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

University: University of Basrah
College: College of Engineering
Department: Mechanical Engineering Department
Date of Form Completion: 2023

Prof. Dr.
Ramzy Salim Ali
Dean's Name
Date: 10 / 9 / 2023

Assist. Prof. Dr.
Haider Maath Mohammad
Dean's Assistant for Scientific Affairs
Date: 10 / 9 / 2023

Assist. Prof. Dr.
Hassanein Ibraheem Khalaf
Head of Department
Date: 10 / 9 / 2023

Assist. Prof. Dr. **Hassanein Ibraheem Khalaf**
Quality Assurance and University Performance Manager
Date: 10 / 9 / 2023

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAM SPECIFICATIO

This programme specification provides a concise summary of the main features of the programme 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 programme.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Program Title	The curricula of the Mechanical Engineering Department
4. Title of Final Award	Bachelor of Mechanical Engineering
5. Modes of Attendance offered	Daily Attendance
6. Accreditation	ABET
7. Other external influences	Field and scientific visits
8. Date of production/revision of this specification	2023
9. Aims of the Program	
1. Preparing and qualifying specialized engineers to meet the requirements of the labor market in the private and public sectors in mechanical engineering through diversity in teaching and learning methods and training students to apply the acquired knowledge and skills to solve real problems.	
2. Providing distinguished academic programs in the field of mechanical engineering, both theoretical and practical, to comply with international standards of academic quality and meet the needs of the labor market.	
3. Encouraging and developing scientific research in the fields of mechanical engineering in general and in the fields of thermal mechanics, heat transfer and all areas of applied mechanics and control in particular on mechanical and hydraulic systems and robots in addition to the fields of manufacturing and metalworking.	

4. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills, such as courses, seminars, and workshops to prepare researchers with high scientific skills.

5. Building and developing partnerships with the governmental and private sectors and the community in all its various institutions and exchanging experiences.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

A1. Clarify the basic concepts of mechanical systems and their applications in engineering and industrial fields.
A2. Acquiring knowledge in designing mechanical parts and trying to apply them in practice and solving industrial problems.
A3. Identifying mechanical parts and metal testing methods and their suitability for engineering uses.
A4. Studying mechanical systems and identifying how to conduct designs calculations according to standard specifications.

B. Subject-specific skills

B1. Designing simple and complex mechanical systems through the computer and performing design calculations.
B2. Gaining experience in manufacturing mechanical parts and testing their suitability for engineering uses.
B3. Gaining experience in writing scientific and engineering reports and how to read designs and engineering drawings.
B4. Keeping abreast of development and modernity in metal manufacturing processes and using modern mechanical designs.

Teaching and Learning Methods

1. Explanation and clarification through lectures and increasing understanding through laboratories.
2. The method of displaying scientific materials on display devices, data shows, smart boards, plasma screens for tablets.
3. Self-learning by homework.
4. The weekly discussion of the subject and the solution of some additional questions for the subject.

Assessment methods

1. Short exams (Quiz).
2. Homework.
3. Semester and final exams for theoretical subjects.
4. Interaction within the lecture and student attendance.

C. Thinking Skills

C1. Interest: Arousing students' attention through questions during the lecture.
C2. Response: Follow up on the student's interaction with the material displayed on the screen.
C3. Attention: Follow up on the interest of the student who interacted the most with the presented material.
C4. Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.
C5. Formation of value behavior: meaning that the student reaches the top of the emotional ladder so that he has a stable level in the lesson and does not become lazy or fidgety.

Assessment methods

1. Effective participation in the classroom is evidence of the student's commitment and responsibility.
2. Commitment to the deadline specified in submitting the duties and research required of the student to submit them.
3. The quarterly and final exams express commitment and cognitive and skill achievement.

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.

11. Programme Structure

Level/Year	Course or module code	Course or module title	Credit hours	
			Theore.	Prac.
First year First Semester	E111	Mathematics I	4	-
	ME112	Engineering mechanics (static)	4	1
	U113	Principles of computer science	2	2
	E114	Engineering Drawing I	1	2
	ME115	Principles of Production Engineering I	2	-
	ME116	Electrical Engineering I	3	-
	E117	Chemistry	2	-
	U118	English Language I	2	-
First year Second Semester	E121	Mathematics II	4	-
	ME122	Engineering Mechanics (dynamic)	4	-
	U123	Computer Programming	2	2
	E124	Engineering Drawing II	1	2
	ME125	Principle of production engineering II	2	2
	ME126	Electrical Engineering II	3	2
	E127	Physics	2	-
	U128	English Language II	2	-
Second year First Semester	E211	Engineering Mathematics I	4	-
	ME212	Fluid Static	3	-
	ME213	Thermodynamics I	3	-
	ME214	Engineering Metallurgy I	2	3
	ME215	Mechanics of Materials	3	3
	ME216	Mechanical Drawing I	1	2
	ME217	Programming of Computers	2	2
	U218	Human Rights and Democracy	2	-

Second year Second Semester	E221	Engineering Mathematics II	4	-
	ME222	Fluid Dynamics	3	3
	ME223	Thermodynamics II	3	3
	ME224	Engineering Metallurgy II	2	-
	ME225	Strength of Materials	3	-
	ME226	Mechanical Drawing II	1	2
	ME227	Advanced Programming	2	2
Third year First Semester	E311	Engineering Analysis	4	-
	ME312	Heat Transfer I	3	-
	ME313	Theory of Mechanisms	3	3
	ME314	Internal Combustion Engines I	3	3
	ME315	Gas Dynamics	3	-
	ME316	Electrical Machines I	3	-
	ME317	Manufacturing Processes I	2	3
Third year Second Semester	E321	Numerical Analysis	3	2
	ME322	Heat Transfer II	3	3
	ME323	Theory of Machines	3	-
	ME324	Internal Combustion Engines II	3	-
	ME325	Turbo Machinery	3	3
	ME326	Electrical Machines II	3	2
	ME327	Manufacturing Processes II	2	-
Fourth year First Semester	ME411	Design of Machine Elements I	4	3
	ME412	Control	3	-
	ME413	Air Conditioning and Refrigeration I	3	3
	ME414	Engineering Materials	2	-
	ME415	Theory of Vibrations	3	-
	ME416	Power Plants I	3	-
	ME417	Industrial Engineering	2	-
	E418	Engineering Project	2	3

Fourth year Second Semester	ME421	Design of Machine Elements II	3	-
	ME422	Measurements	3	3
	ME423	Air Conditioning and Refrigeration II	3	-
	ME424	Failure of Engineering Materials	2	-
	ME425	Vibrations Applications	3	3
	ME426	Power Plants II	3	3
	ME427	Project Management	2	-
	E418	Engineering Project (continued)	-	3

12. Personal Development Planning

1. Upgrading scientific and practical qualifications through self or acquired efforts.
2. Continuing research and enhancing and developing the ability to analyze and conclude.

13. Admission criteria

1. Rate: greater than 90 %.
2. Age: less than 25 years old.
3. Number: about 70 students annually.

14. Key sources of information about the programme

1. The websites of Iraqi and foreign universities.
2. The workshops are held by the Ministry of Higher Education in addition to the Ministry's standards.
3. The Accreditation Board for Engineering and Technology program (ABET).

Curriculum Skills Map																		
please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed																		
Programme Learning Outcomes																		
Year / Level	Course Code	Course Title	Core Title or Option	Knowledge and understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
First year First Semester	E111	Mathematics I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME112	Engineering mechanics (static)	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	U113	Principles of computer science	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	E114	Engineering Drawing I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME115	Principles of Production Engineering I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME116	Electrical Engineering I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	E117	Chemistry	Optional	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	U118	English Language I	Optional	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
First year Second Semester	E121	Mathematics II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME122	Engineering Mechanics (dynamic)	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	U123	Computer Programming	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	E124	Engineering Drawing II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME125	Principle of production engineering II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME126	Electrical Engineering II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	E127	Physics	Optional	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	U128	English Language II	Optional	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Second	E211	Engineering Mathematics I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

year First Semester	ME212	Fluid Static	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME213	Thermodynamics I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME214	Engineering Metallurgy I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME215	Mechanics of Materials	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME216	Mechanical Drawing I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME217	Programming of Computers	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	U218	Human Rights and Democracy	Optional	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Second year Second Semester	E221	Engineering Mathematics II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME222	Fluid Dynamics	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME223	Thermodynamics II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME224	Engineering Metallurgy II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME225	Strength of Materials	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME226	Mechanical Drawing II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME227	Advanced Programming	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Third year First Semester	E311	Engineering Analysis	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME312	Heat Transfer I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME313	Theory of Mechanisms	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME314	Internal Combustion Engines I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME315	Gas Dynamics	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME316	Electrical Machines I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME317	Manufacturing Processes I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Third year	E321	Numerical Analysis	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME322	Heat Transfer II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Second Semester	ME323	Theory of Machines	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME324	Internal Combustion Engines II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME325	Turbo Machinery	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME326	Electrical Machines II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME327	Manufacturing Processes II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fourth year First Semester	ME411	Design of Machine Elements I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME412	Control	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME413	Air Conditioning and Refrigeration I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME414	Engineering Materials	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME415	Theory of Vibrations	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME416	Power Plants I	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME417	Industrial Engineering	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	E418	Engineering Project	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fourth year Second Semester	ME421	Design of Machine Elements II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME422	Measurements	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME423	Air Conditioning and Refrigeration II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME424	Failure of Engineering Materials	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME425	Vibrations Applications	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME426	Power Plants II	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ME427	Project Management	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	E418	Engineering Project (continued)	Essential	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This course reviews the basic ideas you need to start calculus for computer science and engineering, also for students intending to continue to more advanced courses in calculus and mathematics in general Topics include a brief review of functions, followed by discussion of limits, derivatives, and applications of differential calculus to real-world problem areas. An introduction to integration concludes the course, with a brief description of vectors and complex geometry.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Mathematics I / E111
4. Modes of Attendance offered	Daily Attendance
5. Semester/Year	First Semester / First Year
6. Number of hours tuition (total)	60 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	
This course reviews the basic ideas needed to start calculus in geometry, and also for students wishing to further knowledge and learn more advanced calculus and mathematics in general. Topics include a brief review of functions, followed by a discussion of limits, derivatives, and applications of calculus in modeling and solving real engineering mathematics problems. The course concluded with an introduction to integration, with a brief description of transcendental functions.	

9· Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

A1. Clarify the basic concepts of differential and integral calculus.
A2. Acquire the mathematical skills necessary to solve various problems.
A3. Acquire basic skills in dealing with various mathematical problems and ways to solve them.
A4. Gain a basic understanding of mathematical modeling of the work of different industrial systems.

B. Subject-specific skills

B1. The ability to solve various mathematical problems.
B2. The ability to think about addressing a particular problem or issue.
B3. Writing scientific reports.
B4. The ability to acquire mathematics experience in dealing with industrial systems.

Teaching and Learning Methods

• Readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Directing students to some websites to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

• Interaction within the lecture.
• Homework and reports.
• Short exams (Quiz).
• Semester and final exams.

C. Thinking Skills

C1. Attention: Arousing students' attention through questions during the lecture.
C2. Response: Follow up the student's interaction with the material displayed on the screen.
C3. Attention: Follow up on the interest of the student who interacted the most with the presented material.
C4. The formation of the direction: meaning that the student is following the presentation and may have another opinion towards the presented topic and defend it.

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

D1. Develop the student's ability to perform the duties and deliver them on time.

D2. Logical and programmatic thinking to find software solutions to various problems.

D3. Develop the student's ability to dialogue and discussion.

D4. Develop the student's ability to deal with modern technology, especially the Internet.

10. Course Structure

Week	Hours	Required learning outcomes	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	4	The Cartesian Plane and Functions	The distance formula, lines, The slope and the equation of a line, Parallel and perpendicular lines, circles domain and range	Theoretical	Discussion & questions
Second	4	The Cartesian Plane and Functions	Functions and their graphs The Trigonometric Functions and Graphs of Trigonometric Functions.	Theoretical &Tutorial	Discussion & questions
Third	4	The Cartesian Plane and Functions The Limits and Continuity	Graphs of Trigonometric Functions. Calculating Limits Using the Limit Laws, Properties of Limits,	Theoretical	Discussion & questions
Fourth	4	The Limits and Continuity	Limits of Trigonometric Function, Special Trigonometric Limits	Theoretical &Tutorial	Discussion & questions Short exam
Fifth	4	The Limits and Continuity. Differentiation	L-Hopital's Rule, Continuity, Properties of Continuous Function. Definition of the Derivative, Differentiation Rules Definition of the Derivative, Differentiation Rules	Theoretical	Discussion & questions
Sixteenth	4	Differentiation	Derivatives of Trigonometric Functions, The Chain Rule,	Theoretical &Tutorial	Discussion & questions
Seventh	4	Differentiation	Implicit Differentiation, Related Rates.	Theoretical	Discussion & questions
Eighth	4	Applications of Differentiation	The First Derivative Test, Concavity and the Second Derivative Test, The First Derivative Test, Concavity and the Second Derivative Test, Curve Sketching,	Theoretical &Tutorial	Discussion & questions
Ninth	4	Applications of Differentiation Integration	Optimization Problems, The mean value Theorem. The Definite Integral, Basic Integration Rules,	Theoretical	Discussion & questions

Tenth	4	Integration	Integration of Trigonometric Functions, The Area under the Curve	Theoretical &Tutorial	Discussion & questions
Eleventh	4	Integration	The Natural Logarithmic Function, The Derivative and Integration of Natural Logarithmic Function, First Law of Calculus, and the mean value Theorem for Integral.	Theoretical	Discussion & questions
Twelfth	4	Integration Inverse Functions	First Law of Calculus, and the mean value Theorem for Integral. Exponential Functions, Rules and Properties of the Exponential Functions, The Derivative and Integration of Exponential Function	Theoretical &Tutorial	Discussion & questions Short exam
Thirteenth	4	Inverse Functions	Exponential Functions, Rules and Properties of the Exponential Functions, The Derivative and Integration of Exponential Function	Theoretical	Discussion & questions Short exam
Fourteenth	4	Inverse Functions	The Exponential Function for Bases other Than (e) (ax and logax), Derivative and Integration the Exponential Function for Bases other Than (e)products. Equations of lines and planes in the space.	Theoretical &Tutorial	Discussion & questions
Fifteenth	4	Inverse Functions	Inverse Trigonometric Functions, Derivative and Integration of Trigonometric Functions, and Hyperbolic Function.	Theoretical &Tutorial	Discussion & questions Short exam

11. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1. Calculus, By Anton Bivens Davis, 2002 Anton Textbooks, Inc 2. Advanced Engineering Mathematics, By Erwin Kreyszig, 1999, John Wiley & Sons, Inc
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

It is concerned with the study and analysis of loads (such as forces, torques and rotations) in physical systems in a state of static equilibrium, which is the state in which the locations of the parts of the system do not change over time, or that the elements of the system have a constant speed. In static equilibrium, the system is either stationary or its center of gravity is moving at a constant speed. The science of statics specializes in solving all engineering problems related to the study of the balance of material bodies and the mutual influence arising from them, and since the development of modern technology, especially in front of engineers, encounters many and varied problems for the analysis of different facilities such as buildings, bridges, homes and the design of machines and engines, due to the multiplicity of these problems, and despite this, the Part of its solution is based on some general principles that have a common scientific base..

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Engineering Mechanics (Static) / ME112
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First semester / First year
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
It is concerned with the study and analysis of loads (such as forces, torques and rotations) in physical systems in a state of static equilibrium, which is the state in which the locations of the parts of the system do not change over time, or that the elements of the system have a constant speed	
In static equilibrium, the system is either stationary or its center of gravity is moving at a constant speed.	
The science of statics specializes in solving all engineering problems related to the study of the balance of material bodies and the mutual influence arising from them, and since the development of modern technology especially in front of engineers, encounters many and varied problems for the analysis of different facilities. such as buildings, bridges, homes and the design of machines and engines, due to the multiplicity of these problems, and despite this, the Part of its solution is based on some general principles that have a common scientific base.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Practice the basic skills of analyzing simple mechanical systems.

A2. acquire skills in analyzing mechanical systems that are in a constant state of equilibrium

A3. acquire basic skills in focusing on a free body diagram and on choosing an appropriate coordination system

A4.

B. Subject-specific skills

B1. Ability to analyze mechanical systems.

B2. The ability to think about addressing a particular problem or issue.

B3. Solve mechanical problems.

B4. The ability to gain experience in dealing with mechanical systems

Teaching and Learning Methods

Readings, self-learning, panel discussions.
Exercises and activities in the lecture.
Homework.
Directing students to some websites to benefit and develop capabilities

Assessment methods

Interaction within the lecture.
• Homework and reports.
• Short exams (Quiz).
• Semester and final exams.

C. Thinking Skills

C1. Attracting students' attention by solving some questions in the hall.

C2. Response: Follow up the student's interaction with the material displayed on the screen.

C3. Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by asking for solving other problems.

C4. Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1. Develop the student's ability to perform assignments and deliver them on time

D2. Logical and programmatic thinking to find software solutions to various problems

D3. Develop the student's ability to dialogue and discussion

D4. Develop the student's ability to deal with modern technology, especially the Internet

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	4	Newton's Three Laws of Motion, Units of Measurement	General Principles	Theoretical	Questions and discussion
Second	4	Vector Operations	Force Vectors	Theoretical	Questions and discussion
Third	4	Vector Addition of Forces, Addition of a System of Coplanar Forces	Force Vectors	Theoretical	Questions and discussion
Fourth	4	Condition for the Equilibrium of a Particle	Equilibrium of a Particle	Theoretical	Questions and discussion
Fifth	4	The Free-Body Diagram, Coplanar Force Systems	Equilibrium of a Particle	Theoretical	Questions and discussion
Six	4	Moment of a Force -Scalar Formulation	Force System Resultants	Theoretical	Questions and discussion
Seven	4	Principle of Moments, Moment of a Couple, Conditions for Rigid-Body Equilibrium	Force System Resultants	Theoretical	Questions and discussion
Eight	4	Free-Body Diagrams, Equations of Equilibrium	Equilibrium of a Rigid Body	Theoretical	Questions and discussion
Nine	4	Condition for the Equilibrium of a Particle	Equilibrium of a Particle	Theoretical	Questions and discussion
Ten	4	Characteristics of Dry Friction	Friction	Theoretical	Questions and discussion
Eleven	4	Problems Involving Dry Friction	Friction	Theoretical	Questions and discussion
Twelve	4	Center of Gravity, Center of Mass, and the Centroid of a Body	Center of Gravity and Centroid	Theoretical	Questions and discussion
Thirteen	4	Composite Bodies	Center of Gravity and Centroid	Theoretical	Questions and discussion
fourteen	4	Definition of Moments of Inertia for Areas, Parallel-Axis Theorem for an Area	Moments of Inertia	Theoretical	Questions and discussion
Fifteen	4	Radius of Gyration of an Area, Moments of Inertia for Composite Areas	Moments of Inertia	Theoretical	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Computer Programming/ ME113
5. Modes of Attendance offered	Daily attendance
6. Semester/Year	Second semester / First Year
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The theoretical foundations of computer engineering have expanded substantially in recent years. The objective of this course is to introduce students to this fundamental area of computer science which enables students to focus on the study of programming languages. These languages allow the students to assess what could be achieved through computing when they are using it to solve problems in science and engineering. The course exposes students to the programming with C++, as well as to its usage for problem solving. The course introduces basic programming instructions and their properties, and the necessary mathematical libraries to develop different software applications. Upon completion of this course the students are expected to become proficient in key topics of C++ programming, and to have the opportunity to explore the current topics in this area.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Clarify the basic concepts of programming in C++ through a set of programming instructions.
A2. Gain skills in handling programming problems and issues.
A3. Acquiring basic skills as an introduction to building large and applied programs.
A4. Gain a basic understanding of how programmed systems work in various industrial applications.

B. Subject-specific skills

B1. Ability to program and design application programs.
B2. The ability to think about addressing a particular problem or issue.
B3. Writing scientific reports.
B4 - The ability to gain experience in dealing with programmed systems.

Teaching and Learning Methods

• Readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Directing students to some websites to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

• Interaction within the lecture.
• Homework and reports.
• Short exams.
• Semester and final exams.

C. Thinking Skills

C1. Attention: Attracting students' attention by implementing one of the applied programs on the display screen in the hall
C2. Response: Monitoring the student's interaction with the material displayed on the screen
C3. Attention: following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display
C4. The formation of the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1- Develop the student's ability to perform the duties and deliver them on time
D 2- Logical and programmatic thinking to find software solutions to various problems
D 3- Develop the student's ability to dialogue and discussion
D4 - Develop the student's ability to deal with modern technology, especially the Internet

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	4	language properties C++, language program parts, language components (language codes, special words, variables)	Basics of programming in C++	theoretical + practical	Questions, discussion and Short exams
2nd	4	Office functions, types of variables, logical expressions	Basics of programming in C++	theoretical + practical	Questions, discussion and Short exams
3th	4	Arithmetic tools, priority of arithmetic and logical operations, illustrative examples	Basics of programming in C++	theoretical + practical	Questions, discussion and Short exams
4th	4	Input and output order, Directing characters	Input and output statements	theoretical + practical	Questions, discussion and Short exams
5th	4	Formatted console for input and output operations, illustrative examples	Input and output statements	theoretical + practical	Questions, discussion and Short exams
6th	4	Conditional Statements (if statement, if-else statement)	Control Statements	theoretical + practical	Questions, discussion and Short exams
7th	4	Conditional Statements (if-else-if statement, Compound if)	Control Statements	theoretical + practical	Questions, discussion and Short exams
8th	4	Conditional Statements (switch statement, Conditional Ternary Operator, illustrative examples)	Control Statements	theoretical + practical	Questions, discussion and Short exams
9th	4	Loop Statements (for-statement, while-statement)	Control Statements	theoretical + practical	Questions, discussion and Short exams
10th	4	Loop Statements (do-while statement, illustrative examples)	Control Statements	theoretical + practical	Questions, discussion and Short exams
11th	4	Loop Statements (Nested Loop Statements, illustrative examples)	Control Statements	theoretical + practical	Questions, discussion and Short exams
12th	4	One-Dimensional Arrays, illustrative examples	Arrays	theoretical + practical	Questions, discussion and Short exams
13th	4	Two- Dimensional Arrays, Operations on Arrays	Arrays	theoretical + practical	Questions, discussion and Short exams
14th	4	Completing the topic of operations on Arrays, illustrative examples	Arrays	theoretical + practical	Questions, discussion and Short exams
15th	4	Discussion and revision	Different topics	theoretical + practical	Questions, discussion and Short exams

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	أسس نفسك في البرمجة باستخدام لغة++C (م/ إسماعيل علي احمد الشهالي . م/ هاني عبد الرحمن سيف)
Community-based facilities (include for example, guest Lectures, internship, field studies)	Reputable websites. Libraries sites in some international universities. The internet

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

Engineering drawing is the language that enables the engineer to express any design in such a way that others will be able to understand, develop and manufacture it.

The engineering drawing aims to understand all the engineering properties of a product unambiguously. The main purpose of the engineering drawing is to communicate the basic information that enables the manufacturer to produce this component

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Engineering Drawing / ME125
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First semester / First year
7. Number of hours tuition (total)	45 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The objective of this course is to introduce students to this fundamental area of engineering drawing science which enables students to focus on the study of programs that related with it The course exposes students to the knowing principal of engineering drawing as well as Engineering Operations, drawing projections and Drawing missed views. Upon completion of this course, students are expected to become proficient in engineering drawing, AutoCAD and all software related to engineering drawing, and have the opportunity to explore current topics in the field.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1. Clarify the basic concepts in engineering drawing A2. Acquisition of skills in drawing shapes. A3. Acquisition of basic skills as an introduction to design programs such as AutoCAD and other programs that are applied in practical applications. A4. Acquisition a basic understanding of how to connect engineering drawing or AutoCAD in various industrial applications
B. Subject-specific skills B1 - The ability to design in the completion of work B2 - The ability to think about the visualization of shapes according to the topics related to the drawing B3 - The purpose of the engineering drawing is to be used as a guide for the manufacture or implementation of the drawn shape
Teaching and Learning Methods
• Readings, self-learning, Seminars. • Exercises and activities in the lecture. • Homework. • Directing students to some websites to benefit from developing capabilities. • Contract seminars to explain and analyze a specific issue and find solutions to it.
Assessment methods
• Interaction within the lecture. • Homework and class duties. • Short exams (quiz). • Semester and final exams.
C. Thinking Skills C1- Attention: Attracting students' attention by executing one of the drawings in class. C2- Response: Follow up the student's interaction with the material displayed on the screen. C3. Attention: Follow the attention of a student who more interaction with the material presented, and by increasing the interaction request external models from different sources to display. C4. The formation of the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1- Develop the student's ability to perform the duties and deliver them on time D2- Logical and programmatic thinking to visualize and draw engineering and mechanical tasks D 3- Develop the student's ability to dialogue and discussion D4 - Develop the student's ability to deal with modern technology

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	3	Principles of engineering drawing + duties	Principles of engineering drawing + duties	practical	Drawing with tools in class
2nd	3	Principles of engineering drawing + duties	Principles of engineering drawing + duties	practical	Drawing with tools in class
3th	3	Engineering Operations + Duties	Engineering Operations + Duties	practical	Drawing with tools in class
4th	3	Engineering Operations + Duties	Engineering Operations + Duties	practical	Drawing with tools in class
5th	3	Engineering Operations + Duties	Engineering Operations + Duties	practical	Drawing with tools in class
6th	3	Engineering Operations + Duties	Engineering Operations + Duties	practical	Drawing with tools in class
7th	3	Engineering Operations + Duties	Engineering Operations + Duties	practical	Drawing with tools in class
8th	3	Drawing projections + duties	Drawing projections + duties	practical	Drawing with tools in class
9th	3	Drawing projections + duties	Drawing projections + duties	practical	Drawing with tools in class
10th	3	Drawing projections + duties	Drawing projections + duties	practical	Drawing with tools in class
11th	3	Drawing projections + duties	Drawing projections + duties	practical	Drawing with tools in class
12th	3	Drawing missed views + Duties	Drawing missed views + Duties	practical	Drawing with tools in class
13th	3	Drawing missed views + Duties	Drawing missed views + Duties	practical	Drawing with tools in class
14th	3	Drawing missed views + Duties	Drawing missed views + Duties	practical	Drawing with tools in class
15th	3	Drawing missed views + Duties	Drawing missed views + Duties	practical	Drawing with tools in class

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	الرسم الهندسي / عبد الرسول الخفاف
Community-based facilities (include for example, guest Lectures, internship, field studies)	Reputable websites. Libraries sites in some international universities. and the internet

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Principles of Production Engineering I/ ME115
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First semester / First Year
7. Number of hours tuition (total)	30 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The ME 134/1st provides overall view about engineering materials; classification and properties, destructive and destructive tests which included tensile, hardness and impact tests. In ferrous materials, the course indicates the production of cast iron and steel production methods. In non-ferrous material, an overall view gives about production of aluminum, copper, lead, zinc, and tin. Properties of plastics and its classification and production also given. Finally, the course covers the properties of ceramics and its production.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Clarify the principles of mechanical engineering in the production field, methods of metal formation, and the production methods.

