scientific sobriety test for the completed stages.

The first stage:

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/se...	USSWL hr/se...	SWL hr/se...	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
UGI	One	1	MPAC100	Mathematics	الرياضيات	English	6						3	87	113	200	8.00	S	
		2	MPAC101	Engineering Drawing	الرسم الهندسي	English	6						4	88	62	150	6.00	C	
		3	MPAC102	Workshops	المعامل	English			8				4	116	84	200	8.00	C	
		4	MPAC103	Engineering Materials	هندسة المواد	English	4						4	60	90	150	6.00	C	
		5	MPAC104	English	اللغة الانكليزية	English	3						3	45	5	50	2.00	S	
						Total	19	0	8	0	0	0	18	396	354	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/se...	USSWL hr/se...	SWL hr/se...	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
UGI	Two	1	MPAC107	Electrical Engineering	هندسة كهربائية	English	4		4				4	116	59	175	7.00	C	
		2	MPAC108	Engineering Mechanics	الميكانيك الهندسي	English	6						3	87	113	200	8.00	C	MPAC100
		3	MPAC109	Thermodynamics 1	الديناميك الحراري ١	English	6		4				4	144	56	200	8.00	C	
		4	MPAC110	Humans Rights and Democracy	حقوق الانسان والديمقراطية	Arabic	2						2	30	20	50	2.00	B	
		5	MPAC111	Arabic	اللغة العربية	Arabic	2						2	30	20	50	2.00	B	
		6	MPAC112	Computer principles	مبادىء الحاسوب	English	2		2				4	60	15	75	3.00	E	
		7	MPAC105	Matlab	ماتلاب	English	2		2				4	60	15	75	3.00	E	
						Total	24	0	12	0	0	0	23	527	298	825	33		

The second stage:

number of units	Article name in English	No.
6	mathematics(2)	1
4	computer applications2	2
5	strength of materials	3
5	thermodynamics(2)	4
٢	mechanical drawing	5
8	fluid mechanics	6
6	air conditioning and refrigeration(1)	7
2	English language ٢	8

The third stage:

number of units	Article name in English	No.
4	computer applications3	1
6	engineering and numerical analysis	2
4	electrical engineering	3
5	theory of machines	4
8	heat transfer	5
5	mechanical design	6
2	air conditioning systems drawing	7
4	air conditioning instruments maintenance	8
5	air conditioning and refrigeration(2)	9

The fourth stage:

number of units	Article name in English	No.
4	engineering management	1
4	computer applications4	2
6	refrigeration systems	3
6	air conditioning systems	4
5	Renewable Energy	5
5	control circuits	6
5	Power plants	7
4	project	8

13. Personal Development Planning

Academic program accredited how my information essential to the student and skill provides can work on the same continuously develop and is also keen teaching staff on the estimated self-development of the student by urging students to look for problems within their field and then work to resolve this process and be under the supervision and follow up the teaching staff to provide advice and guidance sponsor planting right foundations for the process of personal development.

14. Admission criteria.

Admission criteria are determined annually by the specialized committees in the Ministry of Higher Education and Scientific Research, where inputs are accepting students as follows:

1- Graduates of the scientific branch and at a rate of at least 65%
2- Graduates of Preparatory School industrial and 5% of the country's top graduates.
3- Graduates of technical institutes

15. Key sources of information about the program

1. Specialized scientific books
2. Academic research
3. Internet informatics
4. Accumulated scientific expertise of the staff section
5. Nutrition feedback from the labor market

								Educational outputs from the program										
General skills				Passionate aims				Skills aims				Knowledge aims				basic or assistance	subject	year / level
4d	3d	2d	1d	4c	3c	2c	1c	4b	3b	2b	1b	4a	3a	2a	1a			
			*		*	*	*	*		*		*			*	assistance	mathematics(1)	1st
	*	*		*		*	*	*		*		*			*	assistance	computer applications	
	*		*	*		*	*	*		*	*	*	*	*	*	basic	engineering drawing	
	*		*	*		*	*	*	*	*	*	*	*	*	*	basic	mechanics	
	*	*	*	*		*	*	*	*	*		*			*	basic	electrical technology	
*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	basic	work-shops	
	*		*	*	*	*	*	*	*	*	*	*	*	*	*	basic	thermodynamics	
*				*	*											assistance	human rights and democracy	
			*		*	*	*	*		*		*			*	assistance	mathematics(2)	2nd
	*	*		*		*	*	*		*		*			*	assistance	computer applications	
	*		*	*		*	*	*	*	*	*	*	*	*	*	basic	strength of materials	
	*		*	*	*	*	*	*	*	*	*	*	*	*	*	basic	thermodynamics(2)	
	*		*	*		*	*	*		*	*	*	*	*	*	basic	mechanical drawing	
	*		*	*	*	*	*	*	*	*	*	*	*	*	*	basic	fluid mechanics	
	*		*	*	*	*	*	*	*	*	*	*	*	*	*	basic	air conditioning and refrigeration(1)	
	*	*	*	*	*	*	*	*		*		*		*		basic	engineering materials	
	*	*		*		*	*	*		*		*			*	assistance	computer applications	3rd

	*		*	*		*	*	*		*		*		*		assistance	engineering and numerical analysis	
	*	*	*	*		*	*	*	*	*		*			*	**basic**	electrical engineering	
	*		*	*		*	*	*	*	*	*	*	*	*	*	**basic**	theory of machines	
	*		*	*	*	*	*	*	*	*	*	*	*	*	*	**basic**	heat transfer	
	*		*	*	*	*	*	*	*	*	*	*	*	*	*	**basic**	mechanical design	
	*		*	*	*	*	*	*	*	*	*	*	*	*	*	**basic**	air conditioning systems drawing	
	*		*	*	*	*	*	*	*	*	*	*	*	*	*	**basic**	air conditioning instruments maintenance	
	*		*	*	*	*	*	*	*	*	*	*	*	*	*	**basic**	air conditioning and refrigeration(2)	
*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	assistance	engineering management	**4th**
	*	*		*		*	*	*		*		*			*	assistance	computer applications	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	**basic**	refrigeration systems	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	**basic**	air conditioning systems	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	**basic**	Renewable Energy	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	**basic**	control circuits	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	**basic**	steam engineering	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	**basic**	project	

Sample course

description Course description

This description provides concise purely for the most important characteristics of the decision and expected student learning outcomes achieved demonstrating whether he had achieved a maximum advantage of available learning opportunities. And must be linked to the program description.

educational institution	AlRafidain University College
Scientific Center	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
Name/symbol	Mathematics (1)
Attendance forms available	official time
Semester/year	First semester of the first academic year
The number of hours (total)	٦ theoretical
Date description	15/ 6 /202٣

Objectives of the decision

See mathematical equations and laws

Understand and learn the practical applications of laws and the necessary math problems to solve simple and complex circuit

Understanding and knowledge of appropriate mathematical choice digital programming

Understand and learn the necessary math equations and applications of matrices.

the output of the decision and the methods of teaching, learning and assessment

A cognitive goals.

1. identify the equations and mathematical laws to solve simple and complex circuit
2. identify the matrices and how to use them in programming
3. identify the spaces and sizes account laws

A 4-learn math equations for calculus and how to solve them

B-objectives Marathi for decision.

B 1 – selecting formulae for needed to solve electrical circuits B 2 – preparation of arrays and Baghdad account and used in the programming.

B 3 – calculating the volumes and spaces

B 4.

Teaching and learning methods

Academic lectures that contribute to develop a strong foundation and solid foundation to support the student's cognitive fishing

Methods of evaluation

Interactive assessment which is done directly between the student and the Professor and one of the ways feedback upon which faculty members evaluate the teaching and learning process

Periodical exams husband given how student scientific content and the extent of the interaction with the material given by the faculty.

Quarterly tests and be the middle ring student interest and follow rule during the rest of the semester.

Final examinations and final episode in the student assessment and the extent of its interaction and interest in scientific material during the entire academic year

C-value and affective objectives

C 1-laying the creativity of students and eager to find innovative solutions to various problems

C 2-developing students ' capability for collective action as effective teams graduated with outstanding results

3. develop a sense of responsibility among students and mental configuration of their burdens

C 4-promoting values of prudence and perseverance to complete the work to reach satisfactory results.

Teaching and learning methods

Stimulating the creative side by asking different problems to students and motivate them to find appropriate solutions

Work teams are evaluating the results of its work and change their structure regularly to develop a spirit of cooperation and development and motivating students to make unremitting efforts to work with the different circumstances Methods of evaluation

Direct assessment is assessment by the staff directly and install their remarks about it.
And his ability to aigadl solutions for various scientific problems

D-General and rehabilitative skills (other skills for employability and personal development).
1.- Develop the student's ability to deal with the methods and methods of solving in mathmatics.
2. Develop the student's ability to deal with multiple means of learning
3. Develop the student's ability to dialogue and discussion

11 . Course Structure .

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Determinants, properties,Grammar's rule, application of determinant
Week 2	Vectors, vectors in space, unit vector,Scalar product, vector product
Week 3	Trigonometric functions& relation,Graphing of functions, Trigonometric equations
Week 4	Function of limits, Algebraic limit,Trigonometric limit, Infinity as limit
Week 5	Derivative rule, Algebraic& Trigonometric derivative ,Chain rule, velocity& acceleration
Week 6	Inverse trigonometric functions& its derivative , Logarithm& Exponential functions& its derivative
Week 7	Hyperbolic functions& its derivative, Inverse hyperbolic functions& its derivative
Week 8	Integration, integrals of trigonometric& inverse functions , Integrals of logarithm& Exponential functions
Week 9	Integrals of logarithm& Exponential functions, Integrals of hyperbolic functions& its derivative,L'Hopitals's rules
Week 10	Integration methods; Integration by parts,Integration by partial fraction
Week 11	Integration by trigonometric substitution,Integration of ax2 + bx + c
Week 12	Application of Integration,Area under the curve& between two curves
Week 13	Surface area generated,Length of the curve

TEMPLATE FOR COURSE SPECIFICATION

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	Engineering drawing
4. Programme(s) to which it contributes	*Refrigeration and air conditioning systems*
5. Modes of Attendance offered	official time
6. Semester/Year	First semester of the first academic year
7. Number of hours tuition (total)	٦
8. Date of production/revision of this specification	15/ 6 /202٣

9. Aims of the Course

Introducing the student to the importance of engineering drawing and its relationship to other engineering subjects with the development and development of the student's mental and kinetic abilities in drawing simple and complex shapes and expanding the horizons of his imagination of geometric shapes and complexes to

identify their components and parts, mechanical and working principle, organizing the student's thought to develop a specific and sequential strategy for drawing, assembling and dismantling geometric shapes and parts of machines and equipment .

