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 Course Description Guide

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.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

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 Baghdad

Faculty/Institute: AL–Khwarizmi College of Engineering

Scientific Department: Mechatronics Engineering

Academic or Professional Program Name: B.Sc

Final Certificate Name: .....

Academic System: Quarterly

Description Preparation Date: 28/3/2024

File Completion Date: 28/3/2024

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

1. Program Vision

The scientific department seeks to present academically, scientifically, and even practically in the local and international arena. The reliability of scientific laboratories is within national standards first and international standards second. Apply advanced studying and teaching systems and keeping updated with the latest developments in this field, especially e-learning. Furthermore, studying recent experiences in education and working on apply them in line with the changing standards of scientific and practical requirements. Planning to build postgraduate studies with high standard quality by preparing material requirements from laboratories and others and the scientific needs of researchers, in addition to researchers and supervisors who own a distinguished research line and global scientific publication.

2. Program Mission

The primary goal of the Mechatronics Engineering Department is to train and develop the most highly skilled engineers and leaders in the engineering field of that field. It also aims to balance knowledge in scientific research to benefit the local, regional, and global community. Additionally, the department trains and sharpens students' scientific and cognitive skills while highlighting social and cultural values and meeting local market demands. This objective necessitates adapting and developing the curricula to the various factors, ranging from the shifting demands to the various technological advancements in the scientific domains. A department's desire to realize its vision is what drives it to communicate with the outside world about the most recent advancements in science by attending international conferences and seminars, in addition to hosting many workshops and student events.

3. Program Objectives

Providing graduate engineers with the information and abilities needed for mechatronics system development and design, including applications of mechanical, electrical, electronic, control, and computer engineering. Furthermore, he will possess unique expertise that enables him to create, build, maintain, and use contemporary systems and equipment in a way that advances science. He will also be able to research issues of mechatronics. Graduate an engineer skilled in the application of sophisticated ideas linked to contemporary engineering methods in the field of mechatronics. preparing engineering personnel with a solid background so they can interact with all community members and improve and enrich the needs in Iraq. supplying information and skills that industries and businesses in the domains of robotics, industrial automation, smart systems, medical devices, and other technical and industrial applications require to prepare engineers for the labor market. Developing a scientific engineering personality that can interact with the demands of the government or the private sector of the job market.

4. Program Accreditation

N/A

5. Other external influences
N/A

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				
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
2023-2024 / Third		Vibration Systems	30	20

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	1. Understanding of Basic Concepts: Students should grasp fundamental concepts related to vibration systems, including displacement, velocity, acceleration, frequency, amplitude, and phase. 2. Analysis Techniques: Ability to analyze simple vibratory systems using mathematical techniques such as differential equations, Laplace transforms, and Fourier analysis. 3. Modeling Skills: Proficiency in modeling mechanical and structural systems as vibratory systems, including single degree of freedom (SDOF) and multiple degrees of freedom (MDOF) systems. 4. Characterization of Vibrations: Knowledge of different types of vibrations, including free vibrations, forced vibrations, damped vibrations, and resonance phenomena.