A2. Acquiring the skill in solving industrial problems by using the illustrations and assistive industrial videos.

A3. Acquisition of basic skills for the classification of minerals and methods of production.

A4. Gain experience in industrial systems of mass production.

B. Subject-specific skills

B1. The ability to classify metals according to their mechanical properties.

B2 - The ability to understand the different metals production methods.

B3 - Writing scientific reports, analyzing data such as production images and videos

Teaching and Learning Methods

1. Explanation the lectures.
2. Display scientific materials by projectors: data show, smart boards, plasma screens.
3. Using educational platforms such as Google Classroom, uploading lectures on the university's website, and uploading video lectures on YouTube.
4. Self-learning through homework and small projects.
5. Laboratories.
6. Graduation projects.
7. field trips.
8. Seminars.
9. Summer training.

Assessment methods

1. Short exams (quiz).
2. online exams
3. Homework.
4. Quarterly and final exams for theoretical and practical subjects.
5. Small projects within the lesson.
6. Interaction within the lecture.
7. Reports.

C. Thinking Skills

C1. students’ attention by implementing one of the available programs in the hall.

C2. Response: Follow up the students' interaction with the material displayed.

C3. Interest: Follow up on the interest of the students who interacted more with the available material, by adding new programs for them.

C4. Forming the direction: by respecting the views of students and discuss their points of view.

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

D1 - Develop the student's ability to deal with technical tools.

D2 - Developing the student's ability to deal with the Internet.

D3 - Develop the student's ability to deal with multimedia.

D 4 - Develop the student's ability to dialogue and discussion.

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Engineering Materials	Engineering Materials Classification	Theoretical	Questions & discussion
2	2	Engineering Materials	Mechanical Properties	Theoretical +Tutorial	Questions & discussion
3	2	Engineering Materials	Destructive and Non-Destructive Tests	Theoretical	Questions & discussion
4	2	Ferrous Metal Production	Production Cast Iron	Theoretical +Tutorial	Questions & discussion
5	2	Ferrous Metal Production	Production Cast Iron	Theoretical	Questions & discussion
6	2	Ferrous Metal Production	Steel Production	Theoretical +Tutorial	Questions & discussion
7	2	Ferrous Metal Production	Steel Production	Theoretical	Questions & discussion
8	2	Non-Ferrous Metal Production	Copper Metal Production	Theoretical +Tutorial	Questions & discussion
9	2	Non-Ferrous Metal Production	aluminum Metal Production	Theoretical	Questions & discussion
10	2	Non-Ferrous Metal Production	Zinc, lead, Tin	Theoretical +Tutorial	Questions & discussion
11	2	Plastic Industry	Properties of plastics	Theoretical	Questions & discussion
12	2	Plastic Industry	Plastics classification	Theoretical +Tutorial	Questions & discussion
13	2	Plastic Industry	Plastics production	Theoretical	Questions & discussion
14	2	Ceramic Industry	Ceramics classification	Theoretical +Tutorial	Questions & discussion
15	2	Ceramic Industry	Ceramics Productions	Theoretical	Questions & discussion

12. Infrastructure

Required reading: · Core Texts · Course Materials	Introduction to Basic Manufacturing Processes and Workshop Technology Book by Rajender Singh
Special requirements (include for example workshops, periodicals, IT software, websites)	Reputable websites. Libraries sites in some international universities.
Community-based facilities (include for example, guest Lectures, internship, field studies)	https://www.aboutmech.com/

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Electrical Engineering I / ME116
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First semester / First year
7. Number of hours tuition (total)	30 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
This course aims to identify the basics of electrical engineering and teach the student how to classify and analyze DC electrical circuits and identify the methods of connecting electrical circuits as well as identifying the basic parts of the electrical circuit such as resistors, inductors, capacitors in addition to the power supply, as well as introducing the student to how to calculate the values of Current and voltage and calculate the amount of resistors required in each electrical circuit.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1- The student learns how to analyze DC electrical circuits.
A2- Study the principle of current passing through conductive materials.
A3- Familiarize yourself with the global system of units.
A4- Studying the application of the global system of units to industrial applications.

B. Subject-specific skills

B1 - Learn the basic principles of modern electronics theory.
B 2 - Analysis and study of DC electrical circuits.
B3 - Learn the basic principles of methods for finding branch currents and voltages for electrical networks.
B 4 - How to classify electrical circuits.

Teaching and Learning Methods

• Presenting basic theories and giving practical and industrial examples to link the practical and industrial aspect.
• Allocating lectures to solve advanced questions and giving students the opportunity to participate in solving the questions through the method of group thinking.
• Linking the theoretical material to the laboratory and identifying the mechanism of applying the necessary theories to analyze electrical circuits.

Assessment methods

• Interaction within the lecture.
• Daily tests and interaction inside the hall and asking questions related to previous lectures to know the extent to which the student absorbs the material.
• Setting grades for homework assignments and reports assigned to them.
• Holding seminars and evaluating students on the basis of the student's interaction within the discussion circle and conducting short tests (kozat).
• Mid-semester exams in addition to the final exam.

C. Thinking Skills

C1- Helping the student to establish the scientific basis for analyzing electrical circuits.
C2- Helping the student to suggest the appropriate method for analysis.
C3- Helping the student to use specialized applied equipment to analyze electrical circuits.
C4- Helping the student on how to link the practical and theoretical side in finding the currents and voltages of the branches of the electrical networks.

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

D1 - Qualifying the student to deal with electrical circuits and methods of analysis.
D2 - Teaching the student to write scientific reports describing the basic elements of electrical networks.
D 3 - Develop the student's ability to dialogue and discussion.
D 4 - Develop the student's ability to deal with modern technology, especially the Internet.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Modern electron theorem	Printed papers	Quizzes+monthly exam
2	3		SI units	Printed papers	Quizzes+monthly exam
3	3		Resistance and resistivity	Printed papers	Quizzes+monthly exam
4	3		Effect of temperature on resistance	Printed papers	Quizzes+monthly exam
5	3		Kirchhoff's lows	Printed papers	Quizzes+monthly exam
6	3		Type of DC circuits	Printed papers	Quizzes+monthly exam
7	3		Sources of energy	Printed papers	Quizzes+monthly exam
8	3		Maxwell's circulating current	Printed papers	Quizzes+monthly exam
9	3		Nodal analysis	Printed papers	Quizzes+monthly exam
10	3		Superposition theorem	Printed papers	Quizzes+monthly exam
11	3		Thevenin's theorem	Printed papers	Quizzes+monthly exam
12	3		Norton's theorem	Printed papers	Quizzes+monthly exam
13	3		Generation of AC Voltage	Printed papers	Quizzes+monthly exam
14	3		Average value and effective value	Printed papers	Quizzes+monthly exam
15	3		Generation of AC Voltage	Printed papers	Quizzes+monthly exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Chemistry / E117
4. Programme to which it contributes	First semester / First year
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First semester / First year
7. Number of hours tuition (total)	30 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The theoretical foundations of chemistry have expanded substantially in recent years. The objective of this course is to introduce students to this fundamental area of chemistry which enables students to focus on the study of chemistry for engineering. These allow the students to assess what could be achieved through bonding theory chemistry when they are using it to study corrosion problems in engineering metals. The course exposes students to the polymers, as well as to its usage for nuclear energy. The course introduces basic production and their properties, and the necessary of cement. Upon completion of this course the students are expected to become proficient in key topics of corrosion, and to have the opportunity to explore the current topics in this area.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Clarify the basic concepts of chemistry through theories of chemical bonding.

A2. Acquisition of skills in dealing with chemical-related problems facing mechanical engineers

A3. Acquisition of basic skills as an introduction to building large and applied programs.

A4. Gain a basic understanding of how to prepare polymers and dyes and generate electricity from nuclear energy.

B. Subject-specific skills

B1. Ability to handle chemicals.

B2. The ability to think about the interactions of chemical compounds.

B3. Writing scientific reports on corrosion.

B4. The ability to gain experience in dealing with plastic materials.

Teaching and Learning Methods

- Readings, self-learning, panel discussions.
- Exercises and activities in the lecture.
- Homework.
- Directing students to some websites to benefit and develop capabilities.
- Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

- Interaction within the lecture.
- Homework and reports.
- Short exams (Quiz).
- Semester and final exams.

Thinking Skills

C1. Attention: Arousing the students' attention by implementing one of the practical problems on the display screen in the hall.

C2- Response: Follow up the student's interaction with the material displayed on the screen.

C2. Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other chemical problems facing the mechanical engineer to present them.C3.

C4. Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1. D1- Develop the student’s ability to perform the duties and deliver them on time

D 2- Logical thinking to find chemical solutions to various problems

D 3- Develop the student's ability to dialogue and discussion

D4- Develop the student's ability to deal with modern chemical methods and programs

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	2	Atomic structure and octet theorem	Chemical Bonding	Theoretical	Questions and discussion
Second	2	valance bond theory	Chemical Bonding	Theoretical	Questions and discussion
Third	2	Molecular orbital theory	Molecular orbital theory	Theoretical	Questions , discussion and quiz
Forth	2	Corrosion and its causes	Corrosion and electrochemistry	Theoretical	Questions and discussion
Fifth	2	Potential electrodes and electrochemical cells	Corrosion and electrochemistry	Theoretical	Questions and discussion
Sixth	2	Types of corrosion cells	Corrosion and electrochemistry	Theoretical	Questions , discussion and quiz
Seventh	2	Corrosion treatment methods	Corrosion and electrochemistry	Theoretical	Questions and discussion
Eighth	2	Cathodic and Anodic protection	Corrosion and electrochemistry	Theoretical	Questions and discussion
Ninth	2	Types of polymers and methods of polymerization	Organic Chemistry and Polymers	Theoretical	Questions, discussion and quiz
Tenth	2	Chemical and mechanical properties of polymers	Organic Chemistry and Polymers	Theoretical	Questions and discussion
Eleventh	2	Polymer manufacturing methods	Organic Chemistry and Polymers	Theoretical	Questions and discussion
Twelfth	2	Types of cement and its applications Chemical composition	Cement industry	Theoretical	Questions, discussion and quiz
Thirteen	2	Mechanical properties and cement industry	Cement industry	Theoretical	Questions and discussion
Fourteen	2	Nuclear reactions and their types	nuclear chemistry	Theoretical	Questions and discussion
Fifteen	2	Types of nuclear reactors and electricity production	nuclear chemistry	Theoretical	Questions, discussion and quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Engineering Chemistry: Fundamentals and Applications, Cambridge University Press; 2 edition (2019)
Special requirements (include for example workshops, periodicals, IT software, websites)	Reputable websites. Libraries sites in some international university
Community-based facilities (include for example, guest Lectures, internship, field studies)	https://www.jove.com/education/chem

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This is the second course in calculus, intended for students who have already completed a Calculus I course in limits, differential and integral calculus, and need to extend their skills in this subject.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Mathematics II / E121
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	Second Semester / First Year
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
This is the second course in calculus, intended for students who have already completed a Calculus I course in limits, differential and integral calculus, and need to extend their skills in this subject. It includes applications of integration, integration techniques with numerical integration and concludes with a brief description of polar coordinates.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Illustrate the principle of calculus.

A2. Gain the required mathematical skills to solve different problems.

A3. Improve the essential skills to treat with different mathematical problems.

A4. Study the principal criteria for modelling any industrial system mathematically.

B. Subject-specific skills

B1. Ability to solve mathematical problems.

B2. Ability to analyze and resolve any mathematical problem.

B3. Writing scientific reports.

B4. Gain the required experience to deal with industrial systems mathematically.

Teaching and Learning Methods

- Reading and self-learning.
- Training and activities during lecture.
- HomeWorks.
- Suggesting some websites for extra reading.
- Discussions and workshops.

Assessment methods

- Interaction during lectures.
- HomeWorks and reports.
- Short exam.
- Midterm and final exams.

C. Thinking Skills

C1. Attention: calling student's attention from time to time by direct question

C2. Response: investigate the interactivity of students with presented subject.

C3. Interesting: Follow the more interested student with the subject and suggesting extra uses and application for the subject under consideration.

C4. Building the path: investigate how much students are connected to the subject.

C5. Improve the understanding skills for student and resolving pouring and carless habits.

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

D1. Improve the student's abilities to solve the requested HomeWorks in time.

D2. Building up the logical thinking to analyze the given problem.

D3. Enhance the oral discussion skills for students.

D4. Improve students capabilities to deal with modern technologies.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Applications of Integration	Area Between two curves, The Volume by using the Disk Method,	Theoretical	Discussion & questions
2	4	Applications of Integration	The Volume by using Washer method, Volumes by Cylindrical Shells,	Theoretical &Tutorial	Discussion & questions
3	4	Applications of Integration	Solids with Known Cross Sections,	Theoretical	Discussion & questions
4	4	Applications of Integration	Lengths of Plane Curves	Theoretical &Tutorial	Discussion & questions Short exam
5	4	Applications of Integration	Areas of Surfaces of Revolution.	Theoretical	Discussion & questions
6	4	Applications of Integration Integration Techniques	Basic Integration Formulas	Theoretical &Tutorial	Discussion & questions
7	4	Integration Techniques	Integration by Parts	Theoretical	Discussion & questions
8	4	Integration Techniques	Trigonometric Integrals,	Theoretical &Tutorial	Discussion & questions Short exam
9	4	Integration Techniques	Trigonometric Substitutions,	Theoretical	Discussion & questions
10	4	Integration Techniques	Trigonometric Substitutions,	Theoretical &Tutorial	Discussion & questions Short exam
11	4	Integration Techniques	Integration of Rational Functions by Partial Fractions.	Theoretical	Discussion & questions
12	4	Numerical Integration	The Trapezoidal Rule	Theoretical &Tutorial	Discussion & questions
13	4	Numerical Integration	The Simpson's Rule.	Theoretical	Discussion & questions
14	4	Polar Coordinate	Graphing in Polar Coordinates	Theoretical &Tutorial	Discussion & questions Short exam
15	4	Polar Coordinate	Areas and Lengths in Polar Coordinates. Coordinates.	Theoretical &Tutorial	Discussion & questions

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS	1- Thomas's Calculus, By G. B. Thomas, 12th Edition 2010 Pearson.
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Engineering Mechanics Dynamic / ME122
4. Modes of Attendance offered	Daily attendance
5. Semester/Year	Second semester / second year
6. Number of hours tuition (total)	60 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	
The theoretical foundations of engineering mechanics dynamic have expanded substantially in recent years. the objective of this course is to introduce students to this fundamental area of engineering mechanics dynamic which enables students to focus on the kinematics of particles. the course exposes students to the knowing position, velocity, and acceleration as well as determination of motion of particles, motion of several particles and dependent motions. the course introduces basic of newton's second law in rectangular components and tangential and normal components and energy and momentum methods and principle of work and energy, potential energy, conservation of energy. upon completion of this course the students are expected to become proficient in engineering mechanics dynamic, and to have the opportunity to explore the current topics in this area.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1- Clarify the basic concepts of kinetic mechanics.

A2- Acquisition of problem-solving skills.

A3 - Acquisition of basic skills as an introduction to kinetic mechanics and intertwined in practical applications.

A4- Gain a basic understanding of how kinetic mechanics is linked in various industrial applications

B. Subject-specific skills

B - Skills objectives of the course.

B1 - The ability to analyze the problem and write the steps for the solution in a simpler way.

B2 - The ability to think about addressing a particular problem or issue.

B3 - Writing scientific reports.

B4 - The ability to gain experience in dealing with complex mechanical systems.

Teaching and Learning Methods

- Readings, self-learning, panel discussions.
- Exercises and activities in the lecture.
- Homework.
- Directing students to some websites to benefit and develop capabilities.
- Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

- Interaction within the lecture.
- Homework and reports.
- Short exams (Quiz).
- Semester and final exams.

C. Thinking Skills

C1- Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall.

C2 - Response: Follow up the student's interaction with the material displayed on the screen.

C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting external models from different sources to display them.

C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1- Develop the student's ability to perform the duties and deliver them on time

D 2- Develop the student's ability to dialogue and discussion

D3 - Develop the student's ability to deal with modern technology, especially the Internet

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	4	Rectilinear motion of particle	Introduction to Dynamics	theoretical	Questions and discussion
2nd	4	Determination of motion of particle	Introduction to Dynamics	Theoretical+ tutorial	Questions and discussion
3rd	4	Motion of several particles	Problem-	theoretical	Questions and discussion
4rth	4	Dependent motion	Problem-	Theoretical+ tutorial	Questions and discussion and quize
5fth	4	In the case of the motion projectile	Rectangular components of velocity and acceleration	theoretical	Questions and discussion
6th	4	Solve problems	Tangential and normal components	Theoretical+ Tutorial	Questions and discussion
7	4	Kinetics of particles	Introduction to Kinetics of particles	theoretical	Questions and discussion
8	4	Equations of motion	Newton's Second law Equations of motion	theoretical	Questions and discussion and quize
9	4	problem	Rectangular components	Theoretical+ Tutorial	Questions and discussion
10	4	Work of a force	Energy and momentum methods	theoretical	Questions and discussion
11	4	Applications of the principle of work and energy	Principle of work and energy	theoretical	Questions and discussion
12	4	Conservation of energy	Potential energy	Theoretical+ Tutorial	Questions and discussion
13	4	Direct central impact	Impact	theoretical	Questions and discussion and quize
14	4	General plain motion	Kinematics of rigid bodies	theoretical	Questions and discussion
15	4	problems	Acceleration in plain motion	Theoretical+ Tutorial	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	Mechanics for Engineers Dynamics-Ferdinand P. Beer/Vector Mechanics for Engineers – Beer &Russell Johnston
Community-based facilities (include for example, guest Lectures, internship, field studies)	Reputable websites. Libraries sites in some international universities.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course introduces the student to the history of the computer, its invention, its development and the stages it has gone through up to the present time. In addition to the above, the student learns how to write algorithms and flowcharts to solve problems and practical and academic applications.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Principles of computer sciences / U123
5. Modes of Attendance offered	Daily attendance
6. Semester/Year	Second semester / First year
7. Number of hours tuition (total)	36 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
Introducing the student to the history of the computer, its invention, its development and the stages it has gone through until the present time. In addition to the above, the student learns how to write algorithms and flowcharts to solve problems and practical and academic applications.	

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	4	Introduction to the computer	Computer parts Computer uses	theoretical + lab	Questions and discussion
2nd	4	Introduction to the computer	generations of computers types of computers	theoretical + lab	Questions, discussion and reasoning
3rd	4	basic computer components	solid parts	theoretical + lab	Questions and discussion
4th	4	basic computer components	Software	theoretical + lab	Questions, discussion and reasoning
5th	4	Process flowcharts and algorithms	Symbols and idiomatic forms of process flow maps	theoretical + lab	Questions and discussion
6th	4	Process flowcharts and algorithms	Algorithms	theoretical + lab	Questions, discussion and reasoning
7th	4	Process flowcharts and algorithms	Types of process flowcharts	theoretical + lab	Questions and discussion
8th	4	Process flowcharts and algorithms	Decision sentences and their types	theoretical + lab	Questions, discussion and reasoning
9th	4	Process flowcharts and algorithms	idiomatic form of counters	theoretical + lab	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Web sites of Iraq Universities and lectures.
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

Engineering drawing is the language that enables the engineer to express any design in such a way that others will be able to understand, develop and manufacture it.
The engineering drawing aims to understand all the engineering properties of a product unambiguously. The main purpose of the engineering drawing is to communicate the basic information that enables the manufacturer to produce this component

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	engineering drawing/ ME125
4. Modes of Attendance offered	Daily attendance
5. Semester/Year	Second semester / First year
6. Number of hours tuition (total)	45 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	
The objective of this course is to introduce students to this fundamental area of engineering drawing science which enables students to focus on the study of programs that related with it The course exposes students to the knowing principal of engineering drawing as well as sections, Drawing projections, dimensions, and Pictorial drawing. Upon completion of this course, students are expected to become proficient in engineering drawing, AutoCAD and all software related to engineering drawing, and have the opportunity to explore current topics in the field.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1. Clarify the basic concepts in engineering drawing A2. Acquisition of skills in drawing shapes. A3. Acquisition of basic skills as an introduction to design programs such as AutoCAD and other programs that are applied in practical applications. A4. Acquisition a basic understanding of how to connect engineering drawing or AutoCAD in various industrial applications
B. Subject-specific skills B1 - The ability to design in the completion of work B2 - The ability to think about the visualization of shapes according to the topics related to the drawing B3 - The purpose of the engineering drawing is to be used as a guide for the manufacture or implementation of the drawn shape
Teaching and Learning Methods
• Readings, self-learning, Seminars. • Exercises and activities in the lecture. • Homework. • Directing students to some websites to benefit from developing capabilities. • Contract seminars to explain and analyze a specific issue and find solutions to it.
Assessment methods
• Interaction within the lecture. • Homework and class duties. • Short exams (quiz). • Semester and final exams.
C. Thinking Skills C1- Attention: Attracting students' attention by executing one of the drawings in class. C2- Response: Follow up the student's interaction with the material displayed on the screen. C3. Attention: Follow the attention of a student who more interaction with the material presented, and by increasing the interaction request external models from different sources to display. C4. The formation of the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1- Develop the student's ability to perform the duties and deliver them on time D2- Logical and programmatic thinking to visualize and draw engineering and mechanical tasks D 3- Develop the student's ability to dialogue and discussion D4 - Develop the student's ability to deal with modern technology

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	3	sections + duties	sections + duties	practical	Drawing with tools in class
2nd	3	sections + duties	sections + duties	practical	Drawing with tools in class
3th	3	sections + duties	sections + duties	practical	Drawing with tools in class
4th	3	sections +dimensions duties	sections +dimensions+ duties	practical	Drawing with tools in class
5th	3	sections +dimensions duties	sections +dimensions+ duties	practical	Drawing with tools in class
6th	3	sections +dimensions duties	sections +dimensions+ duties	practical	Drawing with tools in class
7th	3	Pictorial drawing +Duties	Pictorial drawing +Duties	practical	Drawing with tools in class
8th	3	Pictorial drawing +Duties	Pictorial drawing +Duties	practical	Drawing with tools in class
9th	3	Pictorial drawing +Duties	Pictorial drawing +Duties	practical	Drawing with tools in class
10th	3	Pictorial drawing +Duties	Pictorial drawing +Duties	practical	Drawing with tools in class
11th	3	Drawing projections + duties	Drawing projections + duties	practical	Drawing with tools in class
12th	3	Pictorial drawing +Duties	Pictorial drawing +Duties	practical	Drawing with tools in class
13th	3	Pictorial drawing +dimensions +Duties	Pictorial drawing +dimensions+ Duties	practical	Drawing with tools in class
14th	3	Pictorial drawing +dimensions +Duties	Pictorial drawing +dimensions+ Duties	practical	Drawing with tools in class
15th	3	Pictorial drawing +dimensions +Duties	Pictorial drawing +dimensions+ Duties	practical	Drawing with tools in class

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	الرسم الهندسي / عبد الرسول الخفاف
Community-based facilities (include for example, guest Lectures, internship, field studies)	Reputable websites. Libraries sites in some international universities. and the internet

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Principles of Production Engineering II/ ME126
4. Modes of Attendance offered	Daily Attendance
5. Semester/Year	First Year / Second Semester
6. Number of hours tuition (total)	60 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	
The ME 134/II The syllable includes the subjects; hot and cold working and their specifications, principles of rolling, rolling types, force analysis in rolling, hot extrusion, extrusion types, force analysis in extrusion, hot drawing, deep drawing, force analysis in drawing, welding processes, arc welding, casting, casting types, sand casting, Powder Metallurgy production.	

9· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Clarify the principles of mechanical engineering in the production field, methods of metal formation, and the production methods.

A2. Acquiring the skill in solving industrial problems by using the illustrations and assistive industrial videos.

A3. Acquisition of basic skills for the classification of minerals and methods of production.

A4. Gain experience in industrial systems of mass production.

B. Subject-specific skills

B1. The ability to classify metals according to their mechanical properties.

B2 - The ability to understand the different metals production methods.

B3 - Writing scientific reports, analyzing data such as production images and videos

Teaching and Learning Methods

1. Explanation the lectures.
2. Display scientific materials by projectors: data show, smart boards, plasma screens.
3. Using educational platforms such as Google Classroom, uploading lectures on the university's website, and uploading video lectures on YouTube.
4. Self-learning through homework and small projects.
5. Laboratories.
6. Graduation projects.

Assessment methods

1. Short exams (quiz).
2. online exams
3. Homework.
4. Quarterly and final exams for theoretical and practical subjects.
5. Small projects within the lesson.
6. Interaction within the lecture.

C. Thinking Skills

C1. students' attention by implementing one of the available programs in the hall.

C2. Response: Follow up the students' interaction with the material displayed.

C3. Interest: Follow up on the interest of the students who interacted more with the available material, by adding new programs for them.

C4. Forming the direction: by respecting the views of students and discuss their points of view.

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

D1 - Develop the student's ability to deal with technical tools.

D2 - Developing the student's ability to deal with the Internet.

D3 - Develop the student's ability to deal with multimedia.

D 4 - Develop the student's ability to dialogue and discussion.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Cold and Hot working	Cold working	Theoretical + Experimental	Questions & discussion
2	4	Cold and Hot working	Hot working	Theoretical + Experimental	Questions & discussion
3	4	Principles Rolling Processes	Rolling types	Theoretical + Experimental	Questions & discussion
4	4	Principles Rolling Processes	Force analysis in rolling	Theoretical + Experimental	Questions & discussion
5	4	Hot Extrusion	Hot Extrusion types	Theoretical + Experimental	Questions & discussion
6	4	Hot Extrusion	Force analysis in Extrusion	Theoretical + Experimental	Questions & discussion
7	4	Drawing Processes	Hot Drawing types	Theoretical + Experimental	Questions & discussion
8	4	Drawing Processes	Drawing analysis in Extrusion	Theoretical + Experimental	Questions & discussion
9	4	Welding Technology	Welding Processes	Theoretical + Experimental	Questions & discussion
10	4	Welding Technology	Arc Welding	Theoretical + Experimental	Questions & discussion
11	4	Welding Technology	SMAW	Theoretical + Experimental	Questions & discussion
12	4	Casting	Casting types	Theoretical + Experimental	Questions & discussion
13	4	Casting	Casting Sandy	Theoretical + Experimental	Questions & discussion
14	4	Powder Metallurgy	Powder Metallurgy principles	Theoretical	Questions & discussion
15	4	Powder Metallurgy	Powder Metallurgy Production	Theoretical	Questions & discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Introduction to Basic Manufacturing Processes and Workshop Technology Book by Rajender Singh
Special requirements (include for example workshops, periodicals, IT software, websites)	Reputable websites. Libraries sites in some international universities.
Community-based facilities (include for example, guest Lectures, internship, field studies)	https://www.aboutmech.com/

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Electrical Engineering I / ME116
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First Year / Second semester
7. Number of hours tuition (total)	30 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
This course aims to identify the basics of electrical engineering and teach the student how to classify and analyze DC electrical circuits and identify the methods of connecting electrical circuits as well as identifying the basic parts of the electrical circuit such as resistors, inductors, capacitors in addition to the power supply, as well as introducing the student to how to calculate the values of Current and voltage and calculate the amount of resistors required in each electrical circuit.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1- The student learns how to analyze DC electrical circuits.
A2- Study the principle of current passing through conductive materials.
A3- Familiarize yourself with the global system of units.
A4- Studying the application of the global system of units to industrial applications.