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

A1. Knowledge and understanding of the fundamentals of engineering drawing using AutoCAD program
A2 Drawing know basic geometric shapes using computer
A3. Knowledge and understanding of the program commands
A4 Knowledge of drawing 2D dimensional shapes
A5 Knowledge of drawing 3D dimensional shapes
A5 knowledge of writting and put dimmension in dr B.

Subject-specific skills

B1 drawing the 2d dimension
B2. Drawing the 3d dimension
B3 Implementation of orders for engineering drawing
B4 Put-dimensional drawing and writing on the drawing

Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which to develop students knowledge
Laboratory and practical workshops: that provide everything needed by student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to people and property.

Assessment methods

Interactive Rating: where it is this evaluation process directly between the student and teacher and be one of the fundamentals of feedback upon which faculty members evaluate the teaching and learning process
Periodic written tests: The availability of these tests to a faculty member about the extent of follow-up students for the academic content and how to interact with information and observations given by teaching students
Quarterly tests: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester academic skills Final tests: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year academic skills

C. Thinking Skills

C1. Planting the spirit of creativity and innovation among students
C2. develop a sense of responsibility for students

C3. Development diligence and perseverance to get the job done to reach satisfactory results values
C4. scalability students to develop teamwork Teaching and Learning Methods

Ask a scientific problems and the demand of the students to find more than a solution to it different scientific methods to stimulate the creative side of students Form working groups are evaluating the results of its work and change their structure periodically to develop a spirit of cooperation and motivate students to make every effort necessary to work under different conditions and with several people

Assessment methods

Direct assessment: Where is this assessment by the teaching directly and through interaction Note students and their application of sentimental value targets and install notes about it Practical projects is to assess the student's ability to achievement and creativity and to work in teams and get results and solutions to various scientific problems facing students

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1. Clarify the importance of the program in the academic and practical field
D2. Expand the perceptions of students to accommodate for the analysis of engineering drawings
D3. Hiring program for AutoCAD drawing geometric shapes
D4. To find different ways to draw geometric shapes

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Define the Engineering Drawing, tools, types of drawing sheets, and types of lines
Week 2	Introduction to AutoCAD and learning how to use the program interface
Week 3	Learning how to use Draw toolbar and its content
Week 4	Learning how to use Draw toolbar and its content
Week 5	Learning how to use modify toolbar and its content
Week 6	Learning how to use dimension toolbar and its content and draw 2D exercises
Week 7	Theory of projection, Theory of projection 1st angle
Week 8	Find the 3rd project view from 2 views
Week 9	Theory of projection 3rd angle
Week 10	Drawing the three projection views
Week 11	Theory of Section
Week 12	Drawing the three Section views
Week 13	Learning 3D interface in AutoCAD
Week 14	3D tools, 3D exercises
Week 15	**Final Exam**

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	work-shops
4. Programme(s) to which it contributes	*Refrigeration and air conditioning systems*
5. Modes of Attendance offered	official time
6. Semester/Year	First semester of the first academic year
7. Number of hours tuition (total)	٨
8. Date of production/revision of this specification	15/ 6 /202٣

9. Aims of the Course

Introducing the student to acquiring manual skill by implementing operations, manufacturing and maintenance operations using various hand tools and measuring tools. The laboratory material consists of laboratory workshops and refrigeration workshop.

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

A1. Clarify the basic concepts in laboratories and refrigeration workshops.
A2. Acquisition of skills in laboratory departments
A3. Gain basic practical knowledge
A4. Gain practical concepts

B. Subject-specific skills

B1. The ability to memorize the laws of laboratories and workshops
B2. The ability to think and solve a problem according to own rules
B3. Writing practical scientific reports

Teaching and Learning Methods

Theory lecture, the laboratory ,Summer training.

Assessment methods

Quizzes, semester tests ,Final tests, practical test.

C. Thinking Skills

C1.Planting creativity spirit to find out solutions for problems.
C2.developping the capability of team work.
C3.Developing the sensation of holding the burdens.
C4. Encouraging the values of industriousness.

Teaching and Learning Methods

Academic lectures ,practical labs , workshops ,training in related work fields.

Assessment methods

Reactive assessment ,semester tests , final tests.

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

D1.Transforming the electrical circuit into a mathematical model

D2.Calculations of electrical loads.

D3.analogy of electrical circuits with magnetic circuits.

D4.

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي العملي	
	Material Covered
Week 1	Casting of metals and their importance - Purpose of using castings in industry - Contents of the foundry unit - Industrial safety reserves in the foundry - Forming a sand mold for a one-piece model - Sands of molds and hearts: types, sources and properties - Additives, mixing processes and adjusting ingredients - Use of sand mixer - Handling of improvised sand - Sand handling devices - forming sand molds by manual method for a one-piece model - forming a sand mold.
Week 2	Sand mold for a one-piece model with defining the estuaries and elevators - Metal smelting and pouring into the mold - Extracting and cleaning the castings - Forming a mold using the pulp box and drying it in the drying oven - Forming a sand mold for a simple two-piece model with a dog.
Week 3	Forming a sandy mold like the previous one with melting the metal and pouring it into a mold and taking out the casting and cleaning it - Metal melting furnaces: types, qualities, uses (rotary kiln, stirrers and stationary) - Reviewing and examining the castings - Determining the apparent defects and their causes - Reviewing the dimensions of the castings and ensuring that they conform to the required dimensions.
Week 4	Files and the cold process: types and specifications of files - mechanized and their types - methods of attaching artifacts to them - uses of files - the method of cleaning the initiator - the cold process - an exercise on the process of marking and simple filings.
Week 5	Saw cutting: hand saw, saw weapon, saw weapon installation, conditions to be met in the sawing process - an exercise on the sawing process.
Week 6	Lathe: specifications, use, accessories and installation methods - forming the lathe - types of lathe pens and the use of measuring tools.
Week 7	Turning operations: flat turning, straightening, simple graded work with the use of measuring tools.
Week 8	Lathe the internal and external loot in different ways with an explanation of the laws of each method - doing an exercise for the external loot and another for the internal loot.
Week 9	Occupational safety and security needs - gas welding - equipment used and how to install and control it - other auxiliary tools - used gases and their specifications - welding safety, types and measurements - other auxiliary materials - welding equipment - types of flames, method of ignition and control of the required flame - works - rinsing and cleaning the basins to be welded.
Week 10	Practical exercises for welding opposite surfaces, perpendicular surfaces, inclined surfaces and circuit welding, longitudinal and transverse cutting - cutting: circle, irregular shapes - electric arc welding - equipment used.
Week 11	Welding equipment - Practical training on the use of electric arc welding of different surfaces - Point and tape welding - Equipment used in each type - Types of electrodes and their installation method - Practical training on the use of each type.
Week 12	Welding using argon gas - doing welding exercises using argon gas.
Week 13	Gas cutting operations - equipment used - precautions to be provided.
Week 14	Assembly exercises using various different cutting and welding equipment.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	AlRafidain University College
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	mechanics
4. Programme(s) to which it contributes	*Refrigeration and air conditioning systems*
5. Modes of Attendance offered	official time
6. Semester/Year	second semester of the first academic year
7. Number of hours tuition (total)	٦
8. Date of production/revision of this specification	15/ 6 /202٣
9. Aims of the Course	

Teaching the students, the basic principles of statics and dynamics which have crucial role in solving technical problems as well as their role in design and construction of machines, tools

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

A1- Explain the basic concepts of mechanics
A2 Gain skills in solving problems related to mechanics
A3- Acquire basic knowledge as an introduction to solving engineering problems
A4- Acquire theoretical concepts to deal with mechanics problems
A5- know how data is represented inside the electronic calculator
A6- knowledge of the processor of the type 8085

B. Subject-specific skills

B 1 The ability to memorize the laws of mechanics
B-2 The ability to think about solving a problem according to the rules of a physical problem
B 3 Writing scientific reports on questions solutions to topics
B4 Know the comparison between the appropriate way to solve problems

Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which to develop cognitive balance for students
Practical laboratory:, which provides each student the expertise to help develop practical skills side and consolidate the principles necessary to carry out the projects correctly

Assessment methods

Interactive tests: basically to assess the student by observing the extent of interaction provides during the lecture and participation
Written tests: that provides knowledge of the extent of the student's understanding and follow-up of the material and scientific observations given by teaching
Quarterly tests: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester for academic and skills
Final tests: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year for academic and skills

C. Thinking Skills

C1- Implant the spirit of creativity among students and to ensure that find them innovative solutions to various problems

C2- Students develop the ability to work together effectively as teams come out excellent result

C3- Sense of responsibility among students and psychological configuration to carry the burden on their shoulders Development

C4- Development to ensure the values and perseverance to get the job done to reach satisfactory results

Teaching and Learning Methods

Stimulate the creative side of the students and that by asking various scientific problems and the demand of the students find appropriate scientific solutions to them in different ways

