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 Nathab

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

Academic Program and Course Description Guide

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:

<u>Academic Program Description</u>: 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.

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

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

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

<u>**Curriculum Structure:**</u> 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.

<u>Teaching and learning strategies</u>: 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: Signature: Scientific Associate Name:

Date:

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	Specializ	ation	Special		Number of the	teaching staff	
			Requirement	s/Skills			
		(if applicable))			
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

			Pr	ogram	Skills	Out	ine								
							Req	uired	progr	am L	earnin	g outcon	nes		
Year/Level Course Course Code Name	Course Course Code Name	Course Name	Basic or	Knov	Knowledge			Skills			Ethics				
	optional	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

 assan@uoba

 bylon.edu.iq

 8. Course Objectives

 1. This module aims to teach engineering students about the concept of Turbomachinery.
 - 2. Students have knowledge about the types of impellers, compressors and turbines.
 - 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

				pi of se This n prepa applic	roblems Power emester of nodule pr re the me rations of	to be ready to s plants (ENME48 of study. ovides importan echanical enginee turbine machine	study the subject 33) in the eighth t information to er for actual es.
9. Tea	aching a	and Learning Strateg	gies	3			
Strategy	The r partic thinki video	main strategy that will b cipation in the exercises, ing skills. This will be scenes explaining the m	e ac , wł ach nanu	lopted in deliv nile at the sam lieved through lfacturing proc	ering this e time re classes, ess and m	s module is to en fining and expar interactive tutor nethod of work.	acourage students' ading their critical ials and show the
10. Cour	se Stru	ucture					
Week	Hours	Required Learning		Unit or subj	ect	Learning	Evaluation
				name		method	
		Outcomes					method
First	3 S k tu c	tudents have nowledge in urbomachines and its lassifications.	Introduction and classification of turbomachines			The method lepends on explaining the nain principles of this analysis and the mportance of using it in our laily lives by giving a set of examples and asking some puestions.	The evaluation is done through class activities to solve a set of questions
Second	3 S b E tı	tudents have nowledge about the pasic concept of Euler's equation for urbomachinery.	s have Euler's eq lge about the turbomacl concept of equation for achinery.			Precisely explaining the material, larifying its mportance, and presenting a set of examples that are solved first by the teacher and then with the participation of <u>he students</u> Precisely	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 The evaluation
11110	5 5 to 0 tr	o find the inlet and outlet velocity vector riangles and fficiency.	vec Cor	tor triangles, neepts of effici	ency. n	explaining the naterial, larifying its mportance, and	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 losson
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

Eighth 3 Students haveNominal design howined design mominal the evaluation design mechanical and material condition, velocity ratio, mechanical and material considerations. The evaluation is done through the the order and the number of examples that asked to solve a set of questions, and then the solved first polytropic efficiency. Ninth 3 Students are able tolesentropic and efficiency. The evaluation presenting a set of examples that asked to solve a set of questions, are esolved first polytropic efficiency. Ninth 3 Students are able tolesentropic and efficiency. The evaluation esson Ninth 3 Students haveCascade airfoil geometry. The evaluation esson Ninth 3 Students haveCascade airfoil geometry. The evaluation esson Tenth 3 Students haveCascade airfoil geometry. Precisely explaining partial differential geometry and the flow performance of the cascade. asked to solve a by the teacher and then with the participation of ecascade. Eleventh 3 Students haveCascade turbines & knowledge about theCompressors – velocity axial turbines & knowledge about thecompressors – ve					participation of	related to the
Eligitin 3 Students have fourtheomotion velocity ratio, nominal design mechanical and material considerations. explaining the is done through is done through is done as of questions, and material considerations. Ninth 3 Students are able tolsentropic and polytropic find the isentropic and efficiency. Presenting as et is done through is do	Fighth	2	Students have	Nominal design	Precisely	The evaluation
Individing about the summary relation of the students ratio, mechanical and material considerations.Considerations, class activities to importance, and presenting a set the students are asked to solve a hereital to the essonNinth3Students are able to find the isentropic and efficiency.3Students are able to polytropic efficiency.Precisely recisely the studentsThe evaluation is done through explaining the material, considerations.Ninth3Students are able to polytropic efficiency.Students are able to polytropic efficiency.The evaluation is done through explaining the material, class activities to solve a set of importance, and presenting a set the studentsTenth3Students haveCascade airfoil geometry, and hen with the assections, and the studentsThe evaluation is done through explaining the material, class activities to solve a set of importance, and presenting a set the studentsTenth3Students haveAxial turbines & knowledge about the cascade.haveAxial turbines & clarifying the method of the studentsEleventh3Students haveAxial turbines & knowledge about the compressors - velocity axial turbines & triangles,Students haveAxial turbines & knowledge about the compressors - velocity axial turbines & triangles,The evaluation is done through class activities to solve a set of or solve a set of or solve a set of solve a set of or solve a set of solve a set of so	Eighn	3	Image about the	condition velocity ratio	explaining the	is done through
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knowledge about therebeating stages, losses & material. is done through	Twelveth	3	Students have	Stage design parameters	Explaining the	The evaluation
		5	knowledge about the	repeating stages. losses &	material.	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	Evalua	tion									
Quizze Then t	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 ref	ferences	(source:	5)									
Recomm	nended	books	and refe	rences								
(scientif	ic journal	s, repor	:s)									
Electron	ic Refere	nces, V	/ebsites									
			Gas Turbine	Theory	6th Ed, Saravanar	nuttoo, Rogers, C	Cohen and					
			Straznicky, ISBN-10: 0132224372									
Requir	ed Textb	ooks	Fluid Mechai	11 F1	Thermodynamics	s of Turbomachin	ery 7th Edition,					
			Dixon and Ha	all, Else	vier Science & Te	echnology, ISBN	: 978-0-12-					
			A Text Bool	k of Flu	uid Machinery							
			1- Fluid Mecha	nics and	Machinery: http	s·//india oun com	/product/fluid-					
			mechanics-and	-machin	ery-97801956996	530	product/maid-					
			2- Fluid Mecha	nics and	Machinery 1st E	Edition:						
D		F (https://www.an Oiha/dp/01956	1azon.co 99637	om/Fluid-Mechan	ics-Machinery-C	-S-P-					
Recom	mended	l'exts	ojina/ap/01900	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,								
			3. Fluid mecha	nics an	d hydraulic mac	hines:	lia machinad					
			nups://mechani	caldasic	s.com/muid-mech	iames-and-nydrat	unc-machines/					