B. Subject-specific skills

B1 - Learn the basic principles of modern electronics theory.
B 2 - Analysis and study of DC electrical circuits.
B3 - Learn the basic principles of methods for finding branch currents and voltages for electrical networks.
B 4 - How to classify electrical circuits.

Teaching and Learning Methods

• Presenting basic theories and giving practical and industrial examples to link the practical and industrial aspect.
• Allocating lectures to solve advanced questions and giving students the opportunity to participate in solving the questions through the method of group thinking.
• Linking the theoretical material to the laboratory and identifying the mechanism of applying the necessary theories to analyze electrical circuits.

Assessment methods

• Interaction within the lecture.
• Daily tests and interaction inside the hall and asking questions related to previous lectures to know the extent to which the student absorbs the material.
• Setting grades for homework assignments and reports assigned to them.
• Holding seminars and evaluating students on the basis of the student's interaction within the discussion circle and conducting short tests (kozat).
• Mid-semester exams in addition to the final exam.

C. Thinking Skills

C1- Helping the student to establish the scientific basis for analyzing electrical circuits.
C2- Helping the student to suggest the appropriate method for analysis.
C3- Helping the student to use specialized applied equipment to analyze electrical circuits.
C4- Helping the student on how to link the practical and theoretical side in finding the currents and voltages of the branches of the electrical networks.

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

D1 - Qualifying the student to deal with electrical circuits and methods of analysis.
D2 - Teaching the student to write scientific reports describing the basic elements of electrical networks.
D 3 - Develop the student's ability to dialogue and discussion.
D 4 - Develop the student's ability to deal with modern technology, especially the Internet.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Series AC circuits	Printed papers	Quizzes+monthly exam
2	3		Parallel AC circuits	Printed papers	Quizzes+monthly exam
3	3		Maxwell's currents	Printed papers	Quizzes+monthly exam
4	3		Nadal analysis	Printed papers	Quizzes+monthly exam
5	3		Superposition theorem	Printed papers	Quizzes+monthly exam
6	3		Thevenin's theorem	Printed papers	Quizzes+monthly exam
7	3		Norton's theorem	Printed papers	Quizzes+monthly exam
8	3		Maximum power transfer theorem	Printed papers	Quizzes+monthly exam
9	3		Norton's theorem	Printed papers	Quizzes+monthly exam
10	3		Superposition theorem	Printed papers	Quizzes+monthly exam
11	3		Thevenin's theorem	Printed papers	Quizzes+monthly exam
12	3		Norton's theorem	Printed papers	Quizzes+monthly exam
13	3		Maximum power transfer theorem	Printed papers	Quizzes+monthly exam
14	3		Generating of AC voltage	Printed papers	Quizzes+monthly exam
15	3		Average value and effective value of AC quantity	Printed papers	Quizzes+monthly exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

This course presents the basic concepts of general physics principles and introduces the main principles of classical mechanics, heat, sound, light, and properties of matter.

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	University of Basrah
2. University Department/Centre	Mechanical engineering Department
3. Course title/code	Physics / E127
4. Modes of Attendance offered	Daily attendance
5. Semester/Year	Second semester / First Year
6. Number of hours tuition (total)	30 hours
7. Date of production/revision of this Specification	2023
8. Aims of the Course	
This course aims to develop the student's abilities to understand and comprehend these main principles of general physics and to benefit from them in interpreting the work of devices, and to build a basic base for understanding the relevant subsequent courses.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1. To form a strong foundation for the student in the subject of physics. A2. Create advanced thinking in understanding most topics. A3. The student knows how to use computer programs for physics applications. A4. Enable the student to read the literature of the specialized scientific article. A5. The student acquires the largest possible number of specialized interests. A6. Enabling the student to transform theories into applications.
B. Subject-specific skills B1. Giving as much information, terminology and specialized equations regarding the scientific subject. B2. The student acquires experience in the use of scientific equipment. B3. Knowledge of the use of technical applications. B4. The ability to deal with the requirements of the labor market.
Teaching and Learning Methods
1- Giving lectures. 2- Display on the screen. 3- The use of electronic computers. 4- Using some paper illustrations. 5- Discussion.
Assessment methods
1- Daily sharing. 2- Daily exams. 3- Homework. 4- The monthly exam.
C. Thinking Skills C1. Increasing the knowledge and scientific awareness of the student C2. Enable the student to use the physical concepts, both applied and pure, to understand and solve life applications of all kinds. C3. The student's knowledge of the connection between physical concepts and each other. C4. Develop the use of technologies.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1. General physical skills, both theoretical and applied. D2. Logical thinking to understand and solve life applications. D3. Linking different physical concepts to each other. D4. Use of new physical applications.

11 Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Define and define physical quantities	Physics Units & Numbers	Theoretical	Questions &discussion
2	2	Apply knowledge of linear motion	One-Dimensional Kinematics, Free Fall	Theoretical	Questions &discussion
3	2	Application of knowledge of movement in 2D	2D Motion, Projectiles	Theoretical	Questions &discussion+ Quiz
4	2	Explain the basic laws of physics	Newton's Laws of Motion	Theoretical + Tutorial	Questions &discussion
5	2	Understand the principles of friction	Friction	Theoretical	Questions &discussion
6	2	Knowing forces and energy	Work, Kinetic and Potential Energy	Theoretical	Questions &discussion+ Quiz
7	2	Correctly describe and interpret conservation laws	Conservation of Mechanical Energy	Theoretical	Questions &discussion
8	2	Describe and interpret the laws of static fluids	Static Fluids	Theoretical+ Tutorial	Questions &discussion
9	2	Describe and interpret the laws of moving fluids	Buoyant Forces, Bernouli	Theoretical	Questions &discussion+ Quiz
10	2	Understand elementary kinetic theory	Ideal Gases and Kinetic Theory	Theoretical	Questions &discussion
11	2	Understand the basics of heat and temperature	Heat: Temperature Changes	Theoretical	Questions &discussion
12	2	Describe the basic concepts of thermodynamics	Thermodynamics	Theoretical+ Tutorial	Questions &discussion+ Quiz
13	2	Describe simple harmonic motion and its relationship to waves	Vibrations; Simple Harmonic Motion	Theoretical	Questions &discussion
14	2	Calculate intensity and sound level	Sound, Intensity and Level	Theoretical	Questions &discussion
15	2	Define and define the properties of electromagnetic radiation	Wave properties of light	Theoretical+ Tutorial	Questions &discussion+ Quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	اساسيات الفيزياء العامة/محمد ابو دعابس اساسيات في الفيزياء العامة خواص المادة، الحرارة، الحركة الموجية والصوت / عويش بن حربي الغامدي -Raymond A. Serway, John W. Jewett, Jr. , PHYSICS for Scientists and Engineers with Modern Physics, 7 th edition. -Halliday & Resnick & Walker, Fundamental of Physics,10th edition.
Special requirements (include for example workshops, periodicals, IT software, websites)	https://www.physicsclassroom.com https://www.cyberphysics.co.uk https://www.aip.org/aip/about-aip https://aps.org https://phet.colorado.edu/ar_SA Cambridge Books - Cambridge University Oxford Scholarship Online - Oxford University Springer Nature eBook Collections Wiley Online library
Community-based facilities (include for example, guest Lectures, internship, field studies)	Holding seminars during the year

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Engineering Mathematics I / E211
4. Modes of Attendance offered	Daily Attendance
5. Semester/Year	First semester / second year
6. Number of hours tuition (total)	60 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	
The main objective of this course is to teach students the basics of matrix and vector analysis by studying how to deal with matrices and their applications in mechanical engineering. The student also teaches vector analysis by studying several topics such as the basics of vectors and algebraic operations that can be performed on vectors and applied in calculating vector functions such as calculating the Direction Derivative, Divergence and curl of vector functions and thus applying them in calculating line integration, surface integration and also Volume integration and therefore the student will be able to apply it in various topics related to mechanical engineering such as fluid mechanics, heat transfer.....etc.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding By the end of the course the student will be able to: A1. Use mathematical methods to solve engineering problems. A2. Use linear algebra tools to solve systems of linear equations. A3. Use vector analysis to explain many engineering problems.
B. Subject-specific skills B1- The ability to solve engineering problems and how to deal with them mathematically. B 2 - The ability to think about solving engineering problems mathematically and choose the appropriate methods for solving.
Teaching and Learning Methods
• Readings, self-learning, panel discussions. • Exercises and activities in the lecture. • Homework. • Directing students to some websites to benefit and develop capabilities. • Conducting seminars to explain and analyze a specific issue and find solutions to it.
Assessment methods
• Interaction within the lecture. • Homework and reports. • Short tests. • Semester and final exams.
C. Thinking Skills C1- Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall C2- Response: Follow up the student's interaction with the material displayed on the screen C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by solving problems in other ways. C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1- Develop the student's ability to perform the duties and deliver them on time D2 - sound mathematical thinking to find appropriate solutions to various engineering problems D 3- Develop the student's ability to dialogue and discussion

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Properties of Matrices, Matrices Types	Matrices	Theoretical	Questions and Tutorial
2	4	Operations on Matrices (Algebra of Matrices), Partition of Matrices	Matrices	Theoretical	Questions and Tutorial
3	4	Determinants	Matrices	Theoretical	Questions and Tutorial
4	4	Matrix Inverse	Matrices	Theoretical	Questions and Tutorial
5	4	Linear Equations	Matrices	Theoretical and Tutorial	Questions, Tutorial and Quiz
6	4	Vectors Calculus	Vectors Analysis	Theoretical	Questions and Tutorial
7	4	Unit Vector, Dot or Scalar Product	Vectors Analysis	Theoretical	Questions and Tutorial
8	4	Cross or Vector Product	Vectors Analysis	Theoretical	Questions and Tutorial
9	4	Lines and Planes in Space	Vectors Analysis	Theoretical and Tutorial	Questions, Tutorial and Quiz
10	4	Unit Tangent Vectors and Unit Normal Vectors	Vectors Analysis	Theoretical	Questions and Tutorial
11	4	Direction Derivative	Vectors Analysis	Theoretical	Questions and Tutorial
12	4	Divergence and Curl	Vectors Analysis	Theoretical and Tutorial	Questions, Tutorial and Quiz
13	4	Line Integral	Vectors Analysis	Theoretical	Questions and Tutorial
14	4	Surface Integral	Vectors Analysis	Theoretical	Questions and Tutorial
15	4	Volume Integral	Vectors Analysis	Theoretical and Tutorial	Questions, Tutorial and Quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	George B. Thomas, Jr., "Thomas Calculus" , Addison Wesley.
Special requirements (include for example workshops, periodicals, IT software, websites)	Reputable websites. Libraries sites in some international universities.
Community-based facilities (include for example, guest Lectures, internship, field studies)	

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Fluid Static / ME212
4. Modes of Attendance offered	Daily attendance
5. Semester/Year	First Semester / Second Year
6. Number of hours tuition (total)	45 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	
1. Explain the basic concepts of static fluids.	
2. Familiarize students with different pressure measurements.	
3. Enabling students to measure the level of liquids in containers.	
4. Gain experience in hydraulic systems.	
5. Enabling the student to derive mathematical relationships based on laboratory experiments.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1. The learner is able to understand the behavior of fluids according to their properties and use them appropriately. A2. Familiarize students with different pressure measurements. A3. Enabling students to measure the level of liquids in containers. A4. Gain experience in hydraulic systems. A5. Enabling the student to derive mathematical relationships based on laboratory experiments.
B. Subject-specific skills B1. Ability to design tanks and marine boat walls. B2. Know how to stabilize and balance bodies. B3. Knowledge of lubrication and lubrication systems for ball bearings.
Teaching and Learning Methods
1- Giving lectures. 2- Reading methodological and source books and accessing some websites (self-learning). 3- Discussion in the classroom.
Assessment methods
1- Seasonal and final exams. 2- Short tests and participation in the classroom. 3- Provide the assigned homework.
C. Thinking Skills C1. Analysis, learning and comparison. C2. Accuracy of observation and depth of thinking. C3. The speed of information retrieval and the obvious conclusion. C4. 4- Speed and accuracy of decision-making.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Develop and strengthen the student's ability to use multiple sources of the curriculum. D2. Develop and strengthen the student's ability to deal with modern technologies related to the course vocabulary. D3. Develop and strengthen the student's ability to face problems and dilemmas and find appropriate solutions to them. D4. Develop and strengthen the student's ability to translate academic information into practical reality.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	3	General Introduction-Definition of Fluid	Chapter 1	Theoretical	Question & discussion
Second	3	Important Variables in Fluid Mechanics	Chapter 1	Theoretical	Question & discussion
Third	3	Surface tension-capillarity	Chapter 1	Theoretical	Question & discussion
Fourth	3	Pressure acting on a point-Pressure variation with depth	Chapter 2	Theoretical	Question & discussion
Fifth	3	Manometers	Chapter 2	Theoretical	Question & discussion
Sixth	3	Manometers pressure estimation procedure	Chapter 2	Theoretical	Question & discussion
Seventh	3	Forces on Immersed plane Surfaces	Chapter 3	Theoretical	Question & discussion
Eighth	3	Forces on Immersed curved Surfaces	Chapter 3	Theoretical	Question & discussion
Ninth	3	Forces on Immersed curved Surfaces	Chapter 3	Theoretical	Question & discussion
Tenth	3	Buoyancy	Chapter 4	Theoretical	Question & discussion
Eleventh	3	Stability in immerged Bodies	Chapter 4	Theoretical	Question & discussion
Twelfth	3	Stability in floating Bodies	Chapter 4	Theoretical	Question & discussion
Thirteenth	3	Linear motion with constant acceleration	Chapter 5	Theoretical	Question & discussion
Fourteenth	3	Rotation with constant acceleration	Chapter 5	Theoretical	Question & discussion
Fifteenth	3	Dimensionless Analysis	Chapter 6	Theoretical	Question & discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	"Fluid Mechanics" Frank. M. White, 6th edition. "Fundamentals of Fluid Mechanics" 5th edition B. R. Munson et al - John Wiley and Sons.
Special requirements (include for example workshops, periodicals, IT software, websites)	Searching through websites
Community-based facilities (include for example, guest Lectures, internship, field studies)	Other books in the field of specialization and scientific journals

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course provides the possibility to identify the basic principles of thermodynamics, which are heat, work, systems and properties of fluids, in addition to studying the types of operating fluids and closed and flowing systems. The course also aims to identify the types of thermodynamic processes and their applications by identifying their parts, mathematical and engineering analysis, and methods for calculating properties, heat, work and efficiency.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Thermodynamics I / ME213
4. Modes of Attendance offered	Daily attendance
5. Semester/Year	First Semester / Second Year
6. Number of hours tuition (total)	45 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	
The course provides the possibility to identify the basic principles of thermodynamics, which are heat, work, systems and properties of fluids, in addition to studying the types of operating fluids and closed and flowing systems. The course also aims to identify the types of thermodynamic processes and their applications by identifying their parts, mathematical and engineering analysis, and methods for calculating properties, heat, work and efficiency.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1- Clarify the basic concepts of thermodynamics. A2- Acquisition of skills in dealing with problems and issues of thermodynamic systems. A3- Gain a basic understanding of how thermodynamic systems work in various industrial applications.
B. Subject-specific skills B1-The ability to analyze and design mechanical systems. B2 - The ability to think about addressing a particular problem or issue. B3 - Writing scientific reports. B4 - The ability to gain experience in dealing with thermodynamic systems.
Teaching and Learning Methods
1- Giving lectures. 2- Reading methodological and source books and accessing some websites (self-learning). 3- Discussion in the classroom.
Assessment methods
1- Seasonal and final exams. 2- Short tests and participation in the classroom. 3- Provide the assigned homework.
C. Thinking Skills C1. Analysis, learning and comparison. C2. Accuracy of observation and depth of thinking. C3. The speed of information retrieval and the obvious conclusion. C4. Speed and accuracy of decision-making.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Develop and strengthen the student's ability to use multiple sources of the curriculum. D2. Develop and strengthen the student's ability to deal with modern technologies related to the course vocabulary. D3. Develop and strengthen the student's ability to face problems and dilemmas and find appropriate solutions to them. D4. Develop and strengthen the student's ability to translate academic information into practical reality.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	3	Introduction, Definition / Force / Pressure Energy / Rescores / Uses	Chapter 1	Theoretical	Question & discussion
Second	3	Heat / Work / Power Internal Energy / Enthalpy	Chapter 1	Theoretical	Question & discussion
Third	3	Zeroth Law / Temperature and Its Measurement	Chapter 1	Theoretical	Question & discussion
Fourth	3	First Law of Thermodynamics / Perpetual Motion Machine	Chapter 2	Theoretical	Question & discussion
Fifth	3	Open System Processes / Steady – Flow Energy Equation	Chapter 2	Theoretical	Question & discussion
Sixth	3	Application of Steady Flow Energy Equation	Chapter 2	Theoretical	Question & discussion
Seventh	3	Boyles Law / Charles Law Equation of State / closed System	Chapter 3	Theoretical	Question & discussion
Eighth	3	The working fluid – Liquid	Chapter 3	Theoretical	Question & discussion
Ninth	3	The working fluid – Perfect gas	Chapter 3	Theoretical	Question & discussion
Tenth	3	Constant Volume and Constant Pressure Processes	Chapter 4	Theoretical	Question & discussion
Eleventh	3	Adiabatic Processes	Chapter 4	Theoretical	Question & discussion
Twelfth	3	Polytrophic Processes	Chapter 4	Theoretical	Question & discussion
Thirteenth	3	The second law of thermodynamics	Chapter 5	Theoretical	Question & discussion
Fourteenth	3	Entropy and heat	Chapter 5	Theoretical	Question & discussion
Fifteenth	3	The T-S Diagram	Chapter 6	Theoretical	Question & discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Applied Thermodynamics For Engineering Technologists by T.D. Estop
Special requirements (include for example workshops, periodicals, IT software, websites)	Searching through websites
Community-based facilities (include for example, guest Lectures, internship, field studies)	Other books in the field of specialization and scientific journals

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

Metallurgy is the science and technology to extract metals from their ores economically, refining them and preparing them for the end use. It studies the microstructure of a metal, the structural features that are control to observation under a microscope. Microstructure determines mechanical properties of the metal, including their elastic and plastic behavior when applying the force. Chemical composition is the relative content of a particular element within an alloy, usually expressed as a percent weight. Composition, as well as thermal and mechanical processing, will determine microstructure. Metals and their alloys are widely used in our daily lives. They are used for different purposes such as making machines, bridges, motor vehicles, railways, buildings structure, ships, aircrafts, agricultural tools, etc. Therefore, real economic growth can come from increasing quality and quantity of the metal production in that country

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical engineering department
3. Course title/code	Engineering Metallurgy / ME214
4. Modes of Attendance offered	Daily Attendance
5. Semester/Year	First semester / Second Year
6. Number of hours tuition (total)	75 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	
This course is designed for students interested in building technical knowledge and expertise in the principles that govern: 1. Classifications of engineering materials 2. Iron materials, specifications and characteristics 3- Non-ferrous materials, properties and applications 4. Ceramic materials, classification, specifications and applications 5. Polymers 6. Composite materials, their manufacture methods and applications	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A1- Clarify the basic concepts of engineering materials and their classifications
A2- Acquisition of skills in knowledge of different engineering subjects.
A3- Acquisition of basic skills as an introduction to the selection of materials for various engineering applications
A4- Gaining a basic understanding of the importance of engineering materials in the field of applications and taking into account specifications and costs.

B. Subject-specific skills
B1 - The ability to know the classifications of engineering materials.
B 2 - the ability to think about choosing the appropriate materials for engineering applications.
B3 - Writing scientific reports.
B4 - The ability to gain experience in dealing with changes that occur to engineering materials as a result of different operating conditions.

Teaching and Learning Methods

• Readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Directing students to some websites to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

• Interaction within the lecture.
• Homework and reports.
• Short exams .
• Semester and final exams.

C. Thinking Skills
C1. Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall.
C2 - Response: Follow up the student's interaction with the material displayed on the screen.
C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to be presented.
C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1. Develop the student’s ability to perform the duties and deliver them on time
D 2- Logical and programmatic thinking to find software solutions to various problems
D 3- Develop the student's ability to dialogue and discussion
D4 - Develop the student's ability to deal with modern technology, especially the Internet

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	2	Atomic structure, Bonding in materials	Structure of Metals	theoretical	Questions and discussion
Second	2	Crystallographic Structure, Macro – and micro – structure	Structure of Metals	theoretical	Questions and discussion
Third	2	Crystallographic Structure of ingots and castings.	Structure of Metals	theoretical	Questions and discussion
Fourth	2	Imperfections in the Atomic Arrangements	Structure of Metals	theoretical	Questions and discussion
Fifth	2	Dislocations theory Deformation by twinning	Structure of Metals	theoretical	Questions and discussion
Sixth	2	Solidification and Crystallization, Cooling Curves, Nucleation	Formation of Alloys and Thermal Equilibrium Diagrams	theoretical	Questions and discussion
Seventh	2	Solid Solution Phase Equilibrium Diagrams	Formation of Alloys and Thermal Equilibrium Diagrams	theoretical	Questions and discussion
Eighth	2	Eutectic Alloy, Combination Type, Intermetallic Compounds	Formation of Alloys and Thermal Equilibrium Diagrams	theoretical	Questions and discussion
Ninth	2	iron – carbon diagram	Plain Carbon Steel	theoretical	Questions and discussion
Tenth	2	structure of plain carbon steels, classification of plain carbon steels	Plain Carbon Steel	theoretical	Questions and discussion
Eleventh	2	Annealing, Normalizing	Heat Treatment of Plain Carbon Steels	theoretical	Questions and discussion
Twelfth	2	Hardening, Tempering	Heat Treatment of Plain Carbon Steels	theoretical	Questions and discussion
Thirteenth	2	The transformation of austenite, TTT Diagram	Heat Treatment of Plain Carbon Steels	theoretical	Questions and discussion
fourteenth	2	Gray Iron, White Iron, Ductile Iron	Cast Irons	theoretical	Questions and discussion
Fifteenth	2	Malleable Iron, Compacted Graphite Iron	Cast Irons	theoretical	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	1- Materials Science and Engineering: An Introduction, 10th Edition, William D. Callister Jr., January 2018. 2- Selection and Use of Engineering Materials by J. A. Charles, F. A. A. Crane, and J. A. G. Furness, Third Edition 2001. 3- The Science and Engineering of Materials by D. R. Askeland, and P. Phule Fourth Edition 2003.
Community-based facilities (include for example, guest Lectures, internship, field studies)	Reputable websites. Libraries sites in some international universities.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The programme provides the possibility of training the student on simple stress analysis, shear force and bending moment diagrams, deflection and buckling calculations in the elastic stage in a logical manner, as this subject represents an important part of the stages of building the student's analytical capabilities in various mechanical applications.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Mechanics of Materials / ME 215
4. Modes of Attendance offered	Daily Attendance
5. Semester/Year	First Semester / Second Stage
6. Number of hours tuition (total)	45 hours
7. Date of production/revision of this specification	2023
9. Aims of the Course	

1. This material is useful for a detailed study of forces and other external effects and their effects on the mechanical part. This knowledge is very essential for an engineer, to enable him, in designing all type of structure and machine.
2. To Provide the basic concepts and principles of mechanics of materials and to give an ability to analyze a given problem in a simple manner.
3. To give an ability to calculate stresses and deformations of objects under external forces.
4. To give an ability to apply the knowledge of mechanics of materials on engineering applications and design problems.

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Clarify the basic concepts of mechanics of materials.

A2. Acquire skills in dealing with engineering problems and topics related to mechanical design.

A3. Acquisition of basic skills as an introduction to the construction and calculations of mechanical parts and their dimensions.

A4. Understand the deformations that occur in the dimensions of mechanical systems as a result of applying forces and moments.

B. Subject-specific skills

B1. The ability to calculate various types of stresses.

B2. The ability to think on the analysis of a mechanical part subjected to a group of external effects.

B3. Writing scientific reports.

B4. The ability to gain experience in dealing with mechanical parts for the purpose of preparing the student for the design subject.

Teaching and Learning Methods

- Readings, self-learning, panel discussions.
- Exercises and activities in the lecture.
- Homework.
- Directing students to some websites to benefit and develop capabilities.
- Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

- Interaction within the lecture.
- Homework and reports.
- Short exams (Quizzes).
- Semester and final exams.

C. Thinking Skills

C1. Attention: drawing the students' attention by conducting a simplified mechanical analysis on the display screen in the hall.

C2. Response: Follow up the student's interaction with the material displayed on the screen.

C3. Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting specific programs and modifications to the mechanical system and other applications to present them.

C4. Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1 Develop the student's ability to perform the duties and deliver them on time.

D2 Logical and engineering thinking to find solutions and accounts for different mechanical systems and parts.

D3 Develop the student's ability in dialogue and discussion.

D4 Develop the student's ability to deal with modern technology, especially the Internet.