Develop a spirit of cooperation between the students, through the formation of working teams and motivate the students to exert all the necessary conditions for the work of the various efforts and with several people

Assessment methods

Direct assessment: Where is this assessment by the teaching directly and through note student interaction during the lecture and install notes about it

Practical projects is to assess the student's ability to achievement and creativity and to work in teams, consequences and solutions to various scientific problems

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

D1- Analysis methods of treatment the fault in the electronic computer

D2- Data analysis in the electronic computer

D3- acquire skill in the use of the language of the machine

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	STATIC: Basic principles in mechanics, Vector Quantities and forces Analysis (2d ,3d)
Week 2	Equilibrium of a Particle (2d , 3d)
Week 3	Force System Resultants: Moment of a Force Scalar Formulation/Moment of a Force-Vector Formulation
Week 4	Force System Resultants: Moment of a Force about a Specified Axis/Moment of a Couple
Week 5	Equilibrium of a Rigid Body: Conditions for Rigid Body Equilibrium/ Free-Body Diagrams/ Equations of Equilibrium
Week 6	Equilibrium in three dimensions: Free-Body Diagrams/ Equations of Equilibrium
Week 7	Structural Analysis: Simple Trusses/ The Method of Joints/ Zero·Force Members
Week 8	Structural Analysis:The Method of Sections/ Space Trusses/ Frames and Machines
Week 9	DYNAMICS: Kinematics of a Particle/ Rectilinear Kinematics: Continuous Motion
Week 10	Motion of a Projectile
Week 11	Absolute Dependent Motion Analysis of Two Particles
Week 12	Kinetics of a Particle: Force and Acceleration
Week 13	Kinetics of a Particle: Work and Energy/ The Work of a Force
Week 14	Principle of Work and Energy
Week 15	Power and Efficiency

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	Electrical technology
4. Programme(s) to which it contributes	*Refrigeration and air conditioning systems*
5. Modes of Attendance offered	official time
6. Semester/Year	second semester of the first academic year
7. Number of hours tuition (total)	٤ th. - 4 lab.
8. Date of production/revision of this specification	15/ 6 /202٣

9. Aims of the Course

Teaching the student, the basic principles of electrical technology and applications.

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

1. Clarify basic concepts in electrical technology
2 Gain skills in solving problems related to electrical technology
3. Acquire basic knowledge as an introduction to solving engineering problems
4. Acquire theoretical concepts to deal with electrical technology issues
5. know and understand the arrays

B. Subject-specific skills

1. The ability to memorize the laws of electrical technology
2. The ability to think about solving a problem according to the rules of a physical problem
3. Writing scientific reports on questions solutions to topics

Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which the development of the students knowledge

Laboratory and practical workshops: that provide everything he needs from the student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to persons and property

Systematic training: systematic training aims to provide the experience the student and the labor market to enable the student to understand the practical application of curricula he studied.

Assessment methods

Interactive Rating: Rating process where the ditch directly between the student and teaching and be one of the fundamentals of feedback upon which faculty members evaluate the teaching and learning process.

Periodic tests editorial: The availability of these tests the knowledge of a faculty member for over a follow-up to the students to content academy and how to interact with information and observations given by teaching students. Quarterly exam: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester, both academic and skill

The final exam: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year, both academic and skill.

C. Thinking Skills

C1. Planting the spirit of creativity among students and to ensure that find them innovative solutions to various problems

C2. Students develop the ability to work together effectively as teams graduated distinct results.
C3. Sense of responsibility among students and psychological configuration to carry the burden on their shoulders development.
C4. Development to ensure the values and perseverance to get the job

Teaching and Learning Methods

Ask a scientific problems and the demand of the students to find more than a solution to it different scientific methods to stimulate creative side of the students.

Form working groups are evaluating the results of its work and change their structure periodically to develop a spirit of cooperation and stimulate students to instead of all the efforts the crisis of the work of the various conditions and with several people.

Assessment methods

Direct assessment: Where is this Rating by faculty members directly and through observation of the interaction of students and their application of section sentimental ad valorem targets and record their observations about it Operation projects and graduation projects: is assessing the student's ability to ACCT and to work in teams, consequences and solutions to various scientific problems facing students.

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

1. Run all the C++ statements
2. Write and run the programs using C++ language
3. Design related programs in the field of competence

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Resistance, conductance, effect of temp. on the resistance value
Week 2	Oham's law, series connection, parallel connection, compound connection
Week 3	Voltage and current divider solved examples, kirchhoff's laws
Week 4	Star-delta conversion examples
Week 5	Thevenin's theorem, maximum power transfer
Week 6	Nodal method, superposition
Week 7	Alternating voltage and current
Week 8	Frequency, period, instantaneous value of voltage and current
Week 9	Component of A.C circuit, pure resistance, pure inductance, pure capacitance
Week 10	Series A.C circuit, R,L,C in series
Week 11	Impedance, phase angle, resonance, phase diagram
Week 12	Parallel A.C circuit, R,L,C, Admittance, power factor
Week 13	Active, reactive, apparent power in A.C circuit
Week 14	3-phase circuit
Week 15	**Preparatory week before the final Exam**

12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1. How to Program C++ 2. Step by step with C++ 3. Pointers in C++
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions

Pre-requisites	No special requisites
Minimum number of students	40
Maximum number of students	30

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	Computer Principals
4. Programme(s) to which it contributes	*Refrigeration and air conditioning systems*
5. Modes of Attendance offered	official time
6. Semester/Year	second semester of the first academic year
7. Number of hours tuition (total)	2 th. – 2 lab
8. Date of production/revision of this specification	15/ 6 /202٣
9. Aims of the Course	
Learning the basic components of computer system as well as the modern operating system, utility and application programs.	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

A1. Clarify the basic concepts of computers

A2. Gain skills in solving computer-related problems

A3. Acquire basic knowledge as an introduction to solving engineering problems

A4. Acquisition of theoretical concepts for dealing with computer problems

A5. converting waves from analogue system to digital system and vice versa.

A6 . learn methods of designing digital circuits counters and time and other important constituencies in practice

B. Subject-specific skills

B1. - the simplest and best digital circuit design image

B2. the ability to use digital numerical order in the software processes and the conversion from one system to another

B3. digital circuit analysis and knowledge of its working methods and Astkhamadtha

B4. circles container design parts of evicting non-digital and digital enter values in ways that certain designs and as required

Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which to develop cognitive balance for students

Practical laboratory:, which provides each student Maihtaj him the expertise to help develop practical skills side and consolidate the principles necessary to carry out the projects correctly

Assessment methods

Interactive Rating: basically to assess the student by observing the extent of interaction provides during the lecture and participation
Written tests: that provides knowledge of the extent of the student's understanding and follow-up of the material and scientific observations given by teaching
Quarterly tests: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester Bjanbhe academic skills
Final tests: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year Bjanbhe academic skills

C. Thinking Skills

C1. implant the spirit of creativity among students and to ensure that find them innovative solutions to various problems

C2. students develop the ability to work together effectively as teams come out excellent result

C3. sense of responsibility among students and psychological configuration to carry the burden on their shoulders Development

C4. development to ensure the values and perseverance to get the job done to reach satisfactory results

Teaching and Learning Methods

Stimulate the creative side of the students and that by asking various scientific problems and the demand of the students find appropriate scientific solutions to them in different ways
Develop a spirit of cooperation between the students, through the formation of working teams and motivate the students to exert all the necessary conditions for the work of the various efforts and with several people

Assessment methods

Direct assessment: Where is this assessment by the teaching directly and through NOTE student interaction during the lecture and install notes about it
Practical projects is to assess the student's ability to achievement and creativity and to work in teams, consequences and solutions to various scientific problems

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

D1. transfer equations of the time domain to the frequency and vice versa.

D2. analysis equations and their use in the field of communications

D3. find different solutions to complex mathematical equations

D4. arrays and analyze and solve practical ways to take advantage of them

Week	Topic	Practical Subject	Notes
1	Generation of Computer	Generation of Computer	
	Essential components of computer	Essential components of computer	
	Microsoft – Disk Operating System	Microsoft – Disk Operating System	
2	Internal command	Internal command	
	External command	External command	
	Windows Operating System (Getting)	Windows Operating System (Getting)	
3	Started with Windows	Started with Windows	
	Start Windows and view the Active Desktop	Start Windows & view the Active Desktop	
	Use the mouse	Use the mouse	
4	Start a program	Start a program	

	Move and resize windows	Move and resize windows	
	Use menus , keyboard shortcuts, and toolbars	Use menu, keyboard shortcuts and toolbars	
5	Use dialog boxes	Use dialog boxes	
	Use scroll bars	Use scroll bars	
	Get Help	Get Help	
6	Close a program and shut down windows	Close a program and shut down windows	
	Windows Operating System (Working) With Programs , Files , and Folders	Windows Operating System (Working) With Programs , Files , and Folders	
	Create and save a WordPad file	Create and save a WordPad file	
7	Open , edit , and save an existing Paint file	Open , edit , and save an existing Paint file	
	Work with multiple programs	Work with multiple programs	
	Understand file management	Understand file management	
8	View files and create folders & My Computer	View files and create folders& My Computer	
	Move and copy files using My Computer	Move and copy files using My Computer	
9	Manage files with Windows Explorer	Manage files with Windows Explorer	
	Delete and restore files	Delete and restore files	
10	Create a shortcut on the desktop	Create a shortcut on the desktop	
	My Computer- My Documents – Recycle Bin	My Computer- My Documents – Recycle Bin	
11	Accessories calculator	Accessories calculator	
12	Paint	paint	
13	Anti Viruses	Anti Viruses	
	Note pad & WordPad	Note pad & WordPad	
	Computer Viruses	Computer Viruses	

Sample course description

Course description

This description provides concise purely for the most important characteristics of the decision and expected student learning outcomes achieved demonstrating whether he had achieved a maximum advantage of available learning opportunities. And must be linked to the program description.

ducational institution	*AlRafidain University College*
Scientific Center	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
Name/symbol	Human rights
Attendance forms available	
Semester/year	second semester of the first academic year
The number of hours (total)	2
Date description	15/ 6 /202٣

Objectives of the decision

Introduce the student to the laws and regulations related to human rights and democracy

A cognitive goals.

