

Academic Program Description Form

University Name: ...University of Babylon...

Faculty/Institute:College of Engineering.....

Scientific Department:Mechanical Engineering.....

Academic or Professional Program Name:Bachelor of engineering.....

Final Certificate Name: Bachelor's degree in mechanical engineering....

Academic System: ...Semester

Description Preparation Date:

File Completion Date: 21/3/2024

Signature:

Head of Department Name:

Asst. Prof .Dr.Ali Hassoon Nahhab

Date:

Signature:

Scientific Associate Name:

Asst. Prof .Dr.Rehab Noor Mohammed Al-Kaby

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:



Approval of the Dean

**Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department**



Academic Program and

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Academic Program and Course Description Guide

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2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: University of Babylon

Faculty/Institute: College of Engineering

Scientific Department: Mechanical Engineering

Academic or Professional Program Name: Bachelor of engineering

Final Certificate Name: Bachelor's degree in mechanical engineering

Academic System: Annual

Description Preparation Date:

File Completion Date: 31/3/2024

Signature:

Head of Department Name:

Date:

Signature:

Scientific Associate Name:

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Approval of the Dean

Department Requirements				
Summer Training				
Other				

* This can include notes whether the course is basic or optional.

7. Program Description				
Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical

8. Expected learning outcomes of the program	
Knowledge	
Learning Outcomes 1	Learning Outcomes Statement 1
Skills	
Learning Outcomes 2	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies
Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods
Implemented at all stages of the program in general.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

Professional development of faculty members

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. Acceptance Criterion

(Setting regulations related to enrollment in the college or institute, whether central admission or others)

13. The most important sources of information about the program

State briefly the sources of information about the program.

14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4

- Please tick the boxes corresponding to the individual program learning outcomes under evaluation.

Course Description Form

1. Course Name:	
Turbomachine	
2. Course Code:	
356	
3. Semester / Year:	
3	
4. Description Preparation Date:	
31/3/2024	
5. Available Attendance Forms:	
In person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
ECTS credit = 5	
7. Course administrator's name (mention all, if more than one name)	
Name: Farooq Hassan Ali Email: eng.farooq.h hassan@uoba bylon.edu.iq	
8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> 1. This module aims to teach engineering students about the concept of Turbo-machinery. 2. Students have knowledge about the types of impellers, compressors and turbines. 3. This module also teaches the student the basic related calculations in different types of impellers, compressors and turbines. 4. This module also aims to introduce important information on the basic designs consideration of impellers, compressors and turbines. 5. This module helps students to improve their higher-level thinking skills, including critical thinking and creativity and solving calculated problems precisely without mistakes. 6. This module improves students' skills in solving the calculations of turbomachinery

	<p>problems to be ready to study the subject of Power plants (ENME483) in the eighth semester of study.</p> <p>This module provides important information to prepare the mechanical engineer for actual applications of turbine machines.</p>
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9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and show the video scenes explaining the manufacturing process and method of work.
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10. Course Structure

Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation
		Outcomes			method
First	3	Students have knowledge in turbomachines and its classifications.	Introduction and classification of turbomachines	The method depends on explaining the main principles of this analysis and the importance of using it in our daily lives by giving a set of examples and asking some questions.	The evaluation is done through class activities to solve a set of questions
Second	3	Students have knowledge about the basic concept of Euler's equation for turbomachinery.	Euler's equation for turbomachinery	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Third	3	Students have ability to find the inlet and outlet velocity vector triangles and efficiency.	Inlet and outlet velocity vector triangles, Concepts of efficiency.	Precisely explaining the material, clarifying its importance, and	The evaluation is done through class activities to solve a set of questions, and

				presenting a set of examples that are solved first by the teacher and then with the participation of the students	then the students are asked to solve a homework assignment related to the lesson
Fourth	3	Students have knowledge about the centrifugal compressor; performance map, preliminary design of impeller and diffuser.	Centrifugal compressor; performance map, preliminary design of impeller and diffuser.	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Fifth	3	Students able to find the slip factor and impeller back sweep	Slip factor, impeller back sweep	The method depends on explaining the general form of this transformation and the importance of using it in our daily lives by giving a set of examples and asking some questions.	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Sixth	3	Students have knowledge about the Radial turbine and performance map.	Radial turbine; performance map.	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Seventh	3	Students have knowledge about the basic concept of Preliminary design of rotor and nozzle	Preliminary design of rotor and nozzle	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment

				participation of the students	related to the lesson
Eighth	3	Students have knowledge about the nominal design condition, velocity ratio, mechanical and material considerations.	Nominal design condition, velocity ratio, mechanical and material considerations.	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Ninth	3	Students are able to find the isentropic and polytropic efficiency.	Isentropic and polytropic efficiency.	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Tenth	3	Students have knowledge about the cascade airfoil geometry and the flow characteristics and performance of the cascade.	Cascade airfoil geometry. Cascade testing, flow characteristics and performance	Precisely explaining partial differential equations, clarifying the method of separation of variables, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of examples
Eleventh	3	Students have knowledge about the axial turbines & compressors and how to find the velocity triangles,	Axial turbines & compressors – velocity triangles.	Explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Twelveth	3	Students have knowledge about the	Stage design parameters, repeating stages, losses &	Explaining the material,	The evaluation is done through

		basic concept of the stage design parameters, repeating stages and how to find the losses & efficiency.	efficiency	clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Thirteen	3	Students have knowledge about the Reaction, Smith chart, transonic compressors, stall and surge.	Reaction, Smith chart, transonic compressors, stall and surge.	Explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Fourteen	3	Students have knowledge about the introduction of cavitation.	Introduction to cavitation	Explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson

11. Course Evaluation					
Quizzes 10%, Assignments 10%, Report 10%, Midterm Exam 10%, and Final Exam 60% Then the total is 100%					
12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)					
Main references (sources)					
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites					
Required Textbooks		Gas Turbine Theory 6th Ed, Saravanamuttoo, Rogers, Cohen and Straznicky, ISBN-10: 0132224372			
		Fluid Mechanics and Thermodynamics of Turbomachinery 7th Edition, Dixon and Hall, Elsevier Science & Technology, ISBN: 978-0-12-415954-9			
		A Text Book of Fluid Machinery			
Recommended Texts		1- Fluid Mechanics and Machinery: https://india.oup.com/product/fluid-mechanics-and-machinery-9780195699630 2- Fluid Mechanics and Machinery 1st Edition: https://www.amazon.com/Fluid-Mechanics-Machinery-C-S-P-Ojha/dp/0195699637 3. Fluid mechanics and hydraulic machines: https://mechanicalbasics.com/fluid-mechanics-and-hydraulic-machines/			

Introduction:

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Academic Program Description Form

University Name: University of Babylon.....

Faculty/Institute: College of Engineering.....

Scientific Department: Mechanical Engineering.....

Academic or Professional Program Name: Bachelor of engineering.....

Final Certificate Name: Bachelor's degree in mechanical engineering.....

Academic System: Semester

Description Preparation Date:

File Completion Date:2024\3\31

Signature:

Head of Department Name:

Date:

Signature:

Scientific Associate Name:

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Approval of the Dean

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer

Professional Development

Mentoring new faculty members

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14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4

- Please tick the boxes corresponding to the individual program learning outcomes under evaluation.

Course Description Form

1. Course Name:	
Gas Dynamic	
2. Course Code:	
223	
3. Semester / Year:	
3	
4. Description Preparation Date:	
31\3\2024	
5. Available Attendance Forms:	
In person	
6. Number of Credit Hours (Total) / Number of Units (Total)	
ECTS credit = 5	
7. Course administrator's name (mention all, if more than one name)	
Name: Farooq Hassan Ali Email: eng.farooq.hassan@uobabylon.edu.iq	
8. Course Objectives	
Course Objectives	<p>1- To introduce the fundamental concepts and governing equations of fluid mechanics, using mathematical techniques to analyse simple flow problems for an inviscid (frictionless) fluid.</p> <p>2- This course is designed to introduce seniors and beginning graduate students in the fundamentals of compressible fluid flow, with an emphasis on a wide variety of steady, one-dimensional flow problems and a general understanding of the principles of multi-dimensional flow.</p>
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
10. Course Structure	

Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation
		Outcomes			method
First	3	Students have clear knowledge about some of the basic mechanisms, thermodynamic analysis and fluid mechanics properties of gases; demonstrate a clear understanding of the use of the properties.	Fluid properties and dimensional analysis, kinematics of fluid motion.	The method depends on explaining the main principles of this analysis and the importance of using it to solve takes	The evaluation is done through class activities to solve a set of examples
Second		Students have knowledge about the mass, momentum and energy equations.	Equations of mass Momentum and energy equations	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Third		Students have knowledge about the relations between vorticity and entropy generation, and the wave propagation in compressible flows.	Relation between vorticity and entropy generation, wave propagation in compressible flows	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Fourth		Students have knowledge about what is the One-dimensional gas dynamics and the area-velocity relation.	One-dimensional gas dynamics and Area-Velocity relation	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Fifth		Students have knowledge about the Isentropic flows.	Isentropic flows	The method depends on explaining the general form of	The evaluation is done through class activities to solve a set of

				this transformation and the importance of using it in our daily lives by giving a set of examples and asking some questions.	questions, and then the students are asked to solve a homework assignment related to the lesson
Sixth		Students are able to find the fluid properties in Normal shock flow.	Choking and Normal shock	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Seventh		Students have knowledge about the flow in ducts and diffusers.	Flows in ducts and nozzles	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Eighth		Students have knowledge about the flow with friction and heat transfer.	Flow with friction and heat transfer	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher and then with the participation of the students	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment related to the lesson
Ninth		Students are able to find the fluid properties in Oblique shock waves.	Oblique shocks	Precisely explaining the material, clarifying its importance, and presenting a set of examples that are solved first by the teacher	The evaluation is done through class activities to solve a set of questions, and then the students are asked to solve a homework assignment