11. Course Structure					
Week	Hrs	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Types of Loads, Mechanical Properties, Stress and Strain, Direct or normal stress and Strain, Stress – Strain Curve, Poisson's Ratio, Shear stress and Strain Compound Bars	Simple Stress and Strain	Theoretical	Questions + tut
2	3		Simple Stress and Strain	Theoretical + Tutorial	Questions + tut
3	3	Types of Loading, Types of Support, Definition and Sign Convention of Shearing Force and Bending Moment, Shearing Force and Bending Moment for Different Cases, Relationship Between Shear Force (Q), Bending Moment (M) and Intensity of Loading (W).	Shear Force and Bending Moment Diagrams	Theoretical	Questions + tut
4	3		Shear Force and Bending Moment Diagrams	Theoretical	Questions + tut
5	3		Shear Force and Bending Moment Diagrams	Theoretical + Tutorial	Questions + tut
6	3	Simple Theory of Bending, Neutral Axis and Section Modulus, Combined bending and direct stress- eccentric loading.	Bending Stress of Beam	Theoretical	Questions + tut
7	3		Bending Stress of Beam	Theoretical + Tutorial	Questions + tut + Quiz
8	3	Distribution of shear stress due to bending, Applications on the Different Sections	Shear Stress Distribution	Theoretical	Questions + tut
9	3		Shear Stress Distribution	Theoretical	Questions + tut
10	3		Shear Stress Distribution	Theoretical + Tutorial	Questions + tut
11	3	Direct integration method (Double Integration), Macaulay's method, Mohr's "Area-Moment" Method, Continuous Beams- Clapeyron's "Three-Moment" Equation, Built in Beam (Fixed-Fixed).	Slope and Deflection of Beams	Theoretical	Questions + tut
12	3		Slope and Deflection of Beams	Theoretical	Questions + tut
13	3		Slope and Deflection of Beams	Theoretical	Questions + tut
14	3		Slope and Deflection of Beams	Theoretical	Questions + tut
15	3		Slope and Deflection of Beams	Theoretical + Tutorial	Questions + tut + Quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Mechanics of Materials – E J Hearn
Special requirements (include for example workshops, periodicals, IT software, websites)	Mechanics of materials E J Hearn Third Edition Schaum's Outline Series in Strength of Materials
Community-based facilities (include for example, guest Lectures, internship, field studies)	www.mathalino.com

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course aims to teach students the principles of mechanical engineering drawing, drawing machines and mechanical parts, and to learn to read and write mechanical drawing boards with all their details and symbols when designing or assembling machines in laboratories and workshops.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Mechanical drawing/ ME216
4. Programme to which it contributes	Bachelors of Mechanical Engineering
5. Modes of Attendance offered	Daily attendance
6. Semester/Year	First semester / second Year
7. Number of hours tuition (total)	45 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
1- Understand the importance of mechanical drawing for the engineer and its applications	
2- Recognizing the basics of representing the various mechanical parts in engineering drawing and the student's awareness of mechanical drawing as one of the scientific bases for working in the implementation of mechanical works.	
3- Teaching the student the important role of drawing in achieving solutions to technical problems in designing machines, machines, devices, tools, and implementing and manufacturing mechanical parts.	
4- Teaching the student the principles of assembling and dismantling mechanical systems, methods of connecting parts, the foundations of welding, and how to write their symbols	
5- The student learned how to write and read mechanical drawing boards in general.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Acquisition of skills in drawing mechanical parts and knowledge of engineering symbols and terms and standard specifications in engineering and mechanical drawing with the necessary skill to read and write industrial drawings.

A2- Acquiring basic skills as an introduction to design programs such as AutoCAD and other programs that are applied in practical applications.

A3- Gain a basic understanding of how to draw simple and complex assembled mechanical parts in practical life

A4- Informing the student of the role of engineering drawing and its relationship to the production of various industrial products and drawing them in all their fine details.

B. Subject-specific skills

B1. The student acquires the skill to read and understand the schematics of mechanical parts and systems resulting from their assembly

B 2- Representation of the individual mechanical parts and the resulting systems from their assembly by mechanical drawing.

B 3- Acquiring the skill of connecting mechanical parts and the foundations of assembling and dismantling mechanical systems.

B4- Read and represent all the minute details of the surfaces and properties of metals and the methods of connecting mechanical systems.

Teaching and Learning Methods

• Giving lectures, readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Reading textbooks and source material and directing students to some websites (self-learning) to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.
• Using all available means of education such as whiteboard, data show and board for drawing.

Assessment methods

• Interaction within the lecture.
• Home and class duties.
• Short exams (quiz).
• Semester and final exams.

C. Thinking Skills

C1. A1- Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall.

C2- Response: Follow up the student's interaction with the material displayed on the screen.

C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to be presented.

C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion towards the presented topic and defend it.

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

D1- Develop the student's ability to perform the duties and deliver them on time

D 2- Logical and programmatic thinking to find software solutions to various problems

D 3- Develop the student's ability to dialogue and discussion

D4 - Develop the student's ability to deal with modern technology.

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	3	Drawing in 1st and 3rd projection angles with free hand	A review of drawing lines and projections in the first and third projection angles and free drawing	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
2nd	3	types of screws and how to represent them by drawing	Screw threads	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
3th	3	Connect the plates with screws and nuts and represent them by drawing	Screw fastening and nuts	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
4th	3	Connect the plates with rivets represent them by drawing	Rivets and rivets joints	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
5th	3	Represent keys and cotters in joints by drawing	Keys, cotter- joints and pin joints	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
6th	3	Represent coupling by drawing	Shaft coupling	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
7th	3	Represent coupling by drawing	Shaft coupling	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
8th	3	Read and write welding symbols	Welded joints	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
9th	3	Understand the principles of drawing and marking of mechanical parts	Detail drawing (part drawing)	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
10th	3	Understand the principles of drawing and marking of	Detail drawing (part drawing)	Theoretical+ practical	Solve a question from the textbook by drawing with drawing

		mechanical parts			tools
11th	3	part drawing for piston	Engen parts/ pistons	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
12th	3	Understand and draw its component parts	Engen parts/ stuffing box & crossheads	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
13th	3	Understand and draw its component parts	Engen parts/ stuffing box & crossheads	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
14th	3	Understand and draw its component parts	Cranks and Connecting rod	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
15th	3	Understand and draw its component parts	Eccentric	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1-Mechanical Drawing /Shri N.D Bhat 2-Mechanical Drawing / K.L. Narayana 3- الرسم الهندسي / عبد الرسول الخفاف.
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Computer Programming/ ME227
5. Modes of Attendance offered	Daily attendance
6. Semester/Year	first semester / second year
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The theoretical foundations of computer engineering have expanded substantially in recent years. The objective of this course is to introduce students to this fundamental area of computer science which enables students to focus on the study of programming languages. These languages allow the students to assess what could be achieved through computing when they are using it to solve problems in science and engineering. The course exposes students to the programming with FORTRAN 90, as well as to its usage for problem solving. The course introduces basic programming instructions and their properties, and the necessary mathematical libraries to develop different software applications. Upon completion of this course the students are expected to become proficient in key topics of FORTRAN 90 programming, and to have the opportunity to explore the current topics in this area.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Clarify the basic concepts of programming in FORTRAN 90 language through a set of programming instructions.

A2. Gain skills in handling programming problems and issues.

A3. Acquiring basic skills as an introduction to building large and applied programs.

A4. Gain a basic understanding of how programmed systems work in various industrial applications.

B. Subject-specific skills

B1. Ability to program and design application programs.

B2. The ability to think about addressing a particular problem or issue.

B3. Writing scientific reports.

B4 - The ability to gain experience in dealing with programmed systems..

Teaching and Learning Methods

• Readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Directing students to some websites to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

• Interaction within the lecture.
• Homework and reports.
• Short exams.
• Semester and final exams

C. Thinking Skills

C1. Attention: Attracting students' attention by implementing one of the applied programs on the display screen in the hall

C2. Response: Monitoring the student's interaction with the material displayed on the screen

C3. Attention: following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display

C4. The formation of the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1- Develop the student's ability to perform the duties and deliver them on time

D 2- Logical and programmatic thinking to find software solutions to various problems

D 3- Develop the student's ability to dialogue and discussion

D4 - Develop the student's ability to deal with modern technology, especially the Internet.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	4	The rules of writing in the programming language FORTRAN 90	Introduction to programming in FORTRAN 90 language	theoretical + practical	Questions, discussion
2nd	4	Constants and variables types,	Introduction for Fortran 90 programming language	theoretical + practical	Questions, discussion and Short exams
3th	4	Input and output statements, mathematical functions	Input and output	theoretical + practical	Questions, and discussion
4th	4	Read from text files, write in text files, and logical operators	Text files	theoretical + practical	Questions, discussion and Short exams
5th	4	The importance and types of control sentences, unconditional GOTO, if constructs	Control constructs	theoretical + practical	Questions and discussion
6th	4	Case constructs	Control constructs	theoretical + practical	Questions and discussion
7th	4	DO loop control, DO and IF constructs	DO constructs	theoretical + practical	Questions and discussion
8th	4	DO conditional exist	DO constructs	theoretical + practical	Questions, discussion and Short exams
9th	4	Internal Subprograms, function and subroutines	Subprograms	theoretical + practical	Questions and discussion
10th	4	External Subprograms, function and subroutines	Subprograms	theoretical + practical	Questions and discussion
11th	4	The importance and declaration of arrays, read and print one-dimensional array	Arrays	theoretical + practical	Questions and discussion
12th	4	Read and print the matrices and using arrays with subprograms	Arrays	theoretical + practical	Questions, discussion and Short exams
13th	4	operations on arrays	Arrays	theoretical + practical	Questions and discussion
14th	4	Trapezoidal Rules, Simpson's Rules	Numerical Integration	theoretical + practical	Questions, discussion and Short exams
15th	4	Definition of Derivative Central difference method	Numerical Differentiation	theoretical + practical	Questions and discussion

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Engineering Mathematics II / E221
4. Modes of Attendance offered	Daily Attendance
5. Semester/Year	Second semester / second year
6. Number of hours tuition (total)	60 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	
This course teaches the student how to solve ordinary deferential equations by different method and Laplace transformation. The fundamental of series and sequences also can be provide in this course. The goal of this course will be to make everyone comfortable in reducing engineering problems in a mathematical context when appropriate and applying solution techniques.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A. Knowledge and Understanding

By the end of the course the student will be able to:

A1. Use mathematical methods to solve engineering problems using ordinary differential equations.

A2. Use different methods to solve ordinary differential equations..

A3. Use the Laplace transform to explain many engineering problems.

A4. Application of series and sequences in engineering applications.

B. Subject-specific skills

B1- The ability to solve engineering problems and how to deal with them mathematically.

B 2 - The ability to think about solving engineering problems mathematically and choose the appropriate methods for solving.

Teaching and Learning Methods

- Readings, self-learning, panel discussions.
- Exercises and activities in the lecture.
- Homework.
- Directing students to some websites to benefit and develop capabilities.
- Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

- Interaction within the lecture.
- Homework and reports.
- Short tests.
- Semester and final exams.

C. Thinking Skills

C1- Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall

C2- Response: Follow up the student's interaction with the material displayed on the screen

C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by solving problems in other ways.

C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1- Develop the student's ability to perform the duties and deliver them on time

D2 - sound mathematical thinking to find appropriate solutions to various engineering problems

D 3- Develop the student's ability to dialogue and discussion

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Fundamental Definitions, Solution of a Differential Equation, Solutions of The First-Order Differential Equations (1- Separation of Variable in First-Order Differential Equations	Differential equations	Theoretical	Questions and Tutorial
2	4	2- Homogeneous First-Order Differential Equations, 3- Exact First-Order Differential Equations	Differential equations	Theoretical	Questions and Tutorial
3	4	Integrating Factors , 4- First-Order Linear Differential Equations, Bernoulli Equation	Differential equations	Theoretical and Tutorial	Questions, Tutorial and Quiz
4	4	3-3 Solutions of The Second-Order Differential Equations 1- Second Order Differential Equations Reducible to First Order	Differential equations	Theoretical	Questions and Tutorial
5	4	2- Second-Order Homogeneous Linear Differential Equations , 3- Second Order Nonhomogeneous Linear Differential Equations	Differential equations	Theoretical	Questions and Tutorial
6	4	Particular Solution Methods (Methods of the Particular Solution) A- Opposite Operators Method B- Undetermined Coefficients Method C- Variations of Parameters	Differential equations	Theoretical and Tutorial	Questions, Tutorial and Quiz
7	4	Solutions of The Higher-Order Differential Equations A- Higher-Order Homogeneous Linear Differential Equations B- Higher-Order Nonhomogeneous Linear Differential Equations	Differential equations	Theoretical	Questions and Tutorial
8	4	Basic Principles, Laplace Transformation Definition, Basic Properties of The Laplace Transformation	Laplace transforms	Theoretical	Questions and Tutorial
9	4	The Laplace Transformation of Elementary Functions The Laplace Transform of $e^{at} f(t)$	Laplace transforms	Theoretical and Tutorial	Questions, Tutorial and Quiz
10	4	The Laplace Transform of $t^n f(t)$ Inverse Laplace transforms, Properties of Inverse Laplace Transform	Laplace transforms	Theoretical	Questions and Tutorial
11	4	Inverse Laplace Transforms Using Partial Fractions	Laplace transforms	Theoretical	Questions and Tutorial
12	4	The Solution of Differential Equations Using Laplace Transforms	Laplace transforms	Theoretical and Tutorial	Questions, Tutorial and Quiz
13	4	Introduction Sequence, Convergence and Divergence	Infinite Sequences and Series	Theoretical	Questions and Tutorial

14	4	Infinite Series, Converges and Diverges of Infinite Series, Converges and Diverges Tests	Infinite Sequences and Series	Theoretical	Questions and Tutorial
15	4	Power Series, Taylor and Maclaurin Series	Infinite Sequences and Series	Theoretical and Tutorial	Questions, Tutorial and Quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1- George B. Thomas, Jr., "Thomas Calculus", Addison Wesley. 2- Joel L. Schiff "The Laplace Transform: Theory and Applications"
Special requirements (include for example workshops, periodicals, IT software, websites)	Reputable websites. Libraries sites in some international universities.
Community-based facilities (include for example, guest Lectures, internship, field studies)	

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Fluid Dynamics / ME222
4. Modes of Attendance offered	Daily attendance
5. Semester/Year	Second Semester/ Second Year
6. Number of hours tuition (total)	90 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	
1. Clarify the basic concepts of dynamic fluid science.	
2- Studying the flow of fluids in closed tubes and open channels, and teaching the student to measure the flow and velocity of flow.	
3- Helping the student to understand the different scales used to measure fluid velocity, pressure and quantity of discharge.	
4- Gaining experience in hydraulic systems.	
5- Understand the flow of fluids around objects and in open channels.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1 - The student should mention, for example, the properties of physical fluids. A2- The student should know the difference between the types of fluid flow. A3 - To distinguish between the equations of flow and its applications. A4- The student should know the difference between a static liquid and a flowing liquid.
B. Subject-specific skills B1-In-depth understanding of fluid properties and the effects of increased pressures on fluid flow. B2 - Understand the practical applications in technology for fluid flow. B3- Extensive use of mathematical equations to solve complex flow of fluids. B4- Continuous use of different sources to increase understanding of various topics about fluid mechanics.
Teaching and Learning Methods
1- Giving lectures. 2- Reading methodological and source books and accessing some websites (self-learning). 3- Discussion in the classroom.
Assessment methods
1- Oral daily questions. 2- Bi-monthly oral exams. 3- Monthly written exams. 4- Semester test (first semester + second semester). 5- An annual final exam.
C. Thinking Skills C1 - The student's attendance at the lecture from the beginning. C2- The student listens to the lecture and pays attention to the information mentioned in it. C3 - The student maintains calm and interacts with the lecture by paying attention and answering the teacher's questions. C4- The student needs to believe in the importance of studying fluid mechanics and its great impact on his major.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1 - The student's acquisition of important information about fluid mechanics. D2- The student's knowledge of the relationship of the topics of this course with other subjects. D3 - The student's knowledge of the applied aspects of the material’s subjects. D4 - The student acquires knowledge of using different sources for the material's subjects.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	6	Introduction to Fluid Motion	Chapter 1	Theoretical	Question & discussion
Second	6	Types of flowlines-Types of flow	Chapter 1	Theoretical + Practical	Question & discussion + Report
Third	6	Control Volume and Conservations Laws	Chapter 1	Theoretical + Practical	Question & discussion + Report
Fourth	6	Applications of Bernoulli Equation	Chapter 1	Theoretical + Practical	Question & discussion + Report
Fifth	6	Viscous Flow- Entrance Length	Chapter 2	Theoretical	Question & discussion
Sixth	6	Laminar flow between Parallel plates	Chapter 2	Theoretical + Practical	Question & discussion + Report
Seventh	6	Laminar flow in circular pipe- Friction factor in laminar Flow	Chapter 2	Theoretical + Practical	Question & discussion + Report
Eighth	6	Comparison of laminar and turbulent velocity profiles in duct- Turbulent Velocity Profile	Chapter 2	Theoretical + Practical	Question & discussion + Report
Ninth	6	Major friction losses for Turbulent Flow- Losses in Noncircular conduits	Chapter 2	Theoretical + Practical	Question & discussion + Report
Tenth	6	Total losses along a system	Chapter 2	Theoretical + Practical	Question & discussion + Report
Eleventh	6	Multiple Pipe Systems	Chapter 2	Theoretical + Practical	Question & discussion + Report
Twelfth	6	Multiple Pipe Systems	Chapter 2	Theoretical + Practical	Question & discussion + Report
Thirteenth	6	Boundary layer-Prandtl theory	Chapter 3	Theoretical	Question & discussion
Fourteenth	6	Laminar & Turbulent BL	Chapter 3	Theoretical + Practical	Question & discussion + Report
Fifteenth	6	Von Karman integral-Friction drag coefficient	Chapter 3	Theoretical + Practical	Question & discussion + Report

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	"Fluid Mechanics" Frank. M. White, 6th edition. "Fundamentals of Fluid Mechanics" 5th edition B. R. Munson et al - John Wiley and Sons.
Special requirements (include for example workshops, periodicals, IT software, websites)	Searching through websites
Community-based facilities (include for example, guest Lectures, internship, field studies)	Other books in the field of specialization and scientific journals

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course provides the possibility of identifying various types of commonly used mechanical systems, such as heat engines such as car engines, refrigeration and refrigeration devices, compressors, and others by identifying the cycles and the working principle of these systems and their parts, mathematical and engineering analysis, and methods for calculating heat and work. efficiency. The course also provides an opportunity to design such systems for domestic and industrial use.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Thermodynamics II / ME223
4. Modes of Attendance offered	Daily attendance
5. Semester/Year	Second Semester / Second Year
6. Number of hours tuition (total)	45 Hour
7. Date of production/revision of this specification	2023
8. Aims of the Course	
The course provides the possibility to identify the basic principles of thermodynamics, which are heat, work, systems and properties of fluids, in addition to studying the types of operating fluids and closed and flowing systems. The course also aims to identify the types of thermodynamic processes and their applications by identifying their parts, mathematical and engineering analysis, and methods for calculating properties, heat, work and efficiency.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1- Clarify the basic concepts of thermodynamics.

A2- Acquisition of skills in dealing with problems and issues of thermodynamic systems.

A3- Gain a basic understanding of how thermodynamic systems work in various industrial applications.

B. Subject-specific skills

B1-The ability to analyze and design mechanical systems.

B2 - The ability to think about addressing a particular problem or issue.

B3 - Writing scientific reports.

B4 - The ability to gain experience in dealing with thermodynamic systems.

Teaching and Learning Methods

1- Giving lectures.

2- Reading methodological and source books and accessing some websites (self-learning).

3- Discussion in the classroom.

Assessment methods

1- Seasonal and final exams.

2- Short tests and participation in the classroom.

3- Provide the assigned homework.

C. Thinking Skills

C1. Analysis, learning and comparison.

C2. Accuracy of observation and depth of thinking.

C3. The speed of information retrieval and the obvious conclusion.

C4. Speed and accuracy of decision-making.

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

D1. Develop and strengthen the student's ability to use multiple sources of the curriculum.

D2. Develop and strengthen the student's ability to deal with modern technologies related to the course vocabulary.

D3. Develop and strengthen the student's ability to face problems and dilemmas and find appropriate solutions to them.

D4. Develop and strengthen the student's ability to translate academic information into practical reality.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	3	The heat engine cycle, the Carnot cycle for perfect gas	Chapter 1	Theoretical	Question & discussion
Second	3	The heat engine cycle, the Carnot cycle for Steam	Chapter 1	Theoretical	Question & discussion
Third	3	The air standard cycle	Chapter 1	Theoretical	Question & discussion
Fourth	3	The simple Rankine Cycle	Chapter 2	Theoretical	Question & discussion
Fifth	3	Rankine Cycle with Superheat	Chapter 2	Theoretical	Question & discussion
Sixth	3	Reciprocating machine	Chapter 2	Theoretical	Question & discussion
Seventh	3	The condition of minimum work, isothermal efficiency, and volumetric efficiency	Chapter 3	Theoretical	Question & discussion
Eighth	3	Compressor with clearance volume	Chapter 3	Theoretical	Question & discussion
Ninth	3	Multi stage compressor	Chapter 3	Theoretical	Question & discussion
Tenth	3	The Mixtures	Chapter 4	Theoretical	Question & discussion
Eleventh	3	The Dalton laws of mixture, volumetric analysis of gas mixtures	Chapter 4	Theoretical	Question & discussion
Twelfth	3	Adiabatic mixing of gases	Chapter 4	Theoretical	Question & discussion
Thirteenth	3	Combustion: fuels and chemistry	Chapter 5	Theoretical	Question & discussion
Fourteenth	3	Combustion Equation and air fuel ratio	Chapter 5	Theoretical	Question & discussion
Fifteenth	3	Exhaust and flue gas analysis	Chapter 6	Theoretical	Question & discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Applied Thermodynamics For Engineering Technologists by T.D. Estop
Special requirements (include for example workshops, periodicals, IT software, websites)	Searching through websites
Community-based facilities (include for example, guest Lectures, internship, field studies)	Other books in the field of specialization and scientific journals

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

Metallurgy is the science and technology to extract metals from their ores economically, refining them and preparing them for the end use . It studies the microstructure of a metal, the structural features that are control to observation under a microscope. Microstructure determines mechanical properties of the metal, including their elastic and plastic behavior when applying the force. Chemical composition is the relative content of a particular element within an alloy, usually expressed as a percent weight. Composition, as well as thermal and mechanical processing, will determine microstructure. Metals and their alloys are widely used in our daily lives. They are used for different purposes such as making machines, bridges, motor vehicles, railways, buildings structure, ships, aircrafts, agricultural tools, etc. Therefore, real economic growth can come from increasing quality and quantity of the metal production in that country

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical engineering department
3. Course title/code	Engineering Metallurgy / ME224
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	Second semester / Second Year
7. Number of hours tuition (total)	30 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
This course is designed for students interested in building technical knowledge and expertise in the principles that govern: 1. Classifications of engineering materials 2. Iron materials, specifications and characteristics 3- Non-ferrous materials, properties and applications 4. Ceramic materials, classification, specifications and applications 5. Polymers 6. Composite materials, their manufacture methods and applications	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A1- Clarify the basic concepts of engineering materials and their classifications
A2- Acquisition of skills in knowledge of different engineering subjects.
A3- Acquisition of basic skills as an introduction to the selection of materials for various engineering applications
A4- Gaining a basic understanding of the importance of engineering materials in the field of applications and taking into account specifications and costs.

B. Subject-specific skills
B1 - The ability to know the classifications of engineering materials.
B 2 - the ability to think about choosing the appropriate materials for engineering applications.
B3 - Writing scientific reports.
B4 - The ability to gain experience in dealing with changes that occur to engineering materials as a result of different operating conditions.

Teaching and Learning Methods

• Readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Directing students to some websites to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

• Interaction within the lecture.
• Homework and reports.
• Short exams.
• Semester and final exams.

C. Thinking Skills
C1. Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall.
C2 - Response: Follow up the student's interaction with the material displayed on the screen.
C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to be presented.
C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1. Develop the student’s ability to perform the duties and deliver them on time
D 2- Logical and programmatic thinking to find software solutions to various problems
D 3- Develop the student's ability to dialogue and discussion
D4 - Develop the student's ability to deal with modern technology, especially the Internet

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
first	2	Effect of alloying elements	Alloy Steels	theoretical	Questions and discussion
second	2	Manganese steels, Low alloy steels	Alloy Steels	theoretical	Questions and discussion
third	2	Stainless steels, Tool steels	Alloy Steels	theoretical	Questions and discussion
fourth	2	Copper alloys	Non- ferrous Alloys	theoretical	Questions and discussion
Fifth	2	Aluminum alloys	Non- ferrous Alloys	theoretical	Questions and discussion
Sixth	2	Engineering Stress and Engineering Strain	Mechanical Properties	theoretical	Questions and discussion
seventh	2	Elastic Deformation Plastic Deformation	Mechanical Properties	theoretical	Questions and discussion
Eighth	2	True Stress and True Strain	Mechanical Properties	theoretical	Questions and discussion
ninth	2	Hardness	Mechanical Properties	theoretical	Questions and discussion
tenth	2	mechanisms of corrosion	Corrosion	theoretical	Questions and discussion
eleventh	2	corrosion types	Corrosion	theoretical	Questions and discussion
twelfth	2	Corrosion. Prevention	Corrosion	theoretical	Questions and discussion
Thirteenth	2	Polymer Characterization	Polymers	theoretical	Questions and discussion
fourteenth	2	Polymer Synthesis and properties	Polymers	theoretical	Questions and discussion
Fifteenth	2	Polymer processing and testing	Polymers	theoretical	Questions and discussion

12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	1- Materials Science and Engineering: An Introduction, 10th Edition, William D. Callister Jr., January 2018. 2- Selection and Use of Engineering Materials by J. A. Charles, F. A. A. Crane, and J. A. G. Furness, Third Edition 2001. 3- The Science and Engineering of Materials by D. R. Askeland, and P. Phule Fourth Edition 2003.
Community-based facilities (include for example, guest Lectures, internship, field studies)	Reputable websites. Libraries sites in some international universities.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The programme provides the possibility of training the student on simple torsion theory, various type of cylinder and shell, complex stresses, streain energy, and deflection and buckling calculations in the elastic stage in a logical manner, as this subject represents an important part of the stages of building the student's analytical capabilities in various mechanical applications.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Strength of Materials / ME 225
4. Modes of Attendance offered	Daily Attendance
5. Semester/Year	First Semester / Second Stage
6. Number of hours tuition (total)	45 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	

1. This material is useful for a detailed study of forces and other external effects and their effects on the mechanical part. This knowledge is very essential for an engineer, to enable him, in designing all type of structure and machine.
2. To Provide the basic concepts and principles of mechanics of materials and to give an ability to analyze a given problem in a simple manner.
3. To give an ability to calculate stresses and deformations of objects under external forces.
4. To give an ability to apply the knowledge of mechanics of materials on engineering applications and design problems.

9· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Clarify the basic concepts of mechanics of materials.

A2. Acquire skills in dealing with engineering problems and topics related to mechanical design.

A3. Acquisition of basic skills as an introduction to the construction and calculations of mechanical parts and their dimensions.

A4. Understand the deformations that occur in the dimensions of mechanical systems as a result of applying forces and moments.

B. Subject-specific skills

B1. The ability to calculate various types of stresses.

B2. The ability to think on the analysis of a mechanical part subjected to a group of external effects.