1.Clarify the basic concepts of human rights and democracy
2. Acquisition of basic knowledge as an introduction to human rights and democracy

B-objectives Marathi for decision.

B 1 – selecting formulae for needed to solve electrical circuits B
2 – preparation of arrays and Baghdad account and used in the programming.
B 3 – calculating the volumes and spaces
B 4.

Teaching and learning methods

Academic lectures that contribute to develop a strong foundation and solid foundation to support the student's cognitive fishing

Methods of evaluation

Interactive assessment which is done directly between the student and the Professor and one of the ways feedback upon which faculty members evaluate the teaching and learning process
Periodical exams husband given how student scientific content and the extent of the interaction with the material given by the faculty.
Quarterly tests and be the middle ring student interest and follow rule during the rest of the semester.

Final examinations and final episode in the student assessment and the extent of its interaction and interest in scientific material during the entire academic year

C-value and affective objectives
C 1-laying the creativity of students and eager to find innovative solutions to various problems
C 2-developing students ' capability for collective action as effective teams graduated with outstanding results
3. develop a sense of responsibility among students and mental configuration of their burdens
C 4-promoting values of prudence and perseverance to complete the work to reach satisfactory results.

Teaching and learning methods

Stimulating the creative side by asking different problems to students and motivate them to find appropriate solutions

Work teams are evaluating the results of its work and change their structure regularly to develop a spirit of cooperation and development and motivating students to make unremitting efforts to work with the different circumstances Methods of evaluation

Direct assessment is assessment by the staff directly and install their remarks about it.
And his ability to aigadl solutions for various scientific problems

D-General and rehabilitative skills (other skills for employability and personal development).
1.-Select the necessary equations to solve electrical circuits B 2-matrices for use in programming
D 3
.

Week	Subject Topics
1	**Human rights, definition, goals of it.**
	The roots of a human rights and its development in the history the human beings : human rights are in the old and middle eras
	Human rights in the old civilizations and specially in the Mesopotamia
2	**Human rights in the ethereal canons with the emphasizing human rights in the Islam**
	Human rights in the Middle Ages : human rights in the schools of thought and the schools of political theories , human rights in the firms and ads and the insurrections and the constitutions (the documentations of English , the revolution of America , the revolution of France , the revolution of Russia)
	Human rights in the contemporaneous and new history: the states of the recognition by human rights from the first war and agnation of united nations.
3	**The region of the recognition in human rights : the Europe dealing ship for human rights 1950 , American dealing ship for human rights 1969 , the African covenant for human rights 1981 , the Arabs covenant for human rights 1994.**
	The organizations of non governmental and human rights (the committee of international for the red cross organization , the merciful organization , the oversight organization of the human rights)
	National organization of the human rights
4	**Human rights in the Iraqi constitutions between the theory and real**
	The relations between the human rights and general freedoms: 1-in the world announcement for the human rights
	2-in the regional covenants and national constitutions
5	**The necessary human rights and the companying human rights**
	The economical , societal and cultural human rights and the civiler and political human rights
	The modern human rights : the facts of the augmentation , the rights in cleaning environment ,the right in solidarity , the right in the religion
6	**The guarantee of respective and safeguarding the human rights national domain, the guarantee in the constitution and laws , the guarantee in the law imposing principle**
	The guarantees in the constitutional watch , the guarantee in the press and general speech freedoms , the role of the non governmental in respecting and safeguarding the human rights
	Guarantees , respective and safeguarding the human rights on the national domain - the role of the united nations and its agencies specialized in providing the guarantees
7	**The role of the provincial organizations (the Arab union , Europe union , African union , American states organization , Asian organization) - the role of the not governmental provincial international organization and the general speech in**

	respecting and safeguarding the human rights
8	**The general theory for freedoms : the origin of the due and freedoms , the situation of lawful from the rights and announced freedoms , using the general freedom term**
	The practical nature of the general freedoms concept : the philosophy considerations for the employment right , the erection considerations for the positional right, the economical considerations and the general freedoms
	The basic lawful for the law state
9	
	Organizing the general freedoms by the general authority
10	**The lawsuit or lawlessness**
	The lawful stabbing : restriction the state responsibilities on its lawful works
11	**- The effect of coupling the law on the general freedoms**
	- The general freedoms in the due of the management comprehension
12	**The equalization : the historical development for the equalization concept**
13	**The modern development for the equalization concept**
14	**The equalization between the male and female**
	The equalization between the peoples according to their religions and origins

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	Mathematics 2
4. Programme(s) to which it contributes	Second stage
5. Modes of Attendance offered	official time
6. Semester/Year	First and second semester of the second academic year
7. Number of hours tuition (total)	3
8. Date of production/revision of this specification	15/ 6 /202٣
9. Aims of the Course	

teaching the student on the second part of advanced mathematics to develop his intellectual ability to be utilized in the engineering applications.

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

A1- Clarify the basic concepts of calculus
A2- Gain skills in solving mathematical problems
A3- Acquire basic knowledge as an introduction to using mathematics to solve engineering problems
A4- Acquisition of theoretical concepts to deal with issues of control and control
A5- know how data is represented inside the electronic calculator
A6- knowledge of the processor of the type 8086

B. Subject-specific skills

B 1 The ability to memorize the laws of calculus
B-2 - The ability to think and solve a problem according to the rules of a mathematical problem
B 3 - Writing scientific reports on questions solutions to sports topics
B4- the ability to program processor 8086

Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which to develop cognitive balance for students
Practical laboratory:, which provides each student the expertise to help develop practical skills side and consolidate the principles necessary to carry out the projects correctly

Assessment methods

Interactive tests: basically to assess the student by observing the extent of interaction provides during the lecture and participation
Written tests: that provides knowledge of the extent of the student's understanding and follow-up of the material and scientific observations given by teaching
Quarterly tests: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester for academic and skills
Final tests: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year for academic and skills

C. Thinking Skills

C1- Implant the spirit of creativity among students and to ensure that find them innovative solutions to various problems
C2- Students develop the ability to work together effectively as teams come out excellent result
C3- Sense of responsibility among students and psychological configuration to carry the burden on their shoulders Development

C4- Development to ensure the values and perseverance to get the job done to reach satisfactory results

Teaching and Learning Methods

Stimulate the creative side of the students and that by asking various scientific problems and the demand of the students find appropriate scientific solutions to them in different ways
Develop a spirit of cooperation between the students, through the formation of working teams and motivate the students to exert all the necessary conditions for the work of the various efforts and with several people

Assessment methods

Direct assessment: Where is this assessment by the teaching directly and through note student interaction during the lecture and install notes about it
Practical projects is to assess the student's ability to achievement and creativity and to work in teams, consequences and solutions to various scientific problems

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

D1- Analysis methods of treatment the fault in the electronic computer
D2- Data analysis in the electronic computer
D3- acquire skill in the use of the language of the machine

Week	Topics	Practical subject	Notes
1	Review in integrals and derivatives		
2-3	Vectors: equation of line & plane in space, plane , tangent & vertical line , vector function		
4-5	Complex number, polar form , Euler Equation , Exponential &roots of complex number		
6 - 9	Function with two or more variables- Partial differentiation - Partial differentiation chain rule		

	-Victor and valued differentiation - Maximum and minimum values for two variable functions.		
10 - 13	Double integration - Areas and volumes - Physical applications- Triple integrals.		
14 - 15	Polar coordinates - Cylindrical and spherical coordinates - Curves sketching in polar coordinates.		
Half-year Break			
16-17	Polar coordinates - Cylindrical and spherical coordinates - Curves sketching in polar coordinates		
18 - 19	Green's theory -Divergence theory.		
20	Linear integration		
21 - 24	Series: Number sequences — Definition-Limits —Infinite series - Limits definition - Alternating series tests. Power series - Convergence period - Taylor and Macbrain function series - General applications.		
25 - 28	Matrix: matrix operations -Matrix inversion - Linear systems equations) - Solving linear systems by matrix methods – Internal values and vectors.		
29-30	First order differential equations and simple higher order differential equations.		

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	Thermodynamics 2
4. Programme(s) to which it contributes	*Refrigeration and air conditioning systems*
5. Modes of Attendance offered	official time
6. Semester/Year	First and second semester of the second academic year
7. Number of hours tuition (total)	2
8. Date of production/revision of this specification	15/6/2023

9. Aims of the Course

To study the principles of advanced thermodynamics, as the basis of refrigeration & air conditioning engineering and power plant subjects.

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

1. Explain the basic concepts of thermodynamics
2. Gain skills in solving thermodynamic problems
3. special knowledge of electronic measurement devices
4. knowledge and understanding of how to work oscilloscope and sensors of various physical quantities
5. know and understand how the different devices generate electrical signal

B. Subject-specific skills

1. The use of measurement devices for basic electrical transactions
2. Use oscilscope device and sensors of various physical quantities
3.The use of multiple phases for generating electrical signal

devices Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which the development of the students knowledge

Laboratory and practical workshops: that provide everything he needs from the student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to persons and property

Systematic training: systematic training aims to provide the experience the student and the labor market to enable the student to understand the practical application of curricula he studied.

Assessment methods

Interactive Rating: Rating process where the ditch directly between the student and teaching and be one of the fundamentals of feedback upon which faculty members evaluate the teaching and learning process.

Periodic tests editorial: The availability of these tests the knowledge of a faculty member for over a follow-up to the students to content academy and how to interact with information and observations given by teaching students.

Quarterly exam: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester, both academic and skill

The final exam: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year, both academic and skill.