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:

<u>Academic Program Description</u>: 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.

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

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

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

<u>**Curriculum Structure:**</u> 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.

<u>Teaching and learning strategies</u>: 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: Semester Description Preparation Date: File Completion Date:2024\3\31

Signature: Head of Department Name: Signature: Scientific Associate Name:

Date:

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	Specializ	ation	Special		Number of the	teaching staff	
			Requirement	s/Skills			
		(if applicable))			
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														
							Req	uired	progr	am L	earnin	g outcon	ies		
Year/Level Course Course Code Name	Course Cours Code Nam	Course Name	Irse Basic or	Knowledge			Skills			Ethics					
	optional	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4		
				-											
															ļ

• 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.far

ooq.hassan@

uobabylon.ed

u.iq

8. Course Objectives

Course Objectives	1- To introduce the fundamental concepts and governing equations of fluid mechanics, using mathematical techniques to analyses simple flow problems for an inviscid (frictionless) fluid.
	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.
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		Learning		Evaluation	
			-	name			method			
	c	outcomes						m	ethod	
First	3 St kn of ma tha an pr de un us	udents have clear owledge about some the basic echanisms, ermodynamic analysis d fluid mechanics operties of gases; monstrate a clear derstanding of the e of the properties.	Flu diı kiı m('lu im in 101	id properties and ensional analysis, ematics of fluid tion.	Th dej exj ma of and im usi tak	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	St kn ma en	Students have knowledge about the mass, momentum and energy equations.		Equations of mass Momentum and energy equations		Pro exp ma cla im pro of are by and pa the	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	St kn rel vo ge pr co	udents have lowledge about the lations between rrticity and entropy neration, and the wave opagation in mpressible flows.	Re vo ge pr co	Rel or en ro on	ation between ticity and entropy eration, wave pagation in npressible flows	Pre exj ma cla im pre of are by and pa the	ecisely plaining the aterial, urifying its portance, and esenting a set examples that e solved first the teacher d then with the rticipation of e students	The don cla sol que the are a h ass rela less	The evaluation is lone through lass activities to olve a set of juestions, and hen the students are asked to solve homework assignment elated to the esson	
Fourth	Sti kn thơ dy ve	udents have owledge about what is e One-dimensional gas namics and the area- locity relation.	Or dy Ve)no yn Yel	e-dimensional gas amics and Area- ocity relation	Pro exp ma cla im pro of are by and par the	ecisely plaining the aterial, arifying its portance, and esenting a set examples that e solved first the teacher d then with the rticipation of e students	The dor cla sol que the are a h ass rela less	e evaluation is ne through ss activities to ve a set of estions, and on the students asked to solve omework ignment ated to the son	
Fifth	Stı kn Ise	udents have lowledge about the entropic flows.	Ise	sei	ntropic flows	Th dej exj gei	e method pends on plaining the neral form of	The dor cla sol	e evaluation is ne through ss activities to ve 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