B3. Writing scientific reports.

B4. The ability to gain experience in dealing with mechanical parts for the purpose of preparing the student for the design subject.

Teaching and Learning Methods

- Readings, self-learning, panel discussions.
- Exercises and activities in the lecture.
- Homeworks.
- Directing students to some websites to benefit and develop capabilities.
- Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

- Interaction within the lecture.
- Homework and reports.
- Short exams (Quizzes).
- Semester and final exams.

C. Thinking Skills

C1. Attention: drawing the students' attention by conducting a simplified mechanical analysis on the display screen in the hall.

C2. Response: Follow up the student's interaction with the material displayed on the screen.

C3. Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting specific programs and modifications to the mechanical system and other applications to present them.

C4. Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1 Develop the student's ability to perform the duties and deliver them on time.

D2 Logical and engineering thinking to find solutions and accounts for different mechanical systems and parts.

D3 Develop the student's ability in dialogue and discussion.

D4 Develop the student's ability to deal with modern technology, especially the Internet.

11. Course Structure					
Week	Hrs	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Simple torsion theory, Polar Second Moment of Area and Polar Section Modulus Composite Shafts, Combined Stress Systems, Combined Bending and Torsion, Combined Bending, Torsion and Direct Thrust, Shafts with Bolt Coupling, Torsion of Non-Circular	Torsion Theory	Theoretical	Questions + tut
2	3		Torsion Theory	Theoretical + Tutorial	Questions + tut
3	3	Stress Analysis, Graphical solution - Mohr's stress circle Strain Analysis, Principal strains in terms of stresses, Bulk modulus K and Volumetric strain, Relationship between the elastic constants E, G, K and V	Stress and Strain Analysis	Theoretical	Questions + tut
4	3		Stress and Strain Analysis	Theoretical	Questions + tut
5	3		Stress and Strain Analysis	Theoretical + Tutorial	Questions + tut
6	3	Strain energy for different kind of loading, Suddenly applied loads, Castigliano's first theorem for deflection.	Strain Energy	Theoretical	Questions + tut
7	3		Strain Energy	Theoretical + Tutorial	Questions + tut + Quiz
8	3	Thin cylinders under internal pressure, Hoop or circumferential stress, Longitudinal stress, Changes in dimensions, Thin spherical shell under internal pressure, change in internal volume, Vessels subjected to fluid pressure, Cylindrical vessel with hemispherical ends, Wire-wound thin cylinders.	Thin Cylinders and Shells	Theoretical	Questions + tut
9	3		Thin Cylinders and Shells	Theoretical	Questions + tut
10	3		Thin Cylinders and Shells	Theoretical + Tutorial	Questions + tut
11	3	Development of the Lame's theory, Thick cylinder - internal pressure only, Longitudinal stress, Change of cylinder dimensions, Compound cylinders. Built in Beam (Fixed-Fixed).	Thick Cylinders	Theoretical	Questions + tut
12	3		Thick Cylinders	Theoretical	Questions + tut
13	3		Thick Cylinders	Theoretical	Questions + tut
14	3	Euler's theory, Euler "validity limit", Rankine or Rankine-Gordon formula.	Struts	Theoretical	Questions + tut
15	3		Struts	Theoretical + Tutorial	Questions + tut + Quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS	Mechanics of Materials – E J Hearn
Special requirements (include for example workshops, periodicals, IT software, websites)	Mechanics of materials E J Hearn Third Edition Schaum's Outline Series in Strength of Materials
Community-based facilities (include for example, guest Lectures, internship, field studies)	www.mathalino.com

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course aims to teach students the principles of mechanical engineering drawing, drawing machines and mechanical parts and assembling them, and to learn to read and write mechanical drawing boards with all their details and symbols in terms of surface finishes and tolerances or Fits when designing or assembling machines in laboratories and workshops.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Mechanical drawing/ ME224
5. Modes of Attendance offered	Daily attendance
6. Semester/Year	Second semester / second stage
7. Number of hours tuition (total)	45 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
1- Understand the importance of mechanical drawing for the engineer and its applications	
2- Recognizing the basics of representing the various mechanical parts in engineering drawing and the student's awareness of mechanical drawing as one of the scientific bases for working in the implementation of mechanical works.	
3- Teaching the student the important role of drawing in achieving solutions to technical problems in designing machines, machines, devices, tools, and implementing and manufacturing mechanical parts.	
4- Teaching the student the principles of assembling and dismantling mechanical systems, methods of connecting parts, the foundations of surface finishing, Fits and Tolarance, and how to write their symbols	
5- The student learned how to write and read mechanical drawing boards in general.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Acquisition of skills in drawing mechanical parts and knowledge of engineering symbols and terms and standard specifications in engineering and mechanical drawing with the necessary skill to read and write industrial drawings.

A2- Acquiring basic skills as an introduction to design programs such as AutoCAD and other programs that are applied in practical applications.

A3- Gain a basic understanding of how to draw simple and complex assembled mechanical parts in practical life

A4- Informing the student of the role of engineering drawing and its relationship to the production of various industrial products and drawing them in all their fine details.

B. Subject-specific skills

B1. The student acquires the skill to read and understand the schematics of mechanical parts and systems resulting from their assembly

B 2- Representation of the individual mechanical parts and the resulting systems from their assembly by mechanical drawing .

B 3- Acquiring the skill of connecting mechanical parts and the foundations of assembling and dismantling mechanical systems.

B4- Read and represent all the minute details of the surfaces and properties of metals and the methods of connecting mechanical systems.

Teaching and Learning Methods

• Giving lectures, readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Reading textbooks and source material and directing students to some websites (self-learning) to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.
• Using all available means of education such as whiteboard, data show and board for drawing.

Assessment methods

• Interaction within the lecture.
• Home and class duties.
• Short exams (quiz).
• Semester and final exams.

C. Thinking Skills

C1. A1- Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall.

C2- Response: Follow up the student's interaction with the material displayed on the screen.

C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to be presented.

C4 - Forming the direction: meaning that the student is sympathetic to the

presentation and may have an opinion towards the presented topic and defend it.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1- Develop the student's ability to perform the duties and deliver them on time D 2- Logical and programmatic thinking to find software solutions to various problems D 3- Develop the student's ability to dialogue and discussion D4 - Develop the student's ability to deal with modern technology.

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	3	Understand the principles of drawing and assemble mechanical parts	Assembly drawing	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
2nd	3	Understand the principles of drawing and assemble mechanical parts	Assembly drawing	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
3th	3	Understand and draw its assembled parts	Shaft Bearings	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
4th	3	Understand and draw its types and assembled parts	Shaft Bearings	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
5th	3	Understand and draw its types and assembled parts	Pulleys	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
6th	3	Understand and draw its types and assembled parts	Pulleys	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
7th	3	Understand and draw its types and assembled parts	Spur Gears	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
8th	3	Understand and draw its types and assembled parts	Spur Gears	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
9th	3	Understand the principles of calculating and marking them on mechanical parts	Fits, limits and Tolerance	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
10th	3	Understand the principles of calculating and marking them on mechanical parts	Fits, limits and Tolerance	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
11th	3	Understand the principles of marking them on mechanical parts	Surface finishing	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
12th	3	Understand and draw its component parts	Valves	Theoretical+ practical	Solve a question from the textbook by drawing

					with drawing tools
13th	3	Understand and draw its component parts	Valves	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
14th	3	read the mechanical drawing sheets in all its details	Drawing analysis	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools
15th	3	read the mechanical drawing sheets in all its details	Drawing analysis	Theoretical+ practical	Solve a question from the textbook by drawing with drawing tools

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1-Mechanical Drawing /Shri N.D Bhat 2-Mechanical Drawing / K.L. Narayana 3- الرسم الهندسي / عبد الرسول الخفاف.
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

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	Basra University
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Advanced Programming/ ME227
5. Modes of Attendance offered	daily attendance
6. Semester/Year	second semester / second stage
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The theoretical foundations of computer engineering have expanded substantially in recent years. The objective of this course is to introduce students to this fundamental area of computer science which enables students to focus on the study of programming languages. These languages allow the students to assess what could be achieved through computing when they are using it to solve problems in science and engineering. The course exposes students to the programming with MATLAB, as well as to its usage for problem solving. The course introduces basic programming instructions and their properties, and the necessary mathematical libraries to develop different software applications. Upon completion of this course the students are expected to become proficient in key topics of MATLAB language programming, and to have the opportunity to explore the current topics in this area.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Clarify the basic concepts of programming in MATLAB language through a set of programming instructions.

A2. Gain skills in handling programming problems and issues.

A3. Acquiring basic skills as an introduction to building large and applied programs.

A4. Gain a basic understanding of how programmed systems work in various industrial applications.

B. Subject-specific skills

B1. Ability to program and design application programs.

B2. The ability to think about addressing a particular problem or issue.

B3. Writing scientific reports.

B4 - The ability to gain experience in dealing with programmed systems.

Teaching and Learning Methods

• Readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Directing students to some websites to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

• Interaction within the lecture.
• Homework and reports.
• Short exams.
• Semester and final exams

C. Thinking Skills

C1. Attention: Attracting students' attention by implementing one of the applied programs on the display screen in the hall

C2. Response: Monitoring the student's interaction with the material displayed on the screen

C3. Attention: following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display

C4. The formation of the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1- Develop the student's ability to perform the duties and deliver them on time

D 2- Logical and programmatic thinking to find software solutions to various problems

D 3- Develop the student's ability to dialogue and discussion

D4 - Develop the student's ability to deal with modern technology, especially the Internet.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	4	writing symbols in a Matlab language and Matlab screen components	Introduction for programming in matlab language	theoretical + practical	Questions, discussion
2nd	4	Types of constants, variables and arithmetic sentences	Introduction for programming in matlab language	theoretical + practical	Questions, discussion and Short exams
3th	4	Write a simple matrix and how to address it to find any element in it	Arrays and operation on matrices	theoretical + practical	Questions, and discussion
4th	4	Write a regular matrices and how to address it to find any element in it	Arrays and operation on matrices	theoretical + practical	Questions, discussion and Short exams
5th	4	Standard matrices unit, zeroes and eye matrices	Arrays and operation on matrices	theoretical + practical	Questions and discussion
6th	4	operations on arrays	Arrays and operation on matrices	theoretical + practical	Questions and discussion
7th	4	Arithmetic operations between a matrix and a singular number or between matrices	Arrays and operation on matrices	theoretical + practical	Questions and discussion and Short exams
8th	4	Searching for a partial matrix and using prompts to find the sum of the elements of the matrix or the largest or smallest element in it	Arrays and operation on matrices	theoretical + practical	Questions and discussion
9th	4	Input and output sentences	Input and output sentences and conditional sentences	theoretical + practical	Questions and discussion
10th	4	Comparative and logical operators If-else-end form switch-case-otherwise form	Input and output sentences and conditional sentences	theoretical + practical	Questions, discussion and Short exams
11th	4	Rotation and repetition statements	Input and output sentences and conditional sentences	theoretical + practical	Questions and discussion
12th	4	Formula for storing variables and for loading them from a file	Matlab data files	theoretical + practical	Questions and discussion
13th	4	Dealing with files	Matlab data files	theoretical + practical	Questions, discussion and Short exams
14th	4	Instructing plot and partial graphs	graphs	theoretical + practical	Questions and discussion
15th	4	Greate function that deal with one or with several variables with input and one variable with output	functions	theoretical + practical	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	الماتلاب للمهندسين **تعلم الماتلاب بخطوات سهلة من الصفر**
Community-based facilities (include for example, guest Lectures, internship, field studies)	Reputable websites. Libraries sites in some international universities. The internet

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Engineering Analysis / E311
5. Modes of Attendance offered	Daily attendance
6. Semester/Year	First Semester / Third Year
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
1. Preparing and qualifying engineers to meet the requirements of the labor market in the private and public sectors in mechanical engineering.	
2. Providing distinguished academic programs in the field of mechanical engineering, both theoretical and practical, that comply with international standards of academic quality and meet the needs of the labor market.	
3. Building and developing partnerships with the governmental and private sectors and the community with all its various institutions.	
4. Developing and improving scientific research in the fields of mechanical engineering, writing programs for solving differential equations and complex functions, data processing, digital signal analysis and control.	
5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1- Clarify the basic concepts of Engineering Analysis and their applications in social and industrial fields. A2- Acquiring the skill in dealing with and addressing problems through the acquired sciences in this field. A3- Acquisition of basic skills to solve engineering problems. A4- Gaining experience in describing engineering problems mathematically and finding related equations to solve them.
B. Subject-specific skills B1 - The ability to solve mathematical equations. B 2 - The ability to think about addressing problems according to the algorithms and methods of their work. B 3 - Writing scientific reports, reading charts, and analyzing digital data.
Teaching and Learning Methods
1. Explanation and clarification through lectures. 2. Using data show, smart boards, and plasma screens. 3. Self-learning through homework and mini-projects within the lectures. 4. Laboratories. 5. Mid-term and summer training.
Assessment methods
• Active participation in the classroom is evidence of the student's commitment and responsibility. • Commitment to the deadline in submitting the duties and research required of the student to submit them. • The quarterly and final exams express commitment and cognitive and skill achievement.
C. Thinking Skills C1- Attention: Arousing the students’ attention by showing an applied mathematical problem on the display screen. C2- Response: Follow up the student's interaction with the material displayed on the screen. C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display
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 complex functions and solve equations. D3 - Develop the student's ability to deal with multiple media. D4 - Develop the student's ability to dialogue and discussion.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Complex Functions	Complex variables and functions	Theoretical	Questions and discussion
2	4	Special Complex Functions	Complex variables and functions	Theoretical	Questions and discussion
3	4	Continuity and Differentiation	Complex variables and functions	Theoretical	Questions and discussion
4	4	Cauchy-Riemann Equations	Complex variables and functions	Theoretical and tutorial	Questions and discussion
5	4	Complex Integration	Complex variables and functions	Theoretical and tutorial	Questions and discussion
6	4	Fourier Series	Fourier Series	Theoretical	Questions and discussion
7	4	Complex Fourier Series	Fourier Series	Theoretical and tutorial	Questions and discussion
8	4	Laplace Transform of Special Functions and Cases	Laplace Transform	Theoretical	Questions and discussion
9	4	Inverse Laplace Transform	Laplace Transform	Theoretical and tutorial	Questions and discussion
10	4	Ordinary Differential Equations	Ordinary Differential Equations	Theoretical	Questions and discussion
11	4	Solution of ODE	Ordinary Differential Equations	Theoretical and tutorial	Questions and discussion
12	4	Partial Differential Equation	Partial Differential Equation	Theoretical	Questions and discussion
13	4	D-Alembert Solution of the 1-Dim Wave Equation	Partial Differential Equation	Theoretical	Questions and discussion
14	4	Using Separation of Variables to Solve PDE	Partial Differential Equation	Theoretical and tutorial	Questions and discussion
15	4	Solution of 1-Dim Diffuse Equation	Partial Differential Equation	Theoretical and tutorial	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1. Advanced Engineering Mathematics, Wylie, McGraw Hill Books Company. 2. Advanced Engineering Mathematics, Kreyszig, Jon Wylie and Sons. 3. Mathematical Methods for Engineers and Scientists, K. T. Tang 4. Numerical Methods, Robert W. Hornbeck, Quantum Publishers Inc. Finite Elements Methods, A. Alzafrani, Cranfield University.
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This course gives students a comprehensive experience in the topics and applications related to the subject of heat transfer. It is also a development of theoretical capabilities and ways to implement them in practice in this field. This course opens high horizons for the development of self-capacity in building more modern thermal systems and addressing all industrial problems in the field of heat transfer. Heat and scientifically successful methods.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Heat Transfer I / ME312
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First Semester/ Third year
7. Number of hours tuition (total)	45 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to graduate students capable of entering the field of industry with sufficient theoretical and practical experience.	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

- Consolidating the basic principles of heat transfer.
- Introducing the most important practical applications in different industries.
- Calculation of the most important variables to be taken into consideration in the design of systems related to heat transfer.
- Explanation and clarification of modern methods of dealing with issues related to heat transfer and practical applications.
- The use of modern technologies and concepts in understanding the principles of heat energy.

B. Subject-specific skills

- The possibility of studying the principles of heat transfer in modern systems.
- Gaining high confidence in the ability to design modern systems.
- Publishing research articles in the field of heat transfer.

Teaching and Learning Methods

1. Use of recorded video clips.
2. Direct attendance lectures.
3. Laboratories and practical experiments.
4. Practical projects.
5. Using modern display methods such as smart screens.
6. Scientific visits.
7. Seminars held in the department.
8. Preparing lectures using modern programs.

Assessment methods

1. Daily exams.
2. Duties.
3. Semester and final exams for theoretical and practical subjects.
4. Design of practical systems.
5. Classroom participation.
6. Laboratories and evaluation of experiments.

C. Thinking Skills

C1- The lecture should be a source of focus for the students

C2- Communication should be continuous during the lesson

C3 - Asking some surprising questions to draw the students' attention and evaluate the interacting students

C4 - Discussing the students in their opinion in the presentation method.

C5 - The lecture should not be boring and bored.

Week	Hours	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Introduction to Heat Transfer / Basics of Heat Transfer	theoretical	Questions and discussion
2	3	Methods of Heat Transfer / Conduction, Convection and Radiation	theoretical	Questions and discussion
3	3	One Dimensional Steady State Heat Conduction/ plane wall	theory + solution examples	Questions and discussion and quiz
4	3	One Dimensional Steady State Heat Conduction / Cylindrical and Spherical Coordinates	theory + solution examples	Questions and discussion
5	3	Thermal Resistance Concept	theoretical	Questions and discussion
6	3	Multilayer Plane Walls	theory + solution of examples	Questions and discussion
7	3	Multilayered/ Cylinder Sphere	theoretical	Questions and discussion and quiz
8	3	Critical Radius of Insulation	theoretical	Questions and discussion
9	3	Extended Surface Heat Transfer	Theoretical + solution of examples	Questions and discussion
10	3	Extended Surface Heat Transfer	theoretical	Questions and discussion +quiz
11	3	Two-Dimensional, Steady-State Conduction	theoretical	Questions and discussion
12	3	Transient Conduction	Theoretical +solution of examples	Questions and discussion
13	3	Lumped Capacity Method	Theoretical +solution of examples	Questions and discussion +quiz
14	3	The semi-infinite solid	theoretical	Questions and discussion
15	3	Heisler Charts	Theoretical +solution of examples	Questions and discussion +quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Fundamentals of Heat and Mass Transfer By FRANK P. INCROPERA
Special requirements (include for example workshops, periodicals, IT software, websites)	HEAT TRANSFER / A Practical Approach by YUNUS A. CENGEL
Community-based facilities (include for example, guest Lectures, internship, field studies)	HEAT TRANSFER by J.P. Holman

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

The theory of mechanism generates in the student an impression and an understanding about the mechanism of movement of all kinds as a result of the force applied to the mechanical parts.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Theory of Mechanisms / ME313
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First Semester / Third year
7. Number of hours tuition (total)	90
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to graduate cadres capable of entering the field of machinery manufacturing and design.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A1- The basic principles of the theory of machines and machines. A2- Design of movement systems. A3- Maintenance and operation of modern machine systems. A4 - Incorporating programming into the design of movement and power systems.
B. Subject-specific skills Confidence in the possibility of designing different movement systems. B2 - Raising the level of ability to introduce advanced means in the theories and methods of movement and force. B3 - The work of large and small projects. B4 - The ability to operate and rehabilitate machines and equipment.

Teaching and Learning Methods
• Reading the relevant books in the field of the course. • Discussion within the lesson. • Solve some advanced issues. • Searching websites. • Attending scientific conferences.
Assessment methods
• Discussion within the lesson. • Homework and reports. • Daily tests. • Semester and final exams.
C. Thinking Skills C1 - Activating the participation of students. C2- Paying attention to the student's desire to accept the lesson material. C3 - Evaluation of the students interacting in the lesson. C4 - Presenting practical examples that interest the students for the lesson. C 5 - Presenting various topics to keep the recipient away from boredom and boredom.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1- Paying attention to and evaluating duties. D 2 - Access to a systematic and scientific method in raising topics. D3 - Clarify the importance of benefiting from technological and informational progress. D 4- Allocate time for discussion.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	6	Motions and forces terms	introduction	Theoretical/practical	Questions and discussion
2	6	Velocity vectors	Velocity diagram	Theoretical/practical	Questions and discussion
3	6	Acceleration vectors	Acceleration diagram	Theoretical/practical	Questions and discussion and quiz
4	6	Simple crank mech.	Simple crank mech.	Theoretical/practical	Questions and discussion
5	6	Velocity and acceleration of mech.	Velocity and acceleration of mech.	Theoretical/practical	Questions and discussion
6	6	Uniform velocity and SHM	cams and followers displacements	Theoretical/practical	Questions and discussion
7	6	Cam and follower strokes	Cam motions and types	Theoretical/practical	Questions and discussion and quiz
8	6	Cam and follower diagrams two scale	Cam and follower diagrams	Theoretical/practical	Questions and discussion
9	6	Gyroscopic couples	Gyroscopic	Theoretical/practical	Questions and discussion
10	6	Gyroscopic motions	Gyroscopic applications	Theoretical/practical	Questions and discussion +quiz
11	6	Examples of Gyro for certain applications	Aircraft and ship Gyro equation	Theoretical/practical	Questions and discussion
12	6	Benefits and details	Flywheels	Theoretical/practical	Questions and discussion
13	6	Equations and applications	Turning moment diagrams	Theoretical/practical	Questions and discussion +quiz
14	6	Types and equations	Clutches	Theoretical/practical	Questions and discussion
15	6	Examples on clutches	Clutches applications	Theoretical/practical	Questions and discussion +quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Theory of Machines by RS Khurmi and JK Gupt
Special requirements (include for example workshops, periodicals, IT software, websites)	Theory of machines. London, E. Arnold,
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This course gives students a comprehensive experience in preparing modern models and designing or developing Internal Combustion Engines. It is also a development of theoretical capabilities in building models for Internal Combustion Engines in theory and ways to implement them in practice.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Internal Combustion Engines / ME314
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First Semester/ Third year
7. Number of hours tuition (total)	48 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to graduate cadres capable of entering the field of manufacturing, designing and maintaining measurement regulators for all mechanical equipment.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1- Basic principles for the work of Internal Combustion Engines. A2- Design of Internal Combustion Engines. A3 - Maintenance and operation of modern Internal Combustion Engines. A4- Incorporating artificial intelligence into the design of Internal Combustion Engines
B. Subject-specific skills B1 - Confidence in the ability to design Internal Combustion Engines. B2 - Raising the level of ability to introduce advanced methods in Internal Combustion Engines B3 - The work of large and small projects. B4 - The ability to operate and rehabilitate Internal Combustion Engines.
Teaching and Learning Methods
• Reading the relevant books in the field of the course. • Discussion within the lesson. • Solve some advanced issues. • Searching websites. • Attending scientific conferences.
Assessment methods
• Discussion within the lesson. • Homework and reports. • Daily tests. • Semester and final exams.
C. Thinking Skills C1 - Activating the participation of students. C2- Paying attention to the student's desire to accept the lesson material. C3 - Evaluation of the students interacting in the lesson. C4 - Presenting practical examples that interest the students for the lesson. C 5 - Presenting various topics to keep the recipient away from boredom and boredom.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1- Paying attention to and evaluating duties. D 2 - Access to a systematic and scientific method in raising topics. D3 - Clarify the importance of benefiting from technological and informational progress. D 4- Allocate time for discussion.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Introduction to reciprocating engine	Basic Engine types and Their Operation	theoretical	Questions and discussion
2	3	Engine classification by cylinder arrangement.	Familiarization basic engine nomenclature.	theoretical	Questions and discussion
3	3	Spark ignition engine (4 – stroke and 2 – stroke cycle).	Spark ignition engine (4 – stroke and 2 – stroke cycle).	theory + solution examples	Questions and discussion and quiz
4	3	Compression ignition engine (4 – stroke and 2 – stroke cycle).	Compression ignition engine (4 – stroke and 2 – stroke cycle).	theory + solution examples	Questions and discussion
5	3	SI and CI Engines.	Fundamental differences between SI and CI Engines.	theoretical	Questions and discussion
6	3	reciprocating engine.	Energy flow through a reciprocating engine.	theory + solution of examples	Questions and discussion
7	3	Rotary engines.	Rotary engines.	theoretical	Questions and discussion and quiz
8	3	The Wankel engine.	The continuous – combustion gas turbine	theoretical	Questions and discussion
9	3	Basic power measurements.	Engine Power and Performance	Theoretical + solution of examples	Questions and discussion
10	3	Indicated Mean effective pressure, Indicated power.	Engine Power and Performance	theoretical	Questions and discussion +quiz
11	3	Friction power. Mean effective power.	Engine Power and Performance	theoretical	Questions and discussion
12	3	The Air – Cycle approximation:	Thermodynamics of I.C. Engine	Theoretical +solution of examples	Questions and discussion
13	3	Air – cycle calculations.	Thermodynamics of I.C. Engine	Theoretical +solution of examples	Questions and discussion +quiz
14	3	The Actual Engine Cycle	Thermodynamics of I.C. Engine	theoretical	Questions and discussion
15	3	Effect of engine variable on flame speed	Thermodynamics of I.C. Engine	Theoretical +solution of examples	Questions and discussion +quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1. The Internal – Combustion Engines, C.F. Taylor, E.S. Taylor International Text Book Company, 2 nd Edition, Pennsylvania, 1966. 2. The Internal – Combustion Engine in Theory and Practice C.F.Taylor, The M.I.T. Press, Mass, 1968. 3. Internal Combustion Engines and Air Pollutions, In text Educational Publishers, New York, 1970
Special requirements (include for example workshops, periodicals, IT software, websites)	Engineering Fundamentals of the Internal Combustion Engine by Willard W. Pulkrabek

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course is a description of the theories that control the compressible flow of gases and their applications in rocket and jet engines.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Gas Dynamic / ME315
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First Semester / Third year
7. Number of hours tuition (total)	45 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to introduce students to the basics of compressive flow and its application to gas and compressed air transmission systems, as well as to introduce students to the basics of the work of rocket and jet engines.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1- Clarify the basic concepts of compressible flow. A2- Acquisition of skills in dealing with problems and issues related to compression flow. A3- Acquisition of basic skills as an introduction to the study of flow around aircraft. A4- Gain a basic understanding of how jet propulsion engines work.
B. Subject-specific skills B1 - The ability to know the types of compressive flow. B2 - The ability to think about addressing a particular problem or issue. B3 - Writing scientific reports. B4 - The ability to gain experience in dealing with jet engines.