C. Thinking Skills

C1. Planting the spirit of creativity among students and to ensure that find them innovative solutions to various problems

C2. Students develop the ability to work together effectively as teams graduated distinct results.

C3. Sense of responsibility among students and psychological configuration to carry the burden on their shoulders development.

C4. Development to ensure the values and perseverance to get the job

Teaching and Learning Methods

Ask a scientific problems and the demand of the students to find more than a solution to it different scientific methods to stimulate creative side of the students.

Form working groups are evaluating the results of its work and change their structure periodically to develop a spirit of cooperation and stimulate students to instead of all the efforts the crisis of the work of the various conditions and with several people.

Assessment methods

Direct assessment: Where is this Rating by faculty members directly and through observation of the interaction of students and their application of section sentimental ad valorem targets and record their observations about it Operation projects and graduation projects: is assessing the student's ability to ACCT and to work in teams, consequences and solutions to various scientific problems facing students.

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

1. The ability to use measurement devices for electrical engineering
2. The ability to deal with the waves of electrical and electronic analysis devices
3. The ability to deal with sensors for physical quantities and how to design
4. maintenance and design of electrical and electronic measurement devices

Week	Topic	Practical subject	Notes
1	An overview of steam	Measurement of specific heat ratio of air	
2	dryness fraction measurements		
3	Steam power plants	Operating parameters of VCR	
4	Rankine - reheat cycle		
5	Regenerative cycle – dual cycle	Saturated vapor pressure and temperature relation	
6	High speed gas flow		
7	Properties of isentropic flows	Steam boiler efficiency	
8	Shock waves		

9	Supersonic nozzles	Determination the phase of the refrigerant for VCR system components	
10	Reciprocating compressors		
11	Dynamic analysis	Vapor dryness fraction measurement	
12	Clearance volume		
13	Multistage compressors	Determination of the evaporation latent heat	
14	Gas turbines		
15	Velocity triangles , frictional effects		

Half-year Break			
16	Gas turbines comparison	Determination of thermal efficiency for VCR cycle	
17	Steam turbines. Internal combustion engines		
18	Thermodynamics relations	EES software training	
19	Maxwell relations		
20	Clausius Clapyron relations		
21	Thermodynamic relations for du, dh, ds, Cp and Cv		
22	Real gases		
23	Compressibility factors		
24	Real gas equations of states		
25	Gas mixtures		
26	Gibbs- equations		
27	Daltons law and molar ratio		
28	Volumetric analysis		
29	Gravimetric analysis		
30	Combustion, heat of reaction		

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	Fluid mechanics
4. Programme(s) to which it contributes	*Refrigeration and air conditioning systems*
5. Modes of Attendance offered	official time
6. Semester/Year	First and second semester of the second academic year
7. Number of hours tuition (total)	3
8. Date of production/revision of this specification	15/6/2023
9. Aims of the Course	

Introduce the student to the study of the physical properties of fluids, properties of flow, applications of Bernoulli equation, losses due to friction, dimensional analysis and similarity and their applications in line with the specialization of refrigeration and air conditioning

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

1. A review of the basic concepts of fluid mechanics
2. Gain skills in solving problems related to the subject
3. Acquire basic knowledge as an introduction to solving engineering problems in fluid mechanics
4. Acquire theoretical concepts to deal with fluid mechanics problems
5. know and understand the arrays

B. Subject-specific skills

1. Implement the statement and the functions.
2. write the programs using C++
3. Design related programs in the field of competence

Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which the development of the students knowledge

Laboratory and practical workshops: that provide everything he needs from the student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to persons and property

Systematic training: systematic training aims to provide the experience the student and the labor market to enable the student to understand the practical application of curricula he studied.

Assessment methods

Interactive Rating: Rating process where the ditch directly between the student and teaching and be one of the fundamentals of feedback upon which faculty members evaluate the teaching and learning process.

Periodic tests editorial: The availability of these tests the knowledge of a faculty member for over a follow-up to the students to content academy and how to interact with information and observations given by teaching students.

Quarterly exam: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester, both academic and skill

The final exam: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year, both academic and skill.

C. Thinking Skills

C1. Planting the spirit of creativity among students and to ensure that find them innovative solutions to various problems

C2. Students develop the ability to work together effectively as teams graduated distinct results.

C3. Sense of responsibility among students and psychological configuration to carry the burden on their shoulders development.

C4. Development to ensure the values and perseverance to get the job

Teaching and Learning Methods

Ask a scientific problems and the demand of the students to find more than a solution to it different scientific methods to stimulate creative side of the students. Form working groups are evaluating the results of its work and change their structure periodically to develop a spirit of cooperation and stimulate students to instead of all the efforts the crisis of the work of the various conditions and with several people.

Assessment methods

Direct assessment: Where is this Rating by faculty members directly and through observation of the interaction of students and their application of section sentimental ad valorem targets and record their observations about it Operation projects and graduation projects: is assessing the student's ability to ACCT and to work in teams, consequences and solutions to various scientific problems facing students.

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

1. Run all the C++ statements
2. Write and run the programs using C++ language
3. Design related programs in the field of competence

Week	Topic	Practical subject	Notes
1	Physical fluid properties	Experiments curves	
2	Physical fluid properties	Density ,Viscosity	
3	Fluid pressure at static	Density, Viscosity	
4	Fluid pressure Instruments	Fluid pressure	
5	Fluid flow types and pattern	Fluid pressure	
6	Fluid Velocity , acceleration	Center of gravity	
7	Fluid velocity, acceleration	Center of gravity	
8	Continuity equation	Mass flow rate	
9	Continuity equation	Mass flow rate	
10	Energy equation	Type of flow	
11	Energy equation	Type of flow	
12	Flow losses of pipe	Pump head, flow	
13	Flow losses with energy eq.	Pump head, flow	
14	Flow losses with energy eq.	Pump head, flow	
15	Flow losses with energy eq.	Two pumps	

		(H,Q)	

Half-year Break			
16	Flow losses with energy eq.	Flow losses with energy eq.	
17	Pumps types and properties	Orifice flow meter	
18	Pumps types and properties	Orifice flow meter	
19	Operational point of pump	Venture flow meter	
20	Fluid flow meters	Venture flow meter	
21	Fluid flow meters	Weir flow meter	
22	Fluid flow meters	Weir flow meter	
23	Impact-momentum fluid flow		
24	Impact-momentum fluid flow		
25	Impact-momentum on blade		
26	Impact-momentum on pipes		
27	Impact-momentum on pipes		
28	Dimensional analysis		
29	Dimensional analysis		
30	Dimensional analysis , applications		

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	Strength of materials
4. Programme(s) to which it contributes	Refrigeration and air conditioning systems
5. Modes of Attendance offered	official time
6. 7. Semester/Year	First and second semester of the second academic year
7. Number of hours tuition (total)	2
. Date of production/revision of this specification	15 / 6 / 2023

9. Aims of the Course

Introducing the student to stress, strain, thermal stress, concentration and change of stress with the study of Moore's circle and diagrams of shear force and bending moment with the main stresses in beams and torsion and using them as a basis in design and in the field of specialization.

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

1. Review the basic concepts of material resistance
2- Gain skills in solving subject matters
3- Acquisition of basic knowledge as an introduction to solving engineering problems in the resistance of materials
4-identify the frequency response for each type of Turanestor and how to employ it in circuit design
5- Acquisition of theoretical concepts to deal with material resistance issues

B. Subject-specific skills

B1. B 1 - incoming and outgoing values are calculated from the circuit board that contains a diode or Turansistur B 2 - How to design circuitry according to certain values

.

Teaching and Learning Methods

Academic lectures that contribute to a strong and solid basis to support cognitive fishing student
Practical laboratory that provides practical experience for students through practical experiences, which in turn support and promote understand and grasp the theoretical side

Assessment methods

Interactive assessment carried out directly between the student and the professor, one of the feedback upon which faculty members in the evaluation of teaching and learning practical ways
Written tests periodic Toffermalomat all over the follow-up to the student for scientific content and the extent of interaction with the material given by teaching
Quarterly tests and be middle ring, which was held over the student's interest and follow-up of scientific material Bjanbhe theoretical and skills during a full semester

Final exams and is the final episode in the student assessment and the extent of interaction and interest in the subject area during the full academic year

C. Thinking Skills

C1 J1-implant the spirit of creativity and diligence of the students find them on innovative solutions to various problems
C 2-development ability of students to work together effectively as teams come out excellent result
C 3-develop a sense of responsibility among students and psychological configuration to carry the burden on their shoulders
J4- development to ensure the values and perseverance to get the job done to reach satisfactory results

.

.

Teaching and Learning Methods

Stimulate creative side by asking different problems in front of the students and urged them to find appropriate solutions

Form working groups are evaluating the results of its work and change their structure on a regular basis for the development of the spirit of cooperation, development and motivate students to do the tireless work of the various efforts Balzrov

Assessment methods

Direct assessment where they are evaluated by the teaching directly and install their feedback about it Operation projects and graduation projects are neighborhood to assess the student's ability to creativity and achievement, teamwork and ability to Aejadl various scientific solutions to problems

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

D1. he expense of entering and leaving the values of the circuit board that contains a diode or Turansistur B 2 - How to design circuitry according to certain values

D 2.