Teaching and Learning Methods
● Readings, self-learning, panel discussions. ● Exercises and activities in the lecture. ● Homework. ● Directing students to some websites to benefit and develop capabilities. ● Conducting seminars to explain and analyze a specific issue and find solutions to it.
Assessment methods
● Interaction within the lecture. ● Homework and reports. ● Short Quizzes. ● Semester and final exams.
C. Thinking Skills C1- Attention: Arousing the students' attention by running simulation devices and scientific videos. C2 - Response: Follow up the student's interaction with the material displayed on the screen. C3- Attention: Follow up on the interest of the student who interacted the most with the presented material. C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1- Develop the student’s ability to perform the duties and deliver them on time D 2- Engineering thinking to find scientific solutions to various problems D3 - Developing the student's ability to dialogue and debate D4 - Develop the student's ability to deal with modern technology, especially the Internet

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Review of Gas Dynamic	Introduction on Gas Dynamic	Theory	Question and Discussion
2	3	Boosting the knowledge in Isentropic flow	Isentropic Flow	Theory + Tutorial	Question and Discussion + Quiz
3	3	Stating the physics of Mach cone	Mach number and Mach cone	Theory	Question and Discussion
4	3	Importance of Gas Dynamic	Flow through variable area duct	Theory + Tutorial	Question and Discussion + Quiz
5	3	Application of Gas Dynamic	Flow cases in C-D nozzle	Theory	Question and Discussion
6	3	Application of Gas Dynamic	Flow cases in a converging Nozzle	Theory + Tutorial	Question and Discussion + Quiz
7	3	Application of Gas Dynamic	Normal Shock wave	Theory	Question and Discussion
8	3	Application of Gas Dynamic	Oblique Shock wave	Theory + Tutorial	Question and Discussion
9	3	Application of Gas Dynamic	Expansion wave	Theory	Question and Discussion + Quiz
10	3	Application of Gas Dynamic	Prandtl Mayer function	Theory + Tutorial	Question and Discussion
11	3	Application of Gas Dynamic	Rocket Engine	Theory	Question and Discussion
12	3	Application of Gas Dynamic	Turbojet Engine	Theory + Tutorial	Question and Discussion + Quiz
13	3	Application of Gas Dynamic	Fuel Consumption in Turbojet Engine	Theory	Question and Discussion
14	3	Application of Gas Dynamic	Twin-Spool turbojet engine	Theory + Tutorial	Question and Discussion
15	3	Application of Gas Dynamic	Twin-Spool turbojet engine	Theory + Tutorial	Question and Discussion + Quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS	Fluid Mechanics Gas Turbine Theory
Special requirements (include for example workshops, periodicals, IT software, websites)	Introduction to Compressible flow
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

In this course, the basic principles that the student studied in the first stage in the basics of electrical engineering are relied on to enable the student to understand the work of DC and AC induction machines (generators and motors), as well as electrical transformers. Where the basic principles of the electrical machine are studied and the types of electrical machines and the basic components of the electrical machine, which are essential for all kinds of machines, are studied. Then, identifying the method of generating an induced electromotive force, electrical switching, the reaction of the production member, studying the internal and external features, and how to draw these features, and extracting the special mathematical relationships that link these features. Then study the types of generators for DC and AC inductive current and their characteristics, as well as the characteristics and types of DC and AC motors, and what distinguishes each type of features suitable for different mechanical loads.
As well as the study of electrical transformers and the principles of their work and the mathematical relationships governing these transformers, and the study of the types of step up or step down transformers (for voltage or current), as well as knowledge of the internal installation and tests to which the transformers are subjected, which we benefit from in determining the efficiency of the transformer and the extent of its regulation of electrical voltage, as well as knowledge of measurement transformers (transformers).

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Electrical Machines / ME316
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First Semester / Third Year
7. Number of hours tuition (total)	45 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to provide the student with basic skills in the subject of studying and understanding the characteristics of types of DC and AC (inductive) machines, as well as electrical transformers.	

10. Course outcomes and methods of teaching, learning and assessment
A- Cognitive goals A1- Identifying the machine’s (continuous and alternating) installation and derivation of the E.M.F equation and the equivalent circuit of the motors A2- Identify the types of generators and their features. A3- Identify the types of motors and their features. A4- Learn about the applications of generators and motors.
B - Skills objectives of the course. B1 - Learn how DC and AC generators work and features B2 - Learn how DC and AC motors work and features
• Explain the basic principles of the work of generators and engines and link them to practical applications. • Allocating lectures to solve theoretical issues and discuss basic concepts. • Directing students to each other to benefit from the systematic training for the third stage.
Evaluation methods
• Interaction within the lecture. • Homework and reports. • Short exams. • Semester and final exams.
C- Emotional and value goals C1- Helping the student on how to lay the scientific foundations for solving various problems. C2-Help the student to understand the theoretical basis for the work of the machine and the transformer
D - Transferred general and qualifying skills (other skills related to employability and personal development). D1 - Qualifying the student to deal with practical problems and how to solve them. D2 - Teaching the student to write scientific reports describing the various problems and the mechanism for solving them. D3 - Enabling the student to pass the exams held by companies and government and private institutions. D4 - Increasing the student's self-confidence and creating a leadership spirit for him to manage practical problems.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	DC machine construction	DC machine construction	Theoretical and tutorial	Questions and discussion
2	3	E.M.F. Equation and output equation and commutation	E.M.F. Equation and output equation and commutation	Theoretical	Questions, discussion and Quiz
3	3	Types of dc generators DC Motor types	Types of dc generators DC Motor types	Theoretical	Questions and discussion
4	3	Test of dc generators	Test of dc generators	Theoretical and tutorial	Questions, discussion and Quiz
5	3	Starting of dc motors	Starting of dc motors	Theoretical and tutorial	Questions and discussion
6	3	Principle of action	Principle of action	Theoretical	Questions and discussion
7	3	leakage reactions	leakage reactions	Theoretical and tutorial	Questions and discussion
8	3	equivalent circuit	equivalent circuit	Theoretical	Questions, discussion and Quiz
9	3	voltage regulation and efficiency	voltage regulation and efficiency	Theoretical and tutorial	Questions and discussion
10	3	open circuit and short circuit tests.	open circuit and short circuit tests.	Theoretical	Questions and discussion
11	3	Production of rotating magnetic field	Production of rotating magnetic field	Theoretical and tutorial	Questions and discussion
12	3	synchronous speed and slip	synchronous speed and slip	Theoretical	Questions and discussion
13	3	equivalent circuit – torque / speed curve	equivalent circuit – torque / speed curve	Theoretical	Questions, discussion and Quiz
14	3	– starting of cage and slip – ring induction motors	– starting of cage and slip – ring induction motors	Theoretical and tutorial	Questions and discussion
15	3	– speed control and reversal of direction.	– speed control and reversal of direction.	Theoretical and tutorial	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS	Edward Hughes - Hughes electrical and electronic technology [electronic resource]-Pearson Education (2012).pdf Electrical technology by Hindmarch
Special requirements (include for example workshops, periodicals, IT software, websites)	1. Electrical Technology by Theraja 2. المكائن الكهربائية وتطبيقاتها للدكتور محمد زكي
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course provides the possibility of identifying mechanical manufacturing processes, for example, casting processes, forming processes such as (rolling, extrusion, forging and conventional and nonconventional drawing processes, material removal processes, joining processes, powder metallurgy .....etc. As well as calculating and estimating the mechanical loads required for each process and selecting the appropriate manufacturing process for each product according to the required specifications and conditions of work environment. Diagnose the defects associated during the manufacturing process and after manufacturing appear on the final product. Study manufacturing defects from a technical and engineering point of view and trying to avoid them.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Manufacturing Processes I / ME317
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First Semester / Third Year
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course provides the possibility of identifying mechanical manufacturing processes, for example, casting processes, forming processes such as (rolling, extrusion, forging and conventional and nonconventional drawing processes, material removal processes, joining processes, powder metallurgy ..... etc. As well as calculating and estimating the mechanical loads required for each process and selecting the appropriate manufacturing process for each product according to the required specifications and conditions of work environment. Diagnose the defects associated during the manufacturing process and after manufacturing appear on the final product. Study manufacturing defects from a technical and engineering point of view and trying to avoid them.	

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	2	Types of manufacturing processes, materials in manufacturing	Introduction to manufacturing processes	Theoretical	Questions + discussion
2nd	2	Classification of manufacturing processes	Introduction to manufacturing processes	Theoretical + Tutorial	Questions + discussion + quiz
3rd	2	Characteristics of casting processes, calculations of casting	Casting processes	Theoretical	Questions + discussion
4th	2	Types of special casting processes,	Casting processes	Theoretical + Tutorial	Questions + discussion + quiz
5th	2	Defects in castings	Casting processes	Theoretical	Questions + discussion
6th	2	Introduction, types of metal deformation	Metal Forming Processes	Theoretical + Tutorial	Questions + discussion
7th	2	Rolling processes engineering analysis	Metal Forming Processes	Theoretical	Questions + discussion
8th	2	Special rolling processes	Metal Forming Processes	Theoretical	Questions + discussion + quiz
9th	2	Extrusion processes engineering analysis	Metal Forming Processes	Theoretical + Tutorial	Questions + discussion
10th	2	Special extrusion processes	Metal Forming Processes	Theoretical	Questions + discussion
11th	2	Conventional drawing processes engineering analysis	Metal Forming Processes	Theoretical	Questions + discussion
12th	2	Special conventional drawing processes	Metal Forming Processes	Theoretical + Tutorial	Questions + discussion
13th	2	Non-conventional drawing processes engineering analysis	Metal Forming Processes	Theoretical	Questions + discussion + quiz
14th	2	Dieless drawing processes	Metal Forming Processes	Theoretical	Questions + discussion
15th	2	Forging processes engineering analysis	Metal Forming Processes	Theoretical + Tutorial	Questions + discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS	Mikell P. Groover, “Fundamentals of Modern Manufacturing: materials, processes and systems”, 5th edition, John Wiley & Sons, Inc., 2013.
Special requirements (include for example workshops, periodicals, IT software, websites)	Reputable websites. Libraries sites in international universities.
Community-based facilities (include for example, guest Lectures, internship, field studies)	

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Numerical Analysis / E312
5. Modes of Attendance offered	Daily attendance
6. Semester/Year	Second Semester / Third Year
7. Number of hours tuition (total)	45 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
1. Preparing and qualifying engineers to meet the requirements of the labor market in the private and public sectors in mechanical engineering.	
2. Providing distinguished academic programs in the field of mechanical engineering, both theoretical and practical, that comply with international standards of academic quality and meet the needs of the labor market.	
3. Building and developing partnerships with the governmental and private sectors and the community with all its various institutions.	
4. Developing and improving scientific research in the fields of mechanical engineering, writing programs for solving differential equations and complex functions, data processing, digital signal analysis and control.	
5. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1- Clarify the basic concepts of Numerical Analysis and their applications in social and industrial fields.

A2- Acquiring the skill in dealing with and addressing problems through the acquired sciences in this field.

A3- Acquisition of basic skills to solve engineering problems.

A4- Gaining experience in describing engineering problems mathematically and finding related equations to solve them.

B. Subject-specific skills

B1 - The ability to solve mathematical equations numerically.

B 2 - The ability to think about addressing problems according to the algorithms and methods of their work.

B 3 - Writing scientific reports, reading charts, and analyzing digital data.

Teaching and Learning Methods

1. Explanation and clarification through lectures.
2. Using data show, smart boards, and plasma screens.
3. Self-learning through homework and mini-projects within the lectures.
4. Laboratories.
5. Graduation projects.
6. Mid-term and summer training.

Assessment methods

• Active participation in the classroom is evidence of the student's commitment and responsibility.
• Commitment to the deadline in submitting the duties and research required of the student to submit them.
• The quarterly and final exams express commitment and cognitive and skill achievement.

C. Thinking Skills

C1- Attention: Arousing the students' attention by showing an applied mathematical problem on the display screen.

C2- Response: Follow up the student's interaction with the material displayed on the screen.

C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display

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 complex functions and solve equations.

D3 - Develop the student's ability to deal with multiple media.

D4 - Develop the student's ability to dialogue and discussion.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Fixed-point, Newton-Raphson	Finding Roots	Theoretical and tutorial	Questions and discussion
2	3	Iteration method Gauss Elimination method	Solution of Simultaneous Equations	Theoretical	Questions and discussion
3	3	Gauss-Jordan method	Solution of Simultaneous Equations	Theoretical	Questions and discussion
4	3	Forward, Backward and Central differences	Finite differences	Theoretical and tutorial	Questions and discussion
5	3	Newton Interpolation Lagrange Interpolation	Interpolation and Extrapolation	Theoretical and tutorial	Questions and discussion
6	3	Polynomial fitting	Curve fitting	Theoretical	Questions and discussion
7	3	Exponential and Power Fitting	Curve Fitting	Theoretical and tutorial	Questions and discussion
8	3	Trapezoidal and Simpson methods	Numerical Integration and Differentiation	Theoretical	Questions and discussion
9	3	Euler method	Solution of Ordinary Differential Equations	Theoretical and tutorial	Questions and discussion
10	3	Runge Kutta method	Solution of Ordinary Differential Equations	Theoretical	Questions and discussion
11	3	Runge Kutta Second Order method	Solution of Second Order Ordinary Differential Equations	Theoretical and tutorial	Questions and discussion
12	3	Solution of Laplace Equation	Solution of Partial Differential Equation	Theoretical	Questions and discussion
13	3	Solution of the Wave Equation	Solution of Partial Differential Equation	Theoretical	Questions and discussion
14	3	Solution of Diffuse Equation	Solution of Partial Differential Equation	Theoretical and tutorial	Questions and discussion
15	3	Crank-Nicolson method	Solution of Partial Differential Equation	Theoretical and tutorial	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1. An Introduction to Numerical Analysis. Endre Suli. 2. Advanced Engineering Mathematics, Kreyszig, Jon Wylie and Sons. 3. Mathematical Methods for Engineers and Scientists, K. T. Tang 4. Numerical Methods, Robert W. Hornbeck, Quantum Publishers Inc.
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This course gives students a comprehensive experience in the topics and applications related to the subject of heat transfer. It is also a development of theoretical capabilities and ways to implement them in practice in this field. This course opens high horizons for the development of self-capacity in building more modern thermal systems and addressing all industrial problems in the field of heat transfer. Heat and scientifically successful methods.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Heat Transfer / ME322
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	Second Semester/ Third year
7. Number of hours tuition (total)	45 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to graduate cadres capable of entering the field of industry with sufficient theoretical and practical experience.	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

A1. Consolidating the basic principles of heat transfer.
A2. Introducing the most important practical applications in different industries.
A3. Calculation of the most important variables to be taken into consideration in the design of systems related to heat transfer.
A4. Explanation and clarification of modern methods of dealing with issues related to heat transfer and practical applications.

B. Subject-specific skills

B1. The possibility of studying the principles of heat transfer in modern systems.
B2. Gaining high confidence in the ability to design modern systems.
B3. Publishing research articles in the field of heat transfer.

Teaching and Learning Methods

1. Use of recorded video clips.
2. Direct attendance lectures.
3. Laboratories and practical experiments.
4. Practical projects.
5. Using modern display methods such as smart screens.
6. Scientific visits.
7. Seminars held in the department.
8. Preparing lectures using modern programs.

Assessment methods

1. Daily exams.
2. Duties.
3. Semester and final exams for theoretical and practical subjects.
4. Design of practical systems.
5. Classroom participation.
6. Laboratories and evaluation of experiments.

C. Thinking Skills

C1- The lecture should be a source of focus for the students
C2- Communication should be continuous during the lesson
C3 - Asking some surprising questions to draw the students' attention and evaluate the interacting students
C4 - Discussing the students in their opinion in the presentation method.

Week	Hours	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Introduction to Convection Heat Transfer	theoretical	Questions and discussion
2	3	The Convection Boundary Layers	theoretical	Questions and discussion
3	3	Local and Average Convection Coefficients	theory + solution examples	Questions and discussion and quiz
4	3	Laminar and Turbulent Flow	theory + solution examples	Questions and discussion
5	3	The Boundary Layer Equations	theoretical	Questions and discussion
6	3	Physical Interpretation of the Dimensionless Parameters	theory + solution of examples	Questions and discussion
7	3	External Flow	theoretical	Questions and discussion and quiz
8	3	External Flow	theoretical	Questions and discussion
9	3	Internal Flow	Theoretical + solution of examples	Questions and discussion
10	3	Internal Flow	theoretical	Questions and discussion +quiz
11	3	Free Convection	theoretical	Questions and discussion
12	3	Boiling and Condensation	Theoretical +solution of examples	Questions and discussion
13	3	Heat Exchangers	Theoretical +solution of examples	Questions and discussion +quiz
14	3	Heat Exchangers	theoretical	Questions and discussion
15	3	Radiation: Processes and Properties	Theoretical +solution of examples	Questions and discussion +quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Fundamentals of Heat and Mass Transfer By FRANK P. INCROPERA
Special requirements (include for example workshops, periodicals, IT software, websites)	HEAT TRANSFER / A Practical Approach By YUNUS A. CENGEL
Community-based facilities (include for example, guest Lectures, internship, field studies)	HEAT TRANSFER By J.P. Holman

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

The theory of machines generates in the student an impression and an understanding about the mechanism of movement of all kinds as a result of the force applied to the mechanical parts.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Theory of Machines / ME323
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	Second Semester / Third year
7. Number of hours tuition (total)	30 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to graduate cadres capable of entering the field of machinery manufacturing and design.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A1- The basic principles of the theory of machines and machines. A2- Design of movement systems. A3- Maintenance and operation of modern machine systems. A4 - Incorporating programming into the design of movement and power systems.
B. Subject-specific skills Confidence in the possibility of designing different movement systems. B2 - Raising the level of ability to introduce advanced means in the theories and methods of movement and force. B3 - The work of large and small projects. B4 - The ability to operate and rehabilitate machines and equipment.
Teaching and Learning Methods
• Reading the relevant books in the field of the course. • Discussion within the lesson. • Solve some advanced issues. • Searching websites. • Attending scientific conferences.
Assessment methods
• Discussion within the lesson. • Homework and reports. • Daily tests. • Semester and final exams.
C. Thinking Skills C1 - Activating the participation of students. C2- Paying attention to the student's desire to accept the lesson material. C3 - Evaluation of the students interacting in the lesson. C4 - Presenting practical examples that interest the students for the lesson. C 5 - Presenting various topics to keep the recipient away from boredom and boredom.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1- Paying attention to and evaluating duties. D 2 - Access to a systematic and scientific method in raising topics. D3 - Clarify the importance of benefiting from technological and informational progress. D 4- Allocate time for discussion.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2/0	Introductions for types and applications	Belt drive	Theoretical/practical	Questions and discussion
2	2/0	Belts equations	Types of belt	Theoretical/practical	Questions and discussion
3	2/0	Introductions for types and applications	Governors	Theoretical/practical	Questions and discussion and quiz
4	2/0	Equations & details	Watt and porters gov.	Theoretical/practical	Questions and discussion
5	2/0	Equations & details	Proell gov.	Theoretical/practical	Questions and discussion
6	2/0	Equations & details	Hartenall gov.	Theoretical/practical	Questions and discussion
7	2/0	Introductions for types and applications	Balance of retaining masses	Theoretical/practical	Questions and discussion and quiz
8	2/0	Equations & details	Static and dynamic Balance of retaining masses	Theoretical/practical	Questions and discussion
9	2/0	Equations & details	Same plane in Balance of retaining masses	Theoretical/practical	Questions and discussion
10	2/0	Equations & details	different planes in Balance of retaining masses	Theoretical/practical	Questions and discussion +quiz
11	2/0	Introductions for types and applications	Gears	Theoretical/practical	Questions and discussion
12	2/0	Define and drive	Gears equations	Theoretical/practical	Questions and discussion
13	2/0	Introductions for types and applications	Automatic control of machines	Theoretical/practical	Questions and discussion +quiz
14	2/0	Define and drive	Equations of control systems for machines	Theoretical/practical	Questions and discussion
15	2/0	TOM general	Tutorial	Theoretical/practical	Questions and discussion +quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Theory of Machines by RS Khurmi and JK Gupt
Special requirements (include for example workshops, periodicals, IT software, websites)	Theory of machines. London, E. Arnold,
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course is a study of applying momentum preservation equations to fluid machines such as water turbines, pumps, and axial flow gas compressors.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Turbomachinery
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First Semester / Third year
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to introduce students to the basics of compressive flow and its application to gas and compressed air transmission systems, as well as to introduce students to the basics of the work of rocket and jet engines.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A1- Clarify the basic concepts of fluid machinery. A2- Acquisition of skills in dealing with problems and issues with fluid machines. A3- Acquisition of basic skills in studying pump problems. A4- Gain a basic understanding of how axial gas compressors work.
B. Subject-specific skills B1 - The ability to know the types of water turbines and choose the most appropriate type according to the available water column. B2 - The ability to think about addressing a specific problem or issue. B 3 - Writing scientific reports. B4 - The ability to gain experience in dealing with pumps and their problems.
Teaching and Learning Methods
● Readings, self-learning, panel discussions. ● Exercises and activities in the lecture. ● Homework. ● Directing students to some websites to benefit and develop capabilities. ● Conducting seminars to explain and analyze a specific issue and find solutions to it.
Assessment methods
● Interaction within the lecture. ● Homework and reports. ● Short Quizzes. ● Semester and final exams.
C. Thinking Skills C1- Attention: Arousing the students' attention by running simulation devices and scientific videos. C2 - Response: Follow up the student's interaction with the material displayed on the screen. C3- Attention: Follow up on the interest of the student who interacted the most with the presented material. C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1- Develop the student’s ability to perform the duties and deliver them on time D 2- Engineering thinking to find scientific solutions to various problems D3 - Developing the student's ability to dialogue and debate D4 - Develop the student's ability to deal with modern technology, especially the Internet

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Review of the principals of fluid flow	Introduction on fluid power	Theory	Question and Discussion
2	3	Principles and components of Pelton wheel flow	Impulse Turbine-Pelton Wheel	Theory + Tutorial	Question and Discussion + Quiz
3	3	Principles of reaction Turbines	Reaction Turbine	Theory	Question and Discussion
4	3	Importance of Gas Dynamic	Reaction turbine-Francis turbine	Theory + Tutorial	Question and Discussion + Quiz
5	3	Understanding the components of velocity triangles at inlet and outlet	Velocity diagrams of Francis Turbines	Theory	Question and Discussion
6	3	Kaplan Turbine	Principles and components of axial turbines	Theory + Tutorial	Question and Discussion + Quiz
7	3	Understanding the components of velocity triangles at inlet and outlet	Velocity diagrams in Kaplan turbine	Theory	Question and Discussion
8	3	Using the similarity rules in studying the performance of similar machines	Similarity rules	Theory + Tutorial	Question and Discussion
9	3	Principles of centrifugal pump and building the velocity diagrams	Centrifugal pumps	Theory	Question and Discussion + Quiz
10	3	The importance of parallel and series connections	Pumps connection	Theory + Tutorial	Question and Discussion
11	3	Understanding the types of impeller of centrifugal pumps	Types of centrifugal pumps	Theory	Question and Discussion
12	3	How to avoid the cavitation in centrifugal pumps	Cavitation in pumps	Theory + Tutorial	Question and Discussion + Quiz
13	3	Understanding the principles of axial flow gas compressor	Axial flow compressor	Theory	Question and Discussion
14	3	Establishing the velocity triangles at any radius of rotor	Velocity diagrams in axial flow compressor	Theory + Tutorial	Question and Discussion
15	3	Calculating the stage and overall pressure ratios	Pressure ratio in axial flow compressor	Theory + Tutorial	Question and Discussion + Quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS	Fluid Mechanics (by Streeter)
Special requirements (include for example workshops, periodicals, IT software, websites)	Fundamentals of Fluid Mechanics (by Munson)
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

In this course, it is based on the basic principles that the student studied in the third stage, the first course in electrical machines, to enable the student to understand the principle of the work of synchronous machines (generators and motors). The different composition of this material to the formation of the diode, transistor, thyristor and the nature of the work of each of these elements. The third chapter deals with electrical stations and methods of protection using circuit breakers and relays, as well as how to correct the power factor. As for the fourth chapter, it is concerned with studying the methods of measuring electrical quantities such as voltage and current, as well as non-electrical quantities such as pressure, temperature and flow, using sensors and converting these quantities into electrical signals in order to facilitate the process of reading or measuring them.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Electrical Machines / ME326
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	Second Semester / Third Year
7. Number of hours tuition (total)	45 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to provide the student with basic skills in the subject of studying and understanding the characteristics of synchronous machines of both types (motors and generators), as well as studying semiconductors, electrical stations, methods of protection, and how to measure electrical and non-electrical quantities.	
10. Course outcomes and methods of teaching, learning and assessment	
A- Cognitive goals A1- Learn about synchronous machines and their features. A2- Identify the types of semiconductors and their characteristics. A3- Identify electrical stations, erase methods, and the power correction factor. A5 - Identify the methods of measurement for electrical and non-electrical quantities.	

B - Skills objectives of the course.

B1 - Learn how synchronous machines work and features

B2 - Learn how semiconductors work

B 3- Learn how relays and circuit breakers work in stations.

B4- Learn how to measure electrical and non-electrical quantities.

Teaching and learning methods

- Explain the basic principles of the work of generators and synchronous motors and link them to practical applications.
- Explain the basic principles of semiconductor work
- Explanation of the basic principles of the work of relays and circuit breakers
- Explanation of the basic principles of the mechanism of measuring electrical and non-electrical quantities
- Allocating lectures to solve theoretical issues and discuss basic concepts.
- Directing students to each other to benefit from the systematic training for the third stage.

Evaluation methods

- Interaction within the lecture.
- Homework and reports.
- Short exams.
- Semester and final exams.

C- Emotional and value goals

C1- Helping the student on how to lay the scientific foundations for solving various problems.

C2-Help the student to understand the theoretical basis for the work of the machine and the transformer

D - Transferred general and qualifying skills (other skills related to employability and personal development).

D1 - Qualifying the student to deal with practical problems and how to solve them.

D2 - Teaching the student to write scientific reports describing the various problems and the mechanism for solving them.

D3 - Enabling the student to pass the exams held by companies and government and private institutions.

D4 - Increasing the student's self-confidence and creating a leadership spirit for him to manage practical problems.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	E.M.F. equation – armature reaction	E.M.F. equation – armature reaction	Theoretical and tutorial	Questions and discussion
2	3	synchronous impedance voltage regulation – synchronization.	synchronous impedance voltage regulation – synchronization.	Theoretical	Questions, discussion and Quiz
3	3	Synchronous motor– principle of operation	Synchronous motor– principle of operation	Theoretical	Questions and discussion
4	3	starting methods V. curves application of synchronous motors.	starting methods V. curves application of synchronous motors.	Theoretical and tutorial	Questions, discussion and Quiz
5	3	Semiconductor diodes – Rectifiers	Semiconductor diodes – Rectifiers	Theoretical and tutorial	Questions and discussion
6	3	Different types of Bridge circuits	Different types of Bridge circuits	Theoretical	Questions and discussion
7	3	Transistors – Power Amplifiers	Transistors – Power Amplifiers	Theoretical and tutorial	Questions and discussion
8	3	SCRs and their applications.	SCRs and their applications.	Theoretical	Questions, discussion and Quiz
9	3	Means of industrial power supply – Factory layouts for distribution and sub	Means of industrial power supply – Factory layouts for distribution and sub	Theoretical and tutorial	Questions and discussion
10	3	– stations – protection schemes – relays and circuit breakers	– stations – protection schemes – relays and circuit breakers	Theoretical	Questions and discussion
11	3	Illumination and heating designs	Illumination and heating designs	Theoretical and tutorial	Questions and discussion
12	3	power factor corrections.	power factor corrections.	Theoretical	Questions and discussion
13	3	Measurement of current, voltage and power – recording of energy consumption	Measurement of current, voltage and power – recording of energy consumption	Theoretical	Questions, discussion and Quiz
14	3	measurement of non – electrical parameters pressure, velocity , flow, temperature etc	measurement of non – electrical parameters pressure, velocity , flow, temperature etc	Theoretical and tutorial	Questions and discussion
15	3	voltage divider extension of instrument range.	voltage divider extension of instrument range.	Theoretical and tutorial	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Edward Hughes - Hughes electrical and electronic technology [electronic resource]-Pearson Education (2012).pdf Electrical technology by Hindmarch
Special requirements (include for example workshops, periodicals, IT software, websites)	1. Electrical Technology by Theraja 2. المكائن الكهربائية وتطبيقاتها للدكتور محمد زكي
Community-based facilities (include for example, guest Lectures, internship, field studies)	College library to obtain additional resources for the curriculum. Peruse the scientific websites for recent developments in the subject.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course provides the possibility of identifying mechanical manufacturing processes, for example, casting processes, forming processes such as (rolling, extrusion, forging and conventional and nonconventional drawing processes, material removal processes, joining processes, powder metallurgy .....etc. As well as calculating and estimating the mechanical loads required for each process and selecting the appropriate manufacturing process for each product according to the required specifications and conditions of work environment. Diagnose the defects associated during the manufacturing process and after manufacturing appear on the final product. Study manufacturing defects from a technical and engineering point of view and trying to avoid them.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Manufacturing Processes II / ME317
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	Second Semester / Third Year
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course provides the possibility of identifying mechanical manufacturing processes, for example, casting processes, forming processes such as (rolling, extrusion, forging and conventional and nonconventional drawing processes, material removal processes, joining processes, powder metallurgy ..... etc. As well as calculating and estimating the mechanical loads required for each process and selecting the appropriate manufacturing process for each product according to the required specifications and conditions of work environment. Diagnose the defects associated during the manufacturing process and after manufacturing appear on the final product. Study manufacturing defects from a technical and engineering point of view and trying to avoid them.	

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st	2	Special Forging processes	Metal Forming Processes	Theoretical	Questions discussion
2nd	2	Introduction to sheet metalworking processes	Metal Forming Processes	Theoretical Tutorial	Questions discussion Quiz
3rd	2	Cutting operations in sheet metalworking processes	Metal Forming Processes	Theoretical	Questions discussion
4th	2	Bending operations in sheet metalworking processes	Metal Forming Processes	Theoretical Tutorial	Questions discussion Quiz
5th	2	Deep drawing operations in sheet metalworking processes	Metal Forming Processes	Theoretical	Questions discussion
6th	2	Introduction, conventional material removal processes	Material Removal Processes	Theoretical Tutorial	Questions discussion
7th	2	Nonconventional material removal processes	Material Removal Processes	Theoretical	Questions discussion
8th	2	Engineering analysis of machining processes	Material Removal Processes	Theoretical	Questions discussion Quiz
9th	2	Characteristics, materials and products	Powder metallurgy processes	Theoretical Tutorial	Questions discussion
10th	2	Introduction to Welding processes	Joining processes	Theoretical	Questions discussion
11th	2	Types of welding processes	Joining processes	Theoretical	Questions discussion
12th	2	Defect in welding processes	Joining processes	Theoretical Tutorial	Questions discussion
13th	2	Introduction to mechanical assembly processes	Joining processes	Theoretical	Questions discussion Quiz
14th	2	Specific methods in mechanical assembly processes	Joining processes	Theoretical	Questions discussion
15th	2	Design for mechanical assembly	Joining processes	Theoretical Tutorial	Questions discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Mikell P. Groover, “Fundamentals of Modern Manufacturing: materials, processes and systems”, 5th edition, John Wiley & Sons, Inc., 2013.
Special requirements (include for example workshops, periodicals, IT software, websites)	Reputable websites. Libraries sites in international universities.
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course provides the possibility of solving problems and issues related to mechanical design in a scientific manner, depending on the tools and elements that represent an important part of engineering analysis.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Mechanical Design I / ME411
5. Modes of Attendance offered	Daily attendance
6. Semester/Year	First Semester / Fourth year
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
1. Be able to use technology tools (World Wide Web, PowerPoint, Excel, analysis software) to analyze, solve, and present solutions to mechanical engineering design problems	
2. Develop skills necessary to package acquired technical and professional abilities that are required to succeed in engineering design practice.	
3. Understand the mechanical engineering design elements enough to commit to a major design and create a career plan.	
4. To teach students how to apply mechanical engineering design theory to identify and quantify machine elements in the design of commonly used mechanical systems	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1- Clarify the basic concepts in the design of machines through the design of mechanical elements and components.

A2- Acquisition of skills in dealing with engineering problems and issues.

A3 - Acquisition of basic skills as introductions to building mechanical designs.

A4- Gain a basic understanding of how mechanical systems work in various industrial applications.

B. Subject-specific skills

B1 - The ability to design applied mechanical problems.

B2 - The ability to think about solving a specific engineering problem or problem.

B3 - Writing scientific reports.

B4 - The ability to gain experience in dealing with mechanical systems.

Teaching and Learning Methods

• Readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Directing students to some websites to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

• Interaction within the lecture.
• Homework and reports.
• Short exams (quizzes).
• Semester and final exams.

C. Thinking Skills

C1- Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall.

C2 - Response: Follow up the student's interaction with the material displayed on the screen.

C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to be presented.

C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1- Develop the student's ability to perform the duties and deliver them on time

D 2- Logical and sequential thinking to find engineering solutions to various problems

D3- Develop the student's ability to dialogue and discussion

D4- Develop the student's ability to deal with modern technology, especially the Internet

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Stress types, Mohr circle	Stress analysis	Theoretical	Questions and Assignments
2	4	Principal stresses	Stress analysis	Theoretical + tutorial	Questions and Assignments
3	4	Neutral axis calculation	Curved beams	Theoretical	Questions and Assignments
4	4	Calculation of maximum stresses	Curved beams	Theoretical + tutorial	Questions and Assignments
5	4	Basic definitions	Static loading	Theoretical	Questions and Assignments
6	4	Rankine, Tresca and Von-Mises theories	Failure theories, ductile materials	Theoretical + tutorial	Questions and Assignments
7	4	Rankine, Moher and modified Mohr theories	Failure theories, brittle materials	Theoretical + tutorial	Questions and Assignments
8	4	Basic definitions	Fatigue loading	Theoretical	Questions and Assignments
9	4	Endurance limit	Fatigue test, S-N curve	Theoretical + tutorial	Questions and Assignments
10	4	Correction of endurance limit for real environmental conditions	Modification factors	Theoretical	Questions and Assignments
11	4	Calculation of safety factors	Failure theories: Goodman diagram	Theoretical + tutorial	Questions and Assignments
12	4	Basic spring types and terminology	Spring types, Basic definitions	Theoretical	Questions and Assignments
13	4	Calculation of max, shear stress	Stress analysis: max. Shear stress, spring stiffness	Theoretical + tutorial	Questions and Assignments
14	4	Use of strength properties' tables	Spring materials and strengths	Theoretical	Questions and Assignments
15	4	Estimate spring life / safety factor	Springs: dynamic loading	Theoretical + tutorial	Questions and Assignments

2. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Shigley's mechanical engineering design
Special requirements (include for example workshops, periodicals, IT software, websites)	https://nptel.ac.in/courses/112/105/112105124/
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This course gives students a comprehensive experience in preparing modern models and designing or developing control systems. It is also a development of theoretical capabilities in building models of control systems in theory and ways to implement them in practice. This course opens high horizons for the development of self-abilities in the introduction of artificial intelligence in the production and manufacture of systems the control.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Control
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First Semester / Fourth year
7. Number of hours tuition (total)	32 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to graduate cadres capable of entering the field of manufacturing, designing and maintaining control regulators for all mechanical equipment.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1- Basic principles for the operation of control systems.
A2- Design of control systems.
A3 - Maintenance and operation of modern biography systems.
A4- Incorporating artificial intelligence into the design of control systems.

B. Subject-specific skills

B1 - Confidence in the ability to design control systems.
B2 - Raising the level of ability to introduce advanced methods to control variables.
B3 - The work of large and small projects.
B4 - The ability to operate and rehabilitate control systems.

Teaching and Learning Methods

- Reading the relevant books in the field of the course.
- Discussion within the lesson.
- Solve some advanced issues.
- Searching websites.
- Attending scientific conferences.

Assessment methods

- Discussion within the lesson.
- Homework and reports.
- Daily tests.
- Semester and final exams.

C. Thinking Skills

C1 - Activating the participation of students.
C2- Paying attention to the student's desire to accept the lesson material.
C3 - Evaluation of the students interacting in the lesson.
C4 - Presenting practical examples that interest the students for the lesson.
C 5 - Presenting various topics to keep the recipient away from boredom and boredom.

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

D1- Paying attention to and evaluating duties.
D 2 - Access to a systematic and scientific method in raising topics.
D3 - Clarify the importance of benefiting from technological and informational progress.
D 4- Allocate time for discussion.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Introduction to control system	Examples of control systems	theoretical	Questions and discussion
2	2	Laplace transform	Using of Laplace transform in control systems	theoretical	Questions and discussion
3	2	Modeling of dynamic systems	Obtained of transfer functions	theory + solution examples	Questions and discussion and quiz
4	2	Modeling of liquid level control systems	Draw the block diagram of such systems, obtained transfer function, applications	theory + solution examples	Questions and discussion
5	2	Modeling of pneumatic control systems	Draw the block diagram of such systems, obtained transfer function, applications, PID control.	theoretical	Questions and discussion
6	2	Modeling of hydraulic control systems	Draw the block diagram of such systems, obtained transfer function, applications, PID control.	theory + solution of examples	Questions and discussion
7	2	Modeling of heat control systems	Draw the block diagram of such systems, obtained transfer function, applications	theoretical	Questions and discussion and quiz
8	2	Second order system	Determine their rise time, settling time, maximum overshoot, and peak time.	theoretical	Questions and discussion
9	2	stability	Apply Routh’s criterion	Theoretical + solution of examples	Questions and discussion
10	2	Steady state errors	Static, velocity and acceleration steady state errors	theoretical	Questions and discussion +quiz
11	2	Root locus	Conception of root locus analyses	theoretical	Questions and discussion
12	2	Root locus	Plot root locus diagram	Theoretical +solution of examples	Questions and discussion
13	2	Root locus	Application of root locus	Theoretical +solution of examples	Questions and discussion +quiz
14	2	Frequency response analyses	Advantages of using frequency response	theoretical	Questions and discussion
15	2	Bode diagram	Plotting of bode diagram	Theoretical +solution of examples	Questions and discussion +quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	(Modern control engineering) By Katsuhiko Ogata+ (Principles of control systems) by S.P.Eugene Control systems engineering by Norman S. Nise Automatic control engineering by Francis H. Raven Automatic control systems by Benjamin C. Kuo Advanced control engineering by Roland S. Burns Linear control systems with MATLAB applications by B.S. Manke
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Air conditioning and refrigeration-I/ME413
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First Semester / Fourth year
7. Number of hours tuition (total)	45 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
1. Students will learn the basic concepts and principles of air conditioning and refrigeration. 2. Students will learn the fundamental analysis methodology of air conditioning and refrigeration. 3. Students will learn the basic process and systems of air conditioning and refrigeration. 4. Students will apply the course knowledge to do a design project of HVAC system.	

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Thermodynamics	Introduction of moist air properties	Theory and tutorial	Quiz, homework
2	3	Thermodynamics	Relative humidity, moisture content	Theory and tutorial	Quiz, homework
3	3	Thermodynamics	Air conditioning processes and psychrometric chart	Theory and tutorial	Quiz, homework
4	3	Thermodynamics, Heat transfer	Sensible and latent heat	Theory and tutorial	Quiz, homework
5	3	Thermodynamics,	Humidification and dehumidification of air	Theory and tutorial	Quiz, homework
6	3	Thermodynamics	Adiabatic mixing and adiabatic saturation	Theory and tutorial	Quiz, homework
7	3	Thermodynamics, Heat transfer	Summer air conditioning systems	Theory and tutorial	Quiz, homework
8	3	Thermodynamics, Heat transfer	Cooling load estimation	Theory and tutorial	Quiz, homework
9	3	Heat transfer	Steady state heat conduction in buildings	Theory and tutorial	Quiz, homework
10	3	Heat transfer	Unsteady state heat conduction in buildings	Theory and tutorial	Quiz, homework
11	3	Thermodynamics, Heat transfer	Cooling load items, examples and applications	Theory and tutorial	Quiz, homework
12	3	Thermodynamics, Heat transfer	Heating load estimation	Theory and tutorial	Quiz, homework
13	3	Fluid mechanics	Duct design	Theory and tutorial	Quiz, homework
14	3	Fluid mechanics	Duct Design(continue)	Theory and tutorial	Quiz, homework
15	3	Fluid mechanics	Fans selection	Theory and tutorial	Quiz, homework

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course provides the possibility of identifying the mechanical properties of engineering materials and methods of their measurement, and then identifying the types of possible failures: refraction, fatigue, and creep. Transition to know the differe The course provides the possibility of identifying engineering materials, their classifications, characteristics of each type and their advantages, in addition to the applications, and then identifying ferrous materials, non-ferrous materials, ceramic materials, polymers, and finally composite materials.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical engineering department
3. Course title/code	Engineering Materials / ME414
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First semester / Fourth stage
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
This course is designed for students interested in building technical knowledge and expertise in the principles that govern: 1. Classifications of engineering materials 2. Iron materials, specifications and characteristics 3- Non-ferrous materials, properties and applications 4. Ceramic materials, classification, specifications and applications 5. Polymers 6. Composite materials, their manufacture methods and applications	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A1- Clarify the basic concepts of engineering materials and their classifications A2- Acquisition of skills in knowledge of different engineering subjects. A3- Acquisition of basic skills as an introduction to the selection of materials for various engineering applications A4- Gaining a basic understanding of the importance of engineering materials in the field of applications and taking into account specifications and costs.
B. Subject-specific skills B1 - The ability to know the classifications of engineering materials. B 2 - the ability to think about choosing the appropriate materials for engineering applications. B3 - Writing scientific reports. B4 - The ability to gain experience in dealing with changes that occur to engineering materials as a result of different operating conditions.
Teaching and Learning Methods
• Readings, self-learning, panel discussions. • Exercises and activities in the lecture. • Homework. • Directing students to some websites to benefit and develop capabilities. • Conducting seminars to explain and analyze a specific issue and find solutions to it.
Assessment methods
• Interaction within the lecture. • Homework and reports. • Short exams. • Semester and final exams.
C. Thinking Skills C1. Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall. C2 - Response: Follow up the student's interaction with the material displayed on the screen. C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to be presented. C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Develop the student’s ability to perform the duties and deliver them on time D 2- Logical and programmatic thinking to find software solutions to various problems D 3- Develop the student's ability to dialogue and discussion D4 - Develop the student's ability to deal with modern technology, especially the Internet

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First	2	•Nomenclature of Ferrous Alloys •Low Carbon steel •Medium Carbon Steel	ferrous materials	theoretical	Questions and discussion
Second	2	•High Carbon Steel •Stainless—Steels •Effects of Alloying Elements on Steel	ferrous materials	theoretical	Questions and discussion
Third	2	•Cast Irons •SIMPLE HEAT TREATMENTS •Heat Treatment of Steels for Strength	ferrous materials	theoretical	Questions and discussion
Fourth	2	•Light Metals •Heavy Metals	non-ferrous materials	theoretical	Questions and discussion
Fifth	2	•Refractory Metal	non-ferrous materials	theoretical	Questions and discussion
Sixth	2	•Precious Metals •Precipitation Hardening	non-ferrous materials	theoretical	Questions and discussion
Seventh	2	•SPECTRUM OF CERAMICS USES •CERAMIC CRYSTAL STRUCTURES	ceramics	theoretical	Questions and discussion
Eighth	2	•PROPERTIES OF CERAMICS •Traditional Ceramics	ceramics	theoretical	Questions and discussion
Ninth	2	•Advanced Ceramics •Mechanical Properties •STRESS–STRAIN BEHAVIOR (Flexural Strength)	ceramics	theoretical	Questions and discussion
Tenth	2	•Classification of polymers •Synthetic Polymers •Polyimides	Polymers	theoretical	Questions and discussion
Eleventh	2	•Polyvinyl Chloride (PVC) •Epoxies •Polyethylene •Acetals	Polymers	theoretical	Questions and discussion
Twelfth	2	•Mechanical Properties •Viscoelasticity •Viscoelastic Creep	Polymers	theoretical	Questions and discussion
Thirteenth	2	•Classification according to type of reinforcement and matrix •Type of constituents	composite materials	theoretical	Questions and discussion
Fourteenth	2	•Particle reinforced composite materials •Rule of mixtures •Fiber reinforced composite materials	composite materials	theoretical	Questions and discussion
Fifteenth	2	•Types of fibers •Structural composite materials	composite materials	theoretical	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	1- Materials Science and Engineering: An Introduction, 10th Edition, William D. Callister Jr., January 2018. 2- Selection and Use of Engineering Materials by J. A. Charles, F. A. A. Crane, and J. A. G. Furness, Third Edition 2001. 3- The Science and Engineering of Materials by D. R. Askeland, and P. Phule Fourth Edition 2003.
Community-based facilities (include for example, guest Lectures, internship, field studies)	Reputable websites. Libraries sites in some international universities.

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Theory of Vibration / ME415
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First Semester / Fourth year
7. Number of hours tuition (total)	45 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
Clarify the basic concepts. Acquisition of skills in dealing with engineering problems and issues related to vibrations. Acquiring basic skills as an introduction to understanding the principles of vibration. Gain a basic understanding of how vibrations occur in various industrial applications.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Clarify the basic concepts.

A2. Acquisition of skills in dealing with engineering problems and issues related to vibrations.

A3. Acquiring basic skills as an introduction to understanding the principles of vibration.

A4. Gain a basic understanding of how vibrations occur in various industrial applications.

B. Subject-specific skills

B1. The ability to solve various engineering problems.

B2. The ability to think about a specific problem or issue.

B3. Writing scientific reports.

B4. The ability to gain experience in dealing with vibration issues.

Teaching and Learning Methods

• Readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Directing students to some websites to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

• Interaction within the lecture.
• Homework and reports.
•Short exams (Quiz).
•Semester and final exams.

C. Thinking Skills

C1 - Activating the participation of students.

C2- Paying attention to the student's desire to accept the lesson material.

C3 - Evaluation of the students interacting in the lesson.

C4 - Presenting practical examples that interest the students for the lesson.

C 5 - Presenting various topics to keep the recipient away from boredom and boredom.

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

D1- Paying attention to and evaluating duties.

D 2 - Access to a systematic and scientific method in raising topics.

D3 - Clarify the importance of benefiting from technological and informational progress.

D 4- Allocate time for discussion.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
first	3	Introduction, why study vibration, course strategy	introduction	Theoretical	Questions and discussion
second	3	Degree of freedom	Vibration classification	Theoretical & tutorial	Questions and discussion
Third	3	Simple harmonic motion	Vibration classification	Theoretical	Questions and discussion
Forth	3	Free vibration forced, damped, undamped ,… etc	Vibration classification	Theoretical & tutorial	Questions and discussion
Fifth	3	Introduction, newton method, motion equation frequency	Free vibration	Theoretical	Questions and discussion
Six	3	Energy method	Free vibration	Theoretical & tutorial	Questions and discussion
Seven	3	Virtual work	Free vibration	Theoretical	Questions and discussion
Eight	3	Damped vibration, logarithmic	Free vibration	Theoretical & tutorial	Questions and discussion
Nine	3	Harmonically excited vibration	Forced vibration	Theoretical	Questions and discussion
Ten	3	Response under irregular periodic force	Forced vibration	Theoretical & tutorial	Questions and discussion
Eleven	3	Response under non-periodic force	Forced vibration	Theoretical	Questions and discussion
Twelve	3	Derivation of Equation of Motion.	Multi Degrees of Freedom	Theoretical	Questions and discussion
Thirteen	3	Influence coefficients	Multi Degrees of Freedom	Theoretical & tutorial	Questions and discussion
Fourteen	3	Lagrange's Equation	Multi Degrees of Freedom	Theoretical	Questions and discussion
Fifteen	3	Eigen Value Problem	Multi Degrees of Freedom	Theoretical & tutorial	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1. Theory of Vibration with Application, William T. Thomson. 2. Mechanics of Machines Elementary Theory and Examples, J. H. Hannah and R. C. Stephens.
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This course gives students a comprehensive experience about power plants of their traditional and non-traditional types, by identifying their method of operation, design, types of components, and the philosophy of their use, based on the scientific background gained largely from the subject of thermodynamics and heat transfer.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Power Plant I / ME416
5. Modes of Attendance offered	Daily Attendance
6. Semester/Year	First Semester / Fourth year
7. Number of hours tuition (total)	45 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to graduate cadres capable of entering the field of electric power stations, whether design or operation.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1- Basic principles for the operation of power plant.
A2- Design of power plant.
A3- Identify the types of power stations.
A4- Identifying the modern types of power stations and ways to develop them.

B. Subject-specific skills

B1 - Confidence in the ability to design power plant.
B2 - Raising the level of ability to introduce advanced methods to power plant.
B3 - The work of large and small projects.
B4 - The ability to operate and rehabilitate power plant.

Teaching and Learning Methods

- Reading the relevant books in the field of the course.
- Discussion within the lesson.
- Solve some advanced issues.
- Searching websites.
- Attending scientific conferences.

Assessment methods

- Discussion within the lesson.
- Homework and reports.
- Daily tests.
- Semester and final exams.

C. Thinking Skills

C1 - Activating the participation of students.
C2- Paying attention to the student's desire to accept the lesson material.
C3 - Evaluation of the students interacting in the lesson.
C4 - Presenting practical examples that interest the students for the lesson.
C 5 - Presenting various topics to keep the recipient away from boredom and boredom.

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

D1- Paying attention to and evaluating duties.
D 2 - Access to a systematic and scientific method in raising topics.
D3 - Clarify the importance of benefiting from technological and informational progress.
D 4- Allocate time for discussion.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Introduction	Introduce the power plant	theoretical	Questions and discussion
2	3	Types of power plant.	Explain the types of power plant.	theoretical	Questions and discussion
3	3	Classification of Power Plants	Classification of Power Plants	theory + solution examples	Questions and discussion and quiz
4	3	Fuel Cell Basics	Fuel Cell Basics	theory + solution examples	Questions and discussion
5	3	Photovoltaic Cells	Photovoltaic Cells	theoretical	Questions and discussion
6	3	Other types for Power plants	Other types for Power plants.	theory + solution of examples	Questions and discussion
7	3	History of power plant in Iraq	History of power plant in Iraq	theoretical	Questions and discussion and quiz
8	3	Gas Turbine	Introduce the components of gas stations, their applications, classifications, and advantages	theoretical	Questions and discussion
9	3	Analysis of Gas Turbine	Analysis of Gas Turbine	Theoretical + solution of examples	Questions and discussion
10	3	Actual calculation in Gas Turbine	Actual calculation in Gas Turbine	theoretical	Questions and discussion +quiz
11	3	Enhance the Gas Turbine efficiency	Methods to Enhance the Gas Turbine efficiency	theoretical	Questions and discussion
12	3	Steam Turbine	Introduce the components of steam stations, their applications, classifications, and advantages	Theoretical +solution of examples	Questions and discussion
13	3	Steam Turbine cycles	Introduce the Steam Turbine cycles	Theoretical +solution of examples	Questions and discussion +quiz
14	3	Enhance the steam Turbine efficiency	Enhance the steam Turbine efficiency	theoretical	Questions and discussion
15	3	Solve some examples	Solve some examples	Theoretical +solution of examples	Questions and discussion +quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS	Applied Thermodynamics by Onkar Singh Applied-thermodynamics-and-engineering-fifth-edition-by-Eastop-and-A-Mcconkey
Special requirements (include for example workshops, periodicals, IT software, websites)	Power Plant by Raja A text book of Power Plant Engineering By Raja
Community-based facilities (include for example, guest Lectures, internship, field studies)	

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	University of Basrah
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	Industrial Engineering / ME 417
4. Modes of Attendance offered	Daily Attendance
5. Semester/Year	First Semester / Fourth Year
6. Number of hours tuition (total)	30 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	
The course aims to learn the basics of industrial engineering and its role in managing factories, laboratories and projects, while developing students' abilities to rely on international standards to achieve the best performance.	

9· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1- Clarify the basic concepts in industrial engineering.
A2- Acquisition of skills in dealing with industrial problems.
A3- Acquisition of basic skills in relying on international standards.
A4- Gain a basic understanding of how programmed systems work in various industrial applications.

B. Subject-specific skills

B1 - The ability to solve industrial problems.
B2 - The ability to think about addressing a particular problem or issue.
B3 - Writing scientific reports.
B4 - The ability to gain experience in dealing with priority methods.

Teaching and Learning Methods

- Readings, self-learning, panel discussions.
- Exercises and activities in the lecture.
- Homework.
- Directing students to some websites to benefit and develop capabilities.
- Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

- Interaction within the lecture.
- Homework and reports.
- Short exams (Quiz).
- Semester and final exams.