Week	Topic	Practical subject	Notes
1	Introduction — Stress and Strain.		
2	Direct stresses: Tension, Compression, Shear and Bearing	Tensile Test	
3	Statically Indeterminate Problems		
4	Statically Indeterminate Problems	Compression Test	
5	Thermal Stresses		
6	Stress Concentrations		

7	Rivets Joints		
8	Welded Joints		
9	Thin wall vessels		
10	Pressure vessels		
11	Stress variations with angles	Shear Test	
12	Mohr - circle.		
13	Mohr - circle.		
14	Torsion in circular shaft		
15	Beams / Shear Force & Bending moment		
Half-year Break			
16	Shear Force Diagram & Bending Moment Diagram	Torsion Test	
17	Shear Force Diagram & Bending Moment Diagram		
18	Bending Stress in Beams		
19	Bending Stress in Beams	Impact Test	
20	Vertical Shear in Beams		
21	Beams Sections	Hardness Test	
22	Combined Stresses in Beams		
23	Bending Deflection in Beams by Double Integration Method		
24	Bending Deflection in beams by Moment Area Method		
25	Bending Deflection in beams by Moment Area Method		
26	Statically Indeterminate Beams		
27	Statically Indeterminate Beams		
28	Columns		
29	Euler’s Beam Equation.		
30	J.B. Johnson Beam Equation		

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	computer applications3
4. Programme(s) to which it contributes	Refrigeration and air conditioning systems
5. Modes of Attendance offered	official time
6. Semester/Year	First and second semester of the second
7. Number of hours tuition (total)	3
8. Date of production/revision of this specification	15 / 6 / 2023

9. Aims of the Course

1. knowledge and understanding of the design of digital circuits and analysis
2. knowledge and understanding of the uses of digital circuits

3. Learn how to design circuits using sequential synchronization software
4. knowledge and understanding of the design using the algorithm functions
5. know how the non-sequential design using synchronization software

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

1. knowledge and understanding of the design of digital circuits and analysis
2. knowledge and understanding of the uses of digital circuits
3. Learn how to design circuits using sequential synchronization software
4. knowledge and understanding of the design using the algorithm functions
5. know how the non-sequential design using synchronization software

B. Subject-specific skills

1. designing digital circuits simplest and best image
2 - Simulation of electronic CNC systems
3 - digital circuit analysis and knowledge of its working methods and their uses
4- circles container design parts of evicting non-digital and digital enter values in ways that certain designs and as

required Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which the development of the students knowledge

Laboratory and practical workshops: that provide everything he needs from the student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to persons and property

Systematic training: systematic training aims to provide the experience the student and the labor market to enable the student to understand the practical application of curricula he studied.

Assessment methods

Interactive Rating: Rating process where the ditch directly between the student and teaching and be one of the fundamentals of feedback upon which faculty members evaluate the teaching and learning process.

Periodic tests editorial: The availability of these tests the knowledge of a faculty member for over a follow-up to the students to content academy and how to interact with information and observations given by teaching students.

Quarterly exam: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester, both academic and skill

The final exam: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year, both academic and skill.

C. Thinking Skills

C1. Planting the spirit of creativity among students and to ensure that find them innovative solutions to various problems

C2. Students develop the ability to work together effectively as teams graduated distinct results.

C3. Sense of responsibility among students and psychological configuration to carry the burden on their shoulders development.

C4. Development to ensure the values and perseverance to get the job

Teaching and Learning Methods

Ask a scientific problems and the demand of the students to find more than a solution to it different scientific methods to stimulate creative side of the students.

Form working groups are evaluating the results of its work and change their structure periodically to develop a spirit of cooperation and stimulate students to instead of all the efforts the crisis of the work of the various conditions and with several people.

Assessment methods

Direct assessment: Where is this Rating by faculty members directly and through observation of the interaction of students and their application of section sentimental ad valorem targets and record their observations about it Operation projects and graduation projects: is assessing the student's ability to ACCT and to work in teams, consequences and solutions to various scientific problems facing students.

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

1- designing digital circuits simplest and best image
2- simulate electronic CNC systems
3- digital circuit analysis and knowledge of its working methods and their uses
4- circles container design parts of evicting non-digital and digital enter values in ways that certain designs

Week	Topic	Practical subject	Notes
1	Fasteners:	Exercises of Assembly Drawing	
2			
3	- Nuts		
4	- Screws - Washer		
5	Shaft generators		
6	Cylinder		
7	Wrench		
8	Thread		
9	Gears		
10	Chamfer		
11	Fillet		

12	Shaft Component		
13	Roller Bearing		
14	Key: Parallel , Woodruff Key		
15	Seals		
Half-year Break			
16	Drill Bushing: Assembly Drawing	Exercises of Assembly Drawing	
17	Springs: - Compression - Extension - Torsion		
18			
19			
20			
21			
22	Assembly Drawing		
23	Assembly Drawing		
24-25	Moment of Inertia		
26	Assembly Drawing		
27	Deflection Line		
28	Assembly Drawing		
29	Shaft Calculation		
30			

12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	**"Modern electronic instrumentation and measuring techniques",** Cooper D & A D Helfrick
Special requirements (include for example workshops, periodicals, IT software, websites)	1. **"Electronic Instrumentation",** H. S. Kalsi 2. **"Electronic Instrumentation and Measurements",** David A Bell
Community-based facilities (include for example, guest Lectures , internship , field studies)	**1- "Principles of measurement systems",** John P. Beately **2- Electronics & electrical measurements,** A K Sawhney, , Dhanpat Rai & sons http://www.academia.edu

13. Admissions

Pre-requisites	No special requisites
Minimum number of students	30
Maximum number of students	20

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	engineering and numerical analysis
4. Programme(s) to which it contributes	Refrigeration and air conditioning systems
5. Modes of Attendance offered	official time
6. Semester/Year	First and second semester of the third academic year
7. Number of hours tuition (total)	3
8. Date of production/revision of this specification	15 / 6 / 2023

9. Aims of the Course

Article to aim that the student be able to
1. solving equations sports complex in several ways

2. knowledge of mathematical functions to convert from the time domain to the frequency domain process

3. knowledge of mathematical functions to convert from the field to the deterioration of the time domain process

4. knowledge and understanding of how the complex functions analysis and resolution

5. know how to solve the derivatives different analytical methods
6. knowledge and understanding of how to solve matrices

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

A1. Knowledge transfers from the time domain to the frequency domain and vice versa using Laplace

A2. Understand the theoretical applications of Laplace

A3. knowledge and understanding of the way the transfers using a Z -transform and how to use them in the field of communications

A4. knowledge and understanding of the different statistical methods used to solve mathematical equations

A5. knowledge and understanding of ways to put the possibilities to reach the best solution

A6. knowledge and understanding of ways to solve numerical arrays

B. Subject-specific skills

B1. - Calculate various mathematical equations complex ones and Statistics

B2. solving equations using MATLAB software

B3. transfer equations of the time domain to the frequency domain, and vice versa, and how to use them in practical applications

B4- converter functions in intermittent field and take advantage of them in the process communication applications

Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which to develop cognitive balance for students

Practical laboratory:, which provides each student Maihtaj him the expertise to help develop practical skills side and consolidate the principles necessary to carry out the projects correctly

Assessment methods

Interactive Rating: basically to assess the student by observing the extent of interaction provides during the lecture and participation
Written tests: that provides knowledge of the extent of the student's understanding and follow-up of the material and scientific observations given by teaching
Quarterly tests: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester Bjanbhe academic skills
Final tests: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year Bjanbhe academic skills

C. Thinking Skills

C1. implant the spirit of creativity among students and to ensure that find them innovative solutions to various problems

C2. students develop the ability to work together effectively as teams come out excellent result

C3. sense of responsibility among students and psychological configuration to carry the burden on their shoulders Development

C4. development to ensure the values and perseverance to get the job done to reach satisfactory results

Teaching and Learning Methods

Stimulate the creative side of the students and that by asking various scientific problems and the demand of the students find appropriate scientific solutions to them in different ways
Develop a spirit of cooperation between the students, through the formation of working teams and motivate the students to exert all the necessary conditions for the work of the various efforts and with several people

Assessment methods

Direct assessment: Where is this assessment by the teaching directly and through NOTE student interaction during the lecture and install notes about it
Practical projects is to assess the student's ability to achievement and creativity and to work in teams, consequences and solutions to various scientific problems

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

D1. transfer equations of the time domain to the frequency and vice versa.

D2. analysis equations and their use in the field of communications

D3. find different solutions to complex mathematical equations

D4 .arrays and analyze and solve practical ways to take advantage of them

Week	Topic	Lab. Experiment Assignments	Notes
1	First order differential equations		
2	Applications on first order D.E		
3	Special cases of first order D.E		
4	Second order linear equation with constant coefficients		
5	Applications on S.O.D.E		
6	High order linear differential equations		
7	Applications on high order linear differential equations. Integral operators.		
8	Fourier series		
9	Even and odd functions. Applications of Fourier series		

10	Gamma Function		
11	Laplace transformation. Inverse Laplace transformation.		
12	Laplace transformation to solve differential equations. applications		
13-14	Partial differential equations, solution by separation method		
15	Applications of partial differential equations.		
16	Nonlinear equations solution, Simple Iteration		

Half-year Break			
17	Newton-Raphson method		
18	finite difference method		
19	Interpolation		
20	Lagrangian method		
21	Solution of simultaneous linear equations.		
22	Direct methods. Indirect methods		
23	Numerical integration. Complex numerical integration, applications		
24	Curves fitting analysis		
25	Newton method		
26	Numerical method to solve differential equations		
27	Rang-Kotta method		
28	Power series method		
29	Exponential equations		
30	Frobinous method		

12. Infrastructure

Required reading: · CORE TEXTS	Higher Engineering Mathematics by Dr. B.S. Grewal

· COURSE MATERIALS	
· OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	1-Higher Engineering Mathematics by Dr. B.S. Grewal www.ocw.mit.edu www.math.uiowa.edu
Community-based facilities (include for example, guest Lectures , internship , field studies)	1-Higher Engineering Mathematics by Dr. B.S. Grewal 2-An introduction to Numerical analysis by David F. Mayers

13. Admissions	
Pre-requisites	No requisites
Minimum number of students	45

Maximum number of students	56

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	theory of machines
4. Programme(s) to which it contributes	Refrigeration and air conditioning systems
5. Modes of Attendance offered	official time
6. Semester/Year	First and second semester of the third academic year
7. Number of hours tuition (total)	3
8. Date of production/revision of this specification	15 / 6 / 2023

9. Aims of the Course

The course aims to provide students of the third stage of two branches with information and prepare them to be able to:

1. system analysis in the time domain by using differential equations in the Laplace transform
2. System analysis in the frequency domain
3 working on the design of controllers designed using control theory which is PID

4. study and analysis of different systems for different entries response
5. study and analysis of the system stability

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

A1. knowledge and understanding of system analysis in the time domain by using differential equations in the lumpy field using Laplace transform

A2.knowledge and understanding of system analysis in the frequency domain in the lumpy field

A3. study and analysis of different systems for different entries response

A4. knowledge and understanding of the stability of different systems

A5. knowledge and understanding the work of controllers designed using control theory

B. Subject-specific skills

B1. Design controllers using PID control theory

B 2. write and execute algorithms to know systems stability

B 3. design and run controllers circuits using emulator environment

B4.calculating stability of the various systems

Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which to develop students knowledge

Laboratory and practical workshops: that provide everything needed by student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to people and property.

Assessment methods

Interactive Rating: where it is this evaluation process directly between the student and teacher and be one of the fundamentals of feedback upon which faculty members evaluate the teaching and learning process

Periodic written tests: The availability of these tests to a faculty member about the extent of follow-up students for the academic content and how to interact with information and observations given by teaching students

Quarterly tests: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester academic skills Final tests: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year academic skills

C. Thinking Skills

C1. Planting the spirit of creativity and innovation among students

C2. develop a sense of responsibility for students

C3. Development diligence and perseverance to get the job done to reach satisfactory results values

C4. scalability students to develop teamwork

Teaching and Learning Methods

Ask a scientific problems and the demand of the students to find more than a solution to it different scientific methods to stimulate the creative side of students Form working groups are evaluating the results of its work and change their structure periodically to develop a spirit of cooperation and motivate students to make every effort necessary to work under different conditions and with several people

Assessment methods

Direct assessment: Where is this assessment by the teaching directly and through interaction Note students and their application of sentimental value targets and install notes about it

Practical projects is to assess the student's ability to achievement and creativity and to work in teams and get results and solutions to various scientific problems facing students

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

D1 design controller of type PID operations

D2- controlling different system and make sure they reach the stable satet and stay satble

D3-finding systems response for different types of inputs and study stability

11. Course Structure

Week	Topic	Lab. Experiment Assignments	Notes
1	Introduction and Definition. Graphical Representation of Displacement, velocity and acceleration with respect to time. Solved problems.	Four bar mechanism	
2	Velocity in mechanisms.	Quick return mechanism	
3	Solved problems for velocity in mechanisms. Acceleration in mechanisms.		
4	Accelerations in slider crank mechanisms. Solved problems for acceleration in mechanisms.		
5	Balancing of rotating masses. Balancing of a single rotating mass by a single		

	mass rotating in the same plane. Balancing of a single rotating mass by two masses rotating in different planes. Balancing of several masses rotating in the same plane. (a) Analytical method. (b) Graphical method.		
6	Balancing of several masses rotating in different planes. Solved problems.		
7	Classification of gears, spur gears, velocity ratio (gea ratio). Center to center distance.		
8	Gear trains, velocity ratio of simple gear trains, velocity ratio of compound gear trains, solved problems.	Epicyclic gear train	
9	Epicyclic gear trains, simple epicyclic gear trains.		
10	Compound epicyclic gear trains.		
11	Solved problems.	Governors	
12	Types of governors, watt governor, solved problems.		
13	Porter governor: (a) Equilibrium method. (a) Instantaneous center method. Solved problems.	Balancing of rotating masses	
14	Proell governor, Hartnell governor, solved problems.		
15	Types of belts, types of flat belt drive, selection of belt drive. Velocity ratio of open belt drive. Effect of belt thickness on Velocity ratio, slip of the belt. Creep of the belt.		

	Half-year Break		
16	Velocity ratio of a compound belt drive. Length of belt. (a)Open belt. (b)Cross belt. Ratio of driving tension for flat belts. Determination of angle of contact. (a)Open belt. (b)Cross belt.		
17	Power transmitted by a belt. Centrifugal tension (Tc). Maximum tension in the belts (Tmax). Condition for the Transmission of Maximum Power. Initial tension in the belt (to).V – Belt drive and rope drive. Solved problems.		
18	Types of brakes. Simple block or shoe brake. (a) Single block or shoe brake. (b) Double block or shoe brake. Band brake: (a) Simple band brake. (b) Differential band brake.		

19	Band and block brake. Internal expanding shoe brake. The braking of a vehicle. (a) Value of retardation when the brakes are applied to rear wheels only. (b) Value of retardation when the brakes are applied to front wheels only. (c) Value of retardation when the brakes are applied to all the wheels. Solved problems.		
20	Types of followers. Nomenclatures for cam profile. Motions of the follower. (a) Uniform motion or uniform velocity of a follower. Solved problems.		
21	(b) Simple harmonic motion of follower. (c) Uniform acceleration and uniform retardation. Solve problems.		
22	Cam profile construction. Solve problems.		
23	Types of vibration. Important definitions for vibrating motion. Equivalent spring stiffness. Solved problems.	Damped vibration	
24	Free vibrations. Methods of finding the natural frequency of free. Longitudinal vibrations. (a) Equilibrium method. (b) Energy method. (c) Rayleigh's method. Method for natural frequency of free transverse vibration. Solved problems.	Whirling of shafts	
25	Natural frequency of transverse vibrations of shafts or Beams under different types of loads and end conditions. (a) Natural frequency of a shaft carrying a single concentrated load. (b) Natural frequency of a shaft carrying a uniformly distributed load. Natural frequency of transverse vibration of a system of several load attached to the same shaft. (a) Energy or (Rayleigh's) method. (b) Dunkerley's method. Solved problems.	Gyroscope	
26	Whirling speeds or critical speeds. Solved problems.		
27	Frequency of free damped vibrations (viscous damping). Solve problems.		
28	Expression for displacement for over-damped, under-damped and critical-damped system. Logarithmic decrement. Solved problems.		
29	Natural frequency of free torsional vibrations.		

	Free torsional vibrations of a single rotor system. Free torsional vibrations of a two rotor system.		
30	Torsional equivalent shaft. Solved problems.		

Practical Part (Experiments)

No	Topic
1	Four bar mechanism
2	Quick return mechanism
3	Epicyclic gear train
4	Balancing of rotating masses
5	Damped vibration
6	Whirling of shafts
7	Gyroscope
8	Governors
9	Flyweel
10	Spherical guide cam
11	V-belt system
12	Piston- connecting rod system

Direct assessment

12. Infrastructure

Required reading:	Modern Control Engineering by Ogata
· CORE TEXTS · COURSE MATERIALS	
· OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	Control Systems by Bakshi Modern Control Systems by Dorf Control Systems Engineering by Nise
Community-based facilities (include for example, guest Lectures , internship , field studies)	Control Systems by Bakshi

13. Admissions

Pre-requisites	Laptop for each student

Minimum number of students	30
Maximum number of students	40

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	heat transfer
4. Programme(s) to which it contributes	Refrigeration and air conditioning systems
5. Modes of Attendance offered	official time.
6. Semester/Year	First and second semester of the third academic year
7. Number of hours tuition (total)	3
8. Date of production/revision of this specification	15 / 6 / 2023

9. Aims of the Course

The course aims to provide students of the third stage of the computer electronics branch with information and prepare them to be able to:

1. To know what is the purpose of PE, PE devices and types of PE systems.
2. To design ac to dc converter (rectifier). Single and three phase rectifiers.
3 Thyristor commutation circuits'. RC, RL and LC transient analysis.
4. Ac to ac and dc to ac converter (inverter). DC chopper like Buck, Boost and Buck-Boost
5. Switch-mode power supply and DC drive.

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Teaching what are the purpose of PE system and types of PE devices used in this field. Learning what are the types of PE circuits like rectifier ac to ac converter. Transient analysis of RC, RL, LC and RLC. Learn how to design ac to ac converter and dc to ac inverter (single and three phase inverter). Learn how to design dc to dc converter (chopper) and how to control the speed of DC motor (DC drive).

B. Subject-specific skills

Design of a rectifier which feeds high inductive load like large DC motor.
How to find the average and RMS value of a periodic signal.
Design ac to ac converter and dc to ac converter (inverter).
How to design switch-mode power supply using dc to dc converter (chopper)
How to control the speed of a DC motor.

Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which to develop students knowledge

Laboratory and practical workshops: that provide everything needed by student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to people and property.

Assessment methods

Interactive Rating: where it is this evaluation process directly between the student and teacher and be one of the fundamentals of power electronic system upon which faculty members evaluate the teaching and learning process

Periodic written tests: The availability of these tests to a faculty member about the extent of follow-up students for the academic content and how to interact with information and observations given by teaching students

Quarterly tests: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester academic skills Final tests: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year academic skills

C. Thinking Skills

C1. Planting the spirit of creativity and innovation among students
C2. develop a sense of responsibility for students
C3. Development diligence and perseverance to get the job done to reach satisfactory results values
C4. scalability students to develop

teamwork Teaching and Learning Methods

Ask a scientific problems and the demand of the students to find more than a solution to it different scientific methods to stimulate the creative side of students Form working groups are evaluating the results of its work and change their structure periodically to develop a spirit of cooperation and motivate students to make every effort necessary to work under different conditions and with several people

Assessment methods

Direct assessment: Where is this assessment by the teaching directly and through interaction Note students and their application of sentimental value targets and install notes about it

Practical projects is to assess the student's ability to achievement and creativity and to work in teams and get results and solutions to various scientific problems facing students

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

D1 - design of single and three phase rectifier.