C. Thinking Skills

C1- Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall.
C2 - Response: Follow up the student's interaction with the material displayed on the screen.
C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to be presented.
C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1- Develop the student’s ability to perform the duties and deliver them on time
D 2- Logical and programmatic thinking to find industrial solutions to various problems
D 3- Develop the student's ability to dialogue and discussion
D4 - Develop the student's ability to deal with modern technology, especially the Internet

10. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Introduction	Define Industrial engineering and its fields of application	Questions and Assignments
2	2		Operation research	2.1 Introduction to Game Theory	Questions and Assignments
3	2		Maintenance Engineering	2.2 Properties of a Game	Questions, Assignments and Quiz
4	2		Fundamentals of Control: INVENTORY MANAGEMENT AND CONTROL	2.3 Characteristics of Game Theory	Questions and Assignments
5	2		Fundamentals of Control: INVENTORY MANAGEMENT AND CONTROL	2.4 Classification of Games	Questions, Assignments and Quiz
6	2		Break Even Analysis	2.5 Limitations of Game Theory	Questions and Assignments
7	2		Sequencing	2.5 Solving Two-Person and Zero-Sum Game	Questions, Assignments and Quiz
8	2		Introduction to Transportation Problem	Replacement	Questions and Assignments
9	2		Introduction to Transportation Problem	Replacement of items that Deteriorates with time	Questions, Assignments and Quiz
10	2		Assignment Problem	Present with factor	Questions and Assignments
11	2		Assignment Problem	Replacement of items that fail completely	Questions, Assignments and Quiz
12	2		Games with Mixed Strategies	Objectives of Inventory Management	Questions and Assignments
14	2		Introduction to Linear Programming	Requirements for Effective Inventory Management	Questions, Assignments and Quiz
15	2		Introduction to Linear Programming	Inventory Counting Systems	Questions and Assignments

11. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course provides the possibility of solving problems and issues related to mechanical design in a scientific manner, depending on the tools and elements that represent an important part of engineering analysis.

1. Teaching Institution	Basrah University
2. University Department/Centre	Mechanical Engineering Department
3. Course title/code	MeE432 Mechanical Design II
5. Modes of Attendance offered	Daily attendance
6. Semester/Year	First course/ fourth year
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
1. Be able to use technology tools (World Wide Web, PowerPoint, Excel, analysis software) to analyze, solve, and present solutions to mechanical engineering design problems	
2. Develop skills necessary to package acquired technical and professional abilities that are required to succeed in engineering design practice.	
3. Understand the mechanical engineering design elements enough to commit to a major designs and create an career plan.	
4. To teach students how to apply mechanical engineering design theory to identify and quantify machine elements in the design of commonly used mechanical systems	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1- Clarify the basic concepts in the design of machines through the design of mechanical elements and components. A2- Acquisition of skills in dealing with engineering problems and issues.

A3 - Acquisition of basic skills as introductions to building mechanical designs.

A4- Gain a basic understanding of how mechanical systems work in various industrial applications.

B. Subject-specific skills

B1 - The ability to design applied mechanical problems.

B2 - The ability to think about solving a specific engineering problem or problem.

B3 - Writing scientific reports.

B4 - The ability to gain experience in dealing with mechanical systems.

Teaching and Learning Methods

- Readings, self-learning, panel discussions.
- Exercises and activities in the lecture.
- Homework.
- Directing students to some websites to benefit and develop capabilities.
- Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

- Interaction within the lecture.
- Homework and reports.
- Short exams (quizes).
- Semester and final exams.

C. Thinking Skills

C1- Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall.

C2 - Response: Follow up the student's interaction with the material displayed on the screen.

C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to be presented.

C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1- Develop the student's ability to perform the duties and deliver them on time

D 2- Logical and sequential thinking to find engineering solutions to various problems

D 3- Develop the student's ability to dialogue and discussion

D4 - Develop the student's ability to deal with modern technology, especially the Internet

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	screw types, fasteners types	Introduction to screws and fasteners	Theoretical	Questions and Assignments
2	4	Efficiency of power screws	Power screws	Theoretical + tutorial	Questions and Assignments
3	4	Load ratio between bolt and members	Bolted joints in tension	Theoretical + tutorial	Questions and Assignments
4	4	Calculation of load carried by each bolt	Bolted joints in shear eccentric	Theoretical + tutorial	Questions and Assignments
5	4	Load safety factor and separation safety factor	Dynamic loading in tensile joints	Theoretical + tutorial	Questions and Assignments
6	4	Welding codes and types	Introduction to welding	Theoretical	Questions and Assignments
7	4	Stress analysis: calculation of max. shear stress	Welding, joint analysis in shear stress	Theoretical	Questions and Assignments
8	4	Stress analysis: calculation of bending stress	Welding, joint analysis in bending stress	Theoretical	Questions and Assignments
9	4	Gear types, definitions	Introduction to gears	Theoretical + tutorial	Questions and Assignments
10	4	Involute drawing, properties	Conjugate action, involute properties	Theoretical	Questions and Assignments
11	4	Gears interaction, definition of gear train	Contact ratios, gear teeth forming, gear trains	Theoretical	Questions and Assignments
12	4	Calculation of tangential force component	Force analysis, spur gear/helical gear	Theoretical	Questions and Assignments
13	4	Calculation of stress using AGMA equation	Stress analysis, spur/helical gears	Theoretical + tutorial	Questions and Assignments
14	4	Rolling bearing types	Types of rolling contact bearing, bearing life	Theoretical	Questions and Assignments
15	4	Estimate equation for No. Of cycles (life), usage of selection tables	Rating life, selection of bearing	Theoretical + tutorial	Questions and Assignments

2. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Shigley's mechanical engineering design
Special requirements (include for example workshops, periodicals, IT software, websites)	https://nptel.ac.in/courses/112/105/112105124/
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This course gives students a comprehensive experience in preparing modern models and designing or developing control systems. It is also a development of theoretical capabilities in building models of control systems in theory and ways to implement them in practice. This course opens high horizons for the development of self-abilities in the introduction of artificial intelligence in the production and manufacture of systems the control.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Dept. of Mechanical Engineering
3. Course title/code	control
4. Program to which it contributes	
5. Modes of Attendance offered	daily
6. Semester/Year	1st Semester/fourth year
7. Number of hours tuition (total)	32
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to graduate cadres capable of entering the field of manufacturing, designing and maintaining control regulators for all mechanical equipment.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1- Basic principles for the operation of control systems. A2- Design of control systems. A3 - Maintenance and operation of modern biography systems. A4- Incorporating artificial intelligence into the design of control systems.
B. Subject-specific skills B1 - Confidence in the ability to design control systems. B2 - Raising the level of ability to introduce advanced methods to control variables. B3 - The work of large and small projects.

B4 - The ability to operate and rehabilitate control systems.

Teaching and Learning Methods

• Reading the relevant books in the field of the course.
• Discussion within the lesson.
• Solve some advanced issues.
• Searching websites.
• Attending scientific conferences.

Assessment methods

• Discussion within the lesson.
• Homework and reports.
• Daily tests.
• Semester and final exams.

C. Thinking Skills

C1 - Activating the participation of students.
C2- Paying attention to the student's desire to accept the lesson material.
C3 - Evaluation of the students interacting in the lesson.
C4 - Presenting practical examples that interest the students for the lesson.
C 5 - Presenting various topics to keep the recipient away from boredom and boredom.

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

D1- Paying attention to and evaluating duties.
D 2 - Access to a systematic and scientific method in raising topics.
D3 - Clarify the importance of benefiting from technological and informational progress.
D 4- Allocate time for discussion.

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Introduction to control system	Examples of control systems	theoretical	Questions and discussion
2	2	Laplace transform	Using of Laplace transform in control systems	theoretical	Questions and discussion
3	2	Modeling of dynamic systems	Obtained of transfer functions	theory + solution examples	Questions and discussion and quiz
4	2	Modeling of liquid level control systems	Draw the block diagram of such systems, obtained transfer function, applications	theory + solution examples	Questions and discussion
5	2	Modeling of pneumatic control systems	Draw the block diagram of such systems, obtained transfer function, applications, PID control.	theoretical	Questions and discussion

6	2	Modeling of hydraulic control systems	Draw the block diagram of such systems, obtained transfer function, applications, PID control.	theory + solution of examples	Questions and discussion
7	2	Modeling of heat control systems	Draw the block diagram of such systems, obtained transfer function, applications	theoretical	Questions and discussion and quiz
8	2	Second order system	Determine their rise time, settling time, maximum overshoot, and peak time.	theoretical	Questions and discussion
9	2	stability	Apply Routh's criterion	Theoretical + solution of examples	Questions and discussion
10	2	Steady state errors	Static, velocity and acceleration steady state errors	theoretical	Questions and discussion +quiz
11	2	Root locus	Conception of root locus analyses	theoretical	Questions and discussion
12	2	Root locus	Plot root locus diagram	Theoretical +solution of examples	Questions and discussion
13	2	Root locus	Application of root locus	Theoretical +solution of examples	Questions and discussion +quiz
14	2	Frequency response analyses	Advantages of using frequency response	theoretical	Questions and discussion
15	2	Bode diagram	Plotting of bode diagram	Theoretical +solution of examples	Questions and discussion +quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	(Modern control engineering) By Katsuhiko Ogata+ (Principles of control systems) by S.P.Eugene + Control systems engineering by Norman S. Nise +Automatic control engineering by Francis H. Raven +Automatic control systems by Benjamin C. Kuo Advanced control engineering by Roland S. Burns + Linear control systems with MATLAB applications by B.S. Manke
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

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	University of Basrah
2. University Department/Centre	Engineering college -mechanical engineering department
3. Course title/code	Air conditioning and refrigeration-II
4. Modes of Attendance offered	Daily Attendance
5. Semester/Year	second Semester /4th year
6. Number of hours tuition (total)	45 hours
7. Date of production/revision of this specification	2023
8. Aims of the Course	
1. Students will learn the basic concepts and principles of air conditioning and refrigeration. 2. Students will learn the fundamental analysis methodology of air conditioning and refrigeration. 3. Students will learn the basic process and systems of air conditioning and refrigeration. 4. Students will apply the course knowledge to do a design project of HVAC system.	
10· Learning Outcomes, Teaching, Learning and Assessment Method	
A- Cognitive goals A1- Clarify the basic concepts of the air conditioning process. A2- Acquiring skills in dealing with problems and issues specific to the design of air conditioning systems. A3- Acquire basic skills in cooling and checking load calculations. A4- Gain a basic understanding of how to design an integrated project for air conditioning works.	

B - Skills objectives of the course.

B1 - The ability to study the thermal performance of buildings of all kinds.
B2 - The ability to think about addressing a specific problem or issue related to the design of air conditioning systems.
B3 - Writing scientific reports on air conditioning devices and their technical performance.
B4 - The ability to gain experience in dealing with various air conditioning systems.

Teaching and Learning Methods

- Readings, self-learning, panel discussions.
- Exercises and activities in the lecture.
- Homework.
- Directing students to some websites to benefit and develop capabilities.
- Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

- Interaction within the lecture.
- Homework and reports.
- Short exams (Quiz).
- Semester and final exams.

C- Emotional and value goals.

C1- Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall.
C2 - Response: Follow up the student's interaction with the material displayed on the screen.
C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to be presented.
C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

D - Transferred general and qualifying skills (other skills related to employability and personal development).

D1- Develop the student’s ability to perform the duties and deliver them on time
D 2- Logical thinking to find solutions to various problems
D 3- Develop the student's ability to dialogue and discussion
D4 - Develop the student's ability to deal with modern technology, especially the Internet

9. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Fluid mechanics	System of air conditioning	Theory and tutorial	Quiz, homework
2	3	Fluid mechanics	Pipe system design	Theory and tutorial	Quiz, homework
3	3	Fluid mechanics	Piping Network	Theory and tutorial	Quiz, homework
4	3	Thermodynamics, Heat transfer	Chillers	Theory and tutorial	Quiz, homework
5	3	Fluid mechanics	Pumps	Theory and tutorial	Quiz, homework
6	3	Thermodynamics	Refrigeration	Theory and tutorial	Quiz, homework
7	3	Thermodynamics	Vapor compression refrigeration system	Theory and tutorial	Quiz, homework
8	3	Thermodynamics	Carnot refrigeration cycle	Theory and tutorial	Quiz, homework
9	3	Thermodynamics	Ideal refrigeration cycle	Theory and tutorial	Quiz, homework
10	3	Thermodynamics	Real vapor compression refrigeration cycle	Theory and tutorial	Quiz, homework
11	3	Thermodynamics, Heat transfer	Absorption refrigeration system	Theory and tutorial	Quiz, homework
12	3	Thermodynamics, Heat transfer	Steam jet refrigeration	Theory and tutorial	Quiz, homework
13	3	Thermodynamics, Heat transfer	Air cycle refrigeration	Theory and tutorial	Quiz, homework
14	3	Thermodynamics, Heat transfer	Cold storages	Theory and tutorial	Quiz, homework
15	3	Fluid mechanics, Heat transfer	Automatic control	Theory and tutorial	Quiz, homework

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

The course provides the possibility of identifying the mechanical properties of engineering materials and methods of their measurement, and then identifying the types of possible failures: refraction, fatigue, and creep. Transition to know the different types of corrosion and mechanical wear and know their types and ways to prevent them.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Mechanical engineering department
3. Course title/code	Failure of Engineering Materials Code: ME424
5. Modes of Attendance offered	daily work
6. Semester/Year	The second semester / fourth stage
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
This course is designed for students interested in building knowledge and technical expertise in the principles governing: 1. Mechanical Properties of materials 2. diagnosis of cause(s) and mechanisms of failure. 3.experimental techniques for characterizing fractures. 4. The course covers the fundamental types of fracture and their characteristic features, fracture modes. 5. Understanding of the mechanisms of fracture such as fatigue, corrosion fatigue, thermal fatigue, creep, Wear and corrosion will also be covered. 6. The philosophy of performing failure analysis and steps involved in failure analysis investigations will be covered. 7. Case studies on documented engineering failures and failure analysis reports will be discussed.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Clarify the basic concepts of mechanical properties and methods of measuring these properties.

A 2- Acquisition of skills in dealing with various failures.

A3- Acquisition of basic skills as an introduction to preparing designs and selecting appropriate materials for different uses.

A4- Gain a basic understanding of how the various corrosion mechanisms work and ways to prevent them.

B. Subject-specific skills

B1. the ability to calculate the mechanical properties of engineering materials.

B 2 - the ability to think about the treatment of various failure problems.

B3 - Writing scientific reports.

B4 - The ability to gain experience in dealing with corrosion protection systems.

Teaching and Learning Methods

• Readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Directing students to some websites to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

• Interaction within the lecture.
• Homework and reports.
• Short exams.
• Semester and final exams.

C. Thinking Skills

C1. Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall.

C2 - Response: Follow up the student's interaction with the material displayed on the screen.

C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to be presented.

C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1. Develop the student’s ability to perform the duties and deliver them on time

D 2- Logical and programmatic thinking to find software solutions to various problems

D 3- Develop the student's ability to dialogue and discussion

D4 - Develop the student's ability to deal with modern technology, especially the Internet

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Elastic Deformation, Stress-Strain Behavior,	Mechanical Properties	theoretical	Questions and discussion
2	2	Elastic Properties of Materials, Plastic Deformation,	Mechanical Properties	theoretical	Questions and discussion
3	2	Tensile Properties, True Stress and Strain, Hardness.	Mechanical Properties	theoretical	Questions and discussion
4	2	Fundamentals of Fracture, Ductile Fracture	Fracture	theoretical	Questions and discussion
5	2	Brittle Fracture, Principles of Fracture Mechanics	Fracture	theoretical	Questions and discussion
6	2	Impact Fracture Testing	Fracture	theoretical	Questions and discussion
7	2	Cyclic Stresses, the S–N Curve	Fatigue	theoretical	Questions and discussion
8	2	Crack Initiation and Propagation, Factors That Affect Fatigue Life	Fatigue	theoretical	Questions and discussion
9	2	Environmental Effects	Fatigue	theoretical	Questions and discussion
10	2	Generalized Creep Behavior, Stress and Temperature Effects	Creep	theoretical	Questions and discussion
11	2	Data Extrapolation Methods (Larson- Miller Methods)	Creep	theoretical	Questions and discussion
12	2	Alloys for High-Temperature Use	Creep	theoretical	Questions and discussion
13	2	Electrochemical Considerations, Forms of Corrosion	Corrosion and Wear	theoretical	Questions and discussion
14	2	Corrosion Prevention	Corrosion and Wear	theoretical	Questions and discussion
15	2	Wear and Erosion	Corrosion and Wear	theoretical	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	1- Materials Science and Engineering, William D. Callister, Ninth Edition, 2018. The Science and Engineering of Materials by D. R. Askeland, and P. Phule Fifth Edition 2017.
Community-based facilities (include for example, guest Lectures, internship, field studies)	Reputable websites. Libraries sites in some international universities.

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	University of Basrah
2. University Department/Centre	Dept. of Mechanical Engineering
3. Course title/code	Application of Vibration
5. Modes of Attendance offered	daily
6. Semester/Year	2nd Semester/fourth year
7. Number of hours tuition (total)	90
8. Date of production/revision of this specification	2023
9. Aims of the Course	
Clarify the basic concepts. 1. Preparing and qualifying specialized specialists for the requirements of the labor market in the private and public sectors in mechanical engineering through diversification in the methods of learning and teaching and training students to apply the acquired knowledge and skills in mathematics. 2. Providing distinguished academic programs in the theoretical and practical fields of mechanical engineering and international quality rules that meet the needs of the labor market. 3. The emergence of scientific research in the field of mechanical engineering, vibrations in general, the principles of vibration theory, and how vibrations are generated in parts in particular. 4. Preparing a stimulating environment for faculty members to develop their knowledge and educational skills. 5. Building development and government social affairs, and, and, and society in all different institutions.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1. Clarify the basic concepts.

A2. Acquisition of skills in dealing with engineering problems and issues related to vibrations.

A3. Acquiring basic skills as an introduction to understanding the application of vibration.

A4. Gain a basic understanding of how vibrations occur in various industrial applications.

B. Subject-specific skills

B1. The ability to solve various engineering problems.

B2. The ability to think about a specific problem or issue.

B3. Writing scientific reports.

B4. The ability to gain experience in dealing with vibration issues.

Teaching and Learning Methods

• Readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Directing students to some websites to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

• Interaction within the lecture.
• Homework and reports.
•Short exams (Quiz).
•Semester and final exams.

C. Thinking Skills

C1 - Activating the participation of students.

C2- Paying attention to the student's desire to accept the lesson material.

C3 - Evaluation of the students interacting in the lesson.

C4 - Presenting practical examples that interest the students for the lesson.

C 5 - Presenting various topics to keep the recipient away from boredom and boredom.

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

D1- Paying attention to and evaluating duties.

D 2 - Access to a systematic and scientific method in raising topics.

D3 - Clarify the importance of benefiting from technological and informational progress.

D 4- Allocate time for discussion.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
first	3	Conservative Lagrange Equation	Advanced in Vibration Analysis	Theoretical	Questions and discussion
second	3	Non- Conservative Lagrange Equation	Advanced in Vibration Analysis	Theoretical & tutorial	Questions and discussion
Third	3	Elasticity Matrix	Properties of Vibration Systems	Theoretical	Questions and discussion
Forth	3	Stiffness Matrix and mass matrix	Properties of Vibration Systems	Theoretical & tutorial	Questions and discussion
Fifth	3	Rayleigh Method	Approximate Numerical Methods	Theoretical	Questions and discussion
Six	3	Dunkerley's Formula	Approximate Numerical Methods	Theoretical & tutorial	Questions and discussion
Seven	3	Holzer method	Approximate Numerical Methods	Theoretical	Questions and discussion
Eight	3	Transverse Vibration of String. logarithmic	Continuous Systems	Theoretical & tutorial	Questions and discussion
Nine	3	Longitudinal Vibrations of rod	Continuous Systems	Theoretical	Questions and discussion
Ten	3	Torsional Vibrations of Shafts and Rods	Continuous Systems	Theoretical & tutorial	Questions and discussion
Eleven	3	Vibration Pickups	Vibration Measurements	Theoretical	Questions and discussion
Twelve	3	Vibration Exciters	Multi Degrees of Freedom	Theoretical	Questions and discussion
Thirteen	3	Signal Analysis	Multi Degrees of Freedom	Theoretical & tutorial	Questions and discussion
Fourteen	3	Faults Identified by Vibration	Machines, Maintenance and Monitoring	Theoretical	Questions and discussion
Fifteen	3	Faults Identified by Vibration	Machines, Maintenance and Monitoring	Theoretical & tutorial	Questions and discussion

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1. Theory of Vibration with Application, William T. Thomson. 2. Mechanics of Machines Elementary Theory and Examples, J. H. Hannah and R. C. Stephens.
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This course gives students a comprehensive experience about power stations, in particular steam stations, their components, and ways to increase their efficiency. It also introduce hydroelectric stations by identifying their method of operation, design, types of components and the philosophy of their use. This course opens high horizons for the development of self-capacity in the use of alternative and environmentally friendly energies. On the lab, the student will learn about the components of a steam station operating by oil, and the student will do some experiments to calculate the efficiency of the station.

1. Teaching Institution	University of Basrah
2. University Department/Centre	Dept. of Mechanical Engineering
3. Course title/code	Power Plant II (ME426)
4. Program to which it contributes	
5. Modes of Attendance offered	daily
6. Semester/Year	2nd Semester/fourth year
7. Number of hours tuition (total)	45
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to graduate cadres capable of entering the field of electric power stations, whether design or operation.	

10· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1- Basic principles for the operation of power plant. A2- Design of power plant. A3- Identify the types of power stations. A4- Identifying the modern types of power stations and ways to develop them.
B. Subject-specific skills B1 - Confidence in the ability to design power plant. B2 - Raising the level of ability to introduce advanced methods to power plant. B3 - The work of large and small projects. B4 - The ability to operate and rehabilitate power plant.
Teaching and Learning Methods
• Reading the relevant books in the field of the course. • Discussion within the lesson. • Solve some advanced issues. • Searching websites. • Attending scientific conferences.
Assessment methods
• Discussion within the lesson. • Homework and reports. • Daily tests. • Semester and final exams.
C. Thinking Skills C1 - Activating the participation of students. C2- Paying attention to the student's desire to accept the lesson material. C3 - Evaluation of the students interacting in the lesson. C4 - Presenting practical examples that interest the students for the lesson. C 5 - Presenting various topics to keep the recipient away from boredom and boredom.
D. General and Transferable Skills (other skills relevant to employability and personal development) D1- Paying attention to and evaluating duties. D 2 - Access to a systematic and scientific method in raising topics. D3 - Clarify the importance of benefiting from technological and informational progress. D 4- Allocate time for discussion.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Boilers	Introduce the boilers	theoretical	Questions and discussion
2	3	Types of boilers.	Explain the types of boilers	theoretical	Questions and discussion
3	3	Mathematical analysis of boilers	Mathematical analysis of boilers	theory + solution examples	Questions and discussion and quiz
4	3	Mathematical analysis of boilers	Complete mathematical analysis of boilers	theory + solution examples	Questions and discussion
5	3	Solve some examples	Solve some examples	theoretical	Questions and discussion
6	3	Condensers	Introduce Condensers	theory + solution of examples	Questions and discussion
7	3	Types of Condensers	Types of Condensers	theoretical	Questions and discussion and quiz
8	3	Analytical of Condensers	Introduce the analysis of Condensers	theoretical	Questions and discussion
9	3	Analysis of Gas Turbine	Analysis of Gas Turbine	Theoretical + solution of examples	Questions and discussion
10	3	Solve some examples	Solve some examples	theoretical	Questions and discussion +quiz
11	3	Turbine	Introduce the turbines and their types	theoretical	Questions and discussion
12	3	Components of Turbines	Introduce the turbines and their components	Theoretical +solution of examples	Questions and discussion
13	3	Hydroelectric power plant	Introduce the Hydroelectric power plant	Theoretical +solution of examples	Questions and discussion +quiz
14	3	The types of Hydroelectric power plant	The types of Hydroelectric power plant	theoretical	Questions and discussion
15	3	Solve some examples	Solve some examples	Theoretical +solution of examples	Questions and discussion +quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Applied Thermodynamics by Onkar Singh Applied-thermodynamics-and-engineering-fifth-edition-by-Eastop-and-A-Mcconkey
Special requirements (include for example workshops, periodicals, IT software, websites)	Power Plant by Raja A text book of Power Plant Engineering By Raja
Community-based facilities (include for example, guest Lectures, internship, field studies)	

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	University of Basrah
2. University Department/Centre	Mechanical Engineering department
3. Course title/code	Project Management / ME 427
5. Modes of Attendance offered	daily attendance
6. Semester/Year	Second semester / second year
7. Number of hours tuition (total)	30 hours
8. Date of production/revision of this specification	2023
9. Aims of the Course	
The course aims to learn the basics of project management and its role in managing factories, laboratories and projects, while developing the students' abilities to rely on international standards to achieve the best performance.	

10· Learning Outcomes, Teaching, Learning and Assessment Method

A- Knowledge and Understanding

A1- Clarify the basic concepts of project management.

A2- Acquisition of skills in addressing project problems

A3- Acquisition of basic skills in relying on international standards.

A4- Gain a basic understanding of how programmed systems work in various industrial applications.

B. Subject-specific skills

B1 - The ability to solve industrial problems.

B2 - The ability to think about addressing a particular problem or issue.

B3 - Writing scientific reports.

B4 - The ability to gain experience in dealing with priority methods.

Teaching and Learning Methods

• Readings, self-learning, panel discussions.
• Exercises and activities in the lecture.
• Homework.
• Directing students to some websites to benefit and develop capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it.

Assessment methods

• Interaction within the lecture.
• Homework and reports.
• Short exams (Quiz).
• Semester and final exams.

C. Thinking Skills

C1- Attention: Arousing the students' attention by implementing one of the applied programs on the display screen in the hall.

C2 - Response: Follow up the student's interaction with the material displayed on the screen.

C3- Attention: Follow up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to be presented.

C4 - Forming the direction: meaning that the student is sympathetic to the presentation and may have an opinion about the direction of the presented topic and defend it.

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

D1- Develop the student’s ability to perform the duties and deliver them on time

D 2- Logical and programmatic thinking to find industrial solutions to various problems

D 3- Develop the student's ability to dialogue and discussion

D4 - Develop the student's ability to deal with modern technology, especially the Internet

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2		Introduction	Define project management	Questions, discussion and
2	2		Project Initiations	Principle and practice	Questions, discussion and Quiz
3	2		Planning	Principle and practice	Questions, discussion and
4	2		Activity Networks	Principle and practice	Questions, discussion and Quiz
5	2		Activity Networks- - examples	Principle and practice	Questions, discussion and
6	2		Project Resource Analysis	Principle and practice	Questions, discussion and Quiz
7	2		Project Resource Analysis examples	Principle and practice	Questions, discussion and
8	2		SOLVED PROBLEMS	Principle and practice	Questions, discussion and Quiz
9	2		Risk Management	Principle and practice	Questions, discussion and
10	2		Risk Management examples	Principle and practice	Questions, discussion and Quiz
11	2		NPV	Principle and practice	Questions, discussion and
12	2		NPV EXAMPLES	Principle and practice	Questions, discussion and Quiz
14	2		COST MANAGMNET	Principle and practice	Questions, discussion and
15	2		Cost management examples	Principle and practice	Questions, discussion and

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures, internship, field studies)	