D2- how to choose the appropriate PE devices used in the circuits.

D3-how to drive some rules without depending upon the standard equations.

11. Course Structure

Week	Topic	Lab. Experiment Assignments	Notes
1	Introduction, Basic Concepts of Heat Transfer, Heat Transfer Mechanisms.	Calculation of thermal conductivity	
2-3	Steady State One Dimensional Heat Conduction in a Large Plane Wall, and in a Cylinder.	Discussion	
4	Conduction through Multilayer Plane Wall, and Cylinder.	Calculation of heat transfer rate	
5	Over all Heat Transfer Coefficient.	Discussion	
6-7	Critical Radius of Insulation. Thermal Contact Resistance.	Calculation of thermal contact resistance	
8-9	The Fins	Heat transfer in very long straight fins	
10	Transient Heat Conduction, (Lumped System Analysis)	Discussion	
11	Two Dimensional Steady Heat Conduction	Steady two dimensional heat conduction in plate	
12	Introduction to Heat Transfer by Convection, Review to the Fluid Flow	Estimating the convection heat transfer coefficient in fins	
13	Non-Dimensional Group Numbers Analysis	Discussion	
14-15	Analytical Solution for Heat Convection Heat Transfer for Laminar And Turbulent Flow		
Half-year Break			
16	One Dimensional Steady State Force Convection Heat Transfer on Flat Plate		
17-18	Empirical Equations for Forced Convection Heat Transfer (Laminar and Turbulent Flow)	Forced convection from a cylinder in a cross flow	
19	Natural Convection Heat Transfer	Discussion	
20	Empirical Equations for Natural Convection Heat Transfer	Free convection from a cylinder in free flow	
21	Introduction to Heat Exchangers, Kinds of Heat Exchangers	Discussion	
22	The Overall Heat Transfer Coefficient,	Parallel flow shell and	

	Fouling Factor	tube heat exchanger performance	
23	The Log Mean Temperature Difference Method, The Effectiveness of the heat Exchangers	Discussion	
24-25	The Performances for Difference Kinds of the Heat Exchangers	Counter flow shell and tube heat exchanger performance	
26	Heat Radiation, Introduction, Basic Concepts	Discussion	
27	Characteristics of Radiation, The View Factor	Radiation Heat Transfer	
28	Radiation Heat Transfer Between Two Black Surfaces		
29	Radiation Heat Transfer Between Two Gray Surfaces		
30	Radiation Shields and The Radiation Effect		

12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Power electronics systems by Lander
Special requirements (include for example workshops, periodicals, IT software, websites)	Power electronics and application by Rashid
Community-based facilities (include for example, guest Lectures , internship , field studies)	Power electronics cock book by Rashid

13. Admissions	
Pre-requisites	electronic components, Laptop for each student
Minimum number of students	30
Maximum number of students	40

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

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

1. Teaching Institution	*AlRafidain University College*
2. University Department/Centre	*Power mechanical Techniques engineering, refrigeration and air conditioning branch*
3. Course title/code	air conditioning and refrigeration(2)
4. Programme(s) to which it contributes	Refrigeration and air conditioning systems
5. Modes of Attendance offered	official time
6. Semester/Year	First and second semester of the third academic year 8.
7. Number of hours tuition (total)	3
8. Date of production/revision of this specification	15 / 6 / 2023

9. Aims of the Course

The course aims to provide students of the 3th stage of the two branches with information and prepare them to be able to:

1. Known the types of Microcontroller and its architecture.
2. The difference between the microcontroller and microprocessor.

3 dealing with the internal parts of Microcontroller.

4. Programming the PIC Microcontrollers
5. Connect the Microcontrollers with peripherals to input and output the information.
6. Know the PLC controller with its internal architecture.
7. Programming the PLC with the Peripherals devices.

8. Connecting the Microcontrollers with other Microcontrollers through many interfaces.

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Programming the PIC Microcontroller using Micro C.
A2. Activating the internal ports for Input/ Output with peripherals devices
A3. Connecting the PIC with Peripheral devices such Sensors / Actuators and using ADC for signal converting.
A4. Using the serial connection for Information transfer.
A5. Using the Interrupt program within the programming.
A6. Using the Timers and delays within the program to achieve suitable program.

B. Subject-specific skills

B1. Reading the Analog and digital data.
B2. Connecting sensors and actuators.
B3. Design systems to make a decisions and storing the information in special memory.
B4. Connecting two or more PIC Microcontrollers using Serial connections.

Teaching and Learning Methods

Academic lectures: providing a solid foundation upon which to develop students' knowledge
Laboratory and practical workshops: that provides everything needed by student's experiences to help develop practical skills side and consolidate the principles necessary to carry out practical projects correctly and follow the occupational safety steps to reduce the damage caused to people and property.

Assessment methods

Interactive Rating: where it is this evaluation process directly between the student and teacher and be one of the fundamentals of feedback upon which faculty members evaluate the teaching and learning process.
Periodic written tests: The availability of these tests to a faculty member about the extent of follow-up students for the academic content and how to interact with information and observations given by teaching students.
Quarterly tests: Episode moderation and be to assess the student's interest and its interaction with the scientific article received during the semester academic skills
Final tests: These are the final episode to assess the student's interest and its interaction with the scientific article received during the school year academic skills.

C. Thinking Skills

C1. Planting the spirit of creativity and innovation among students
C2. develop a sense of responsibility for students
C3. Development diligence and perseverance to get the job done to reach satisfactory results values
C4. scalability students to develop teamwork

Teaching and Learning Methods

Ask a scientific problems and the demand of the students to find more than a solution to it different scientific methods to stimulate the creative side of students.
Form working groups are evaluating the results of its work and change their structure periodically to develop a spirit of cooperation and motivate students to make every effort necessary to work under different conditions and with several people.

Assessment methods

Direct assessment: Where is this assessment by the teaching directly and through interaction Note students and their application of sentimental value targets and install notes about it.
A practical project is to assess the student's ability to achievement and creativity and to work in teams and get results and solutions to various scientific problems facing students.

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

D1.writing programs easily using Proton & Micro C
D2. Programming different PIC Microcontrollers with different external devices.
D3. Design a control and Sensing system using PIC Microcontrollers.
D4. Easily programming and modification the program to access a suitable program.

Week	Topic	Lab. Experiment Assignments	Notes
1	Site survey of air conditioned space, relation between heat gain and cooling load.		
2-4	Inside and outside design conditions, for winter & summer, heating load calculation (heat loss from windows, doors, walls, roof, floor, base of building, ventilation (air change method, air required for each person, air volume per unit area,) infiltration (crack method) total heating load.		
5	Cooling load (radiation glasses, conduction heat transfer through walls, roof, glasses,..etc using equivalent		

	temperature deference,)		
6-7	Heat transfer through part ions, peoples heat generated, people metabolic rate, lighting heat, motors & equipment, ventilation and infiltration load.		
8	Room total load, zone load, building load, bypass factor, cooling coil temperature.		
9-11	Psychrometric processes, cooling & dehumidification, cooling & dehumidification in case of high latent load, cooling & humidification, evaporative cooling, heating & humidification.		
12	Air ducting (pressure loses in straight duct, duct fittings (sudden enlargement & contraction, branches, bends, ….etc)		
13	Duct design, methods of design, equal friction method, balancing of duct system.		
14-15	Fans (type, selection, performance of centrifugal, laws) room air distribution, selection of supply & return air opening, diffusers, grilles, return grilles.)		

Half-year Break			
16-17	Water piping design, pressure losses in straight, and other links, valves, and accessories, cooling water pipes, water pipe network design.		
18-19	Pumps (performance, types, pump selections, design of water distribution system , design of expansion tank)		
	Refrigeration and Cold Storage		
20	Food thermal properties, water contain, primary freezing point, ice fraction, density, specific heat.		
21	Freezing and nonfreezing foods, thermal conductivity, parallel method, respiration heat, heat transfer coefficient of surface.		
22	Time of Food cooling and freezing.		
23	Estimation of Food cooling Time depending		

	on dimensionless heat transfer coefficient, method of freezing estimation.		
24	Blanc Equation for freezing time estimation.		
25-26	Refrigeration and the food deceases, biological deceases sources, microbes growth, critical growth requirement of microbes, control of microbes growth, HACCP method.		
	Refrigeration Load		
27-29	Thermal load of transportation, air filtration, equipment, safety factor, total ref. load, principle of freezing storage design, volume calculation, design of the storage construction, storage requirement,		
30	Methods of construction, space requirement, treatment of air and vapor infiltration from cracks, floor structure, preparing of the roof, water derange, Freezing systems ,fan coil unit, valve selection, vale position, system design, Refrigerators.		

Week	**Practical Subjects**
1	Calculation of thermal balance and COP of heat pumps in case cooling and heating
2	Calculation of chilled water refrigeration capacity, With studding the sensible cooling process.
3	Refrigeration system
4	Evaporative cooling system
5	Cooling Tower performance

6	Air conditioning Unit performance.
7	Actual refrigeration cycle
8	Thermal balance of air conditioning unit.
9	Thermo-electric refrigeration unit.
10	Domestic absorption refrigeration unit
11	Thermal balance of refrigeration system.
12	Test of fan performance
13	Processes of air conditioned
14	Calculation of the performance of window type A/C unit.
15	Study the pressure drop in ducting system accessories.
16	Study the characteristic of a centrifugal pump & draw the relations between the head, power and the flow.
17	Parallel & series pumps connection, and the relation between the heads their flow.

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS	PIC Microcontroller from absolute Beginner By: M. Amer Iqbal Qureshi
· OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	Programmable Controller, theory and Implementation

Community-based facilities (include for example, guest Lectures , internship , field studies)	Automating Manufacturing Systems with PLCs

13. Admissions

Pre-requisites	Laptop for each student & PIC KIT Trainer
Minimum number of students	20
Maximum number of students	30