	5. Response Analysis: Capability to predict and analyze the response of vibratory systems under various excitation conditions, including harmonic, transient, and random excitations. 6. Vibration Control Strategies: Understanding of vibration control techniques such as passive damping, active control, and vibration isolation. 7. Safety Considerations: Awareness of safety considerations associated with vibration hazards in engineering practice and methods for mitigating risks.
Skills	
Learning Outcomes 2	1. Analytical Skills: The ability to analyze and solve complex problems using mathematical techniques such as differential equations, linear algebra, and calculus. 2. Modeling Skills: Proficiency in creating mathematical models of mechanical and structural systems to understand their dynamic behavior under vibration. 3. Critical Thinking: Capacity to critically evaluate and interpret vibration analysis results to make informed engineering decisions and recommendations. 4. Numerical Simulation: Skills in using numerical simulation tools such as MATLAB, Python, or finite element analysis (FEA) software to simulate and analyze vibration responses in complex systems. 5. Problem-solving Skills: Ability to apply knowledge of vibration theory to troubleshoot and resolve vibration-related issues in engineering design, manufacturing, and maintenance. 6. Communication Skills: Effective communication of technical concepts, analysis results, and engineering solutions through written reports, presentations, and interpersonal interactions. 7. Teamwork and Collaboration: Experience working collaboratively in multidisciplinary teams to address vibration-related challenges in engineering projects and research endeavors.
Ethics	
Learning Outcomes 3	1. Environmental Impact: Engineers and researchers working with vibration systems should consider the potential environmental impact of their projects. This includes minimizing noise pollution and vibrations that could disturb ecosystems or communities. 2. Safety of Structures and Equipment: Ensuring the safety and integrity of structures, machinery, and equipment is paramount. Ethical engineers should design, analyze, and maintain systems to prevent catastrophic failures and protect human life and property. 3. Health and Well-being of Workers: Vibrations from machinery and equipment can pose health risks to workers, such as hand-arm vibration syndrome or whole-body vibration effects. Ethical considerations include implementing measures to minimize worker exposure to harmful vibrations and providing appropriate training and protective equipment. 4. Informed Consent in Research: When conducting research involving human subjects, such as studying the effects of vibrations on human health or comfort, researchers must obtain informed consent from participants and ensure that their rights and well-being are protected. 5. Social Responsibility: Engineers and researchers have a responsibility to consider the broader societal implications of their work. This includes addressing issues such as accessibility, equity, and social justice in the design and implementation of vibration-related technologies and systems. 6. Professional Integrity: Ethical conduct in vibration engineering involves upholding professional standards of honesty, transparency, and accountability in research, design, and decision-making processes.

	7. Conflict of Interest: Engineers and researchers should avoid conflicts of interest that could compromise the integrity or objectivity of their work, particularly when dealing with industry-sponsored projects or consulting engagements. 8. Regulatory Compliance: Adhering to relevant laws, regulations, and industry standards governing vibration levels, noise emissions, structural integrity, and workplace safety is essential to ethical practice in vibration engineering.

9. Teaching and Learning Strategies

1- Detailed explanation of the scientific material.
2- Students' participation in solving mathematical problems in class time.
3- Discussion and dialogue about vocabulary related to the topic.

10. Evaluation methods

Mid-term exam, Quizzes, class and home assignments, lab reports and seminars.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Asst. Prof.	Mechanical Engineering	Vibration Applications-Mechanical Engineering			yes	

Professional Development

Mentoring new faculty members

Professional development of faculty members

12. Acceptance Criterion

13. The most important sources of information about the program

Textbooks dedicated to vibration analysis and mechanical vibrations are essential resources for understanding the theoretical foundations, analysis techniques, and practical applications of vibration systems. Examples include:

1. Mechanical Vibrations by Singiresu S. Rao.
2. Vibration Analysis for Electronic Equipment by Dave S. Steinberg.
3. Dynamics of Structures by Anil K. Chopra.

14. Program Development Plan

- Staying updated with the latest developments in the vibration systems.
- Using modern technologies in teaching which have the potential to transform teaching and learning by providing new ways to engage students, individualize instruction, and improve educational outcomes.

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

Third	MCT 314	Vibration systems	Basic	×				×				×			

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

Course Description Form

1. Course Name:
Vibration systems
2. Course Code:
MCT314
3. Semester / Year:
First semester / 2024
4. Description Preparation Date:
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
Weekly 3 hours (Total 45 hours)/ 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Asst. prof. Wisam S. Khudhair Hacham Email: wisam@kecbu.uobaghdad.edu.iq
8. Course Objectives

Course Objectives	1.Acquire a foundational comprehension of the fundamental principles governing different vibrating systems. 2.Explore the engineering applications of mechanical vibrations. 3.Grasp the methodologies utilized to derive the equations of motion for diverse vibrating systems.

9. Teaching and Learning Strategies

Strategy	1.Elaborate on the scientific content with thorough explanations. 2.Engage students in collaborative problem-solving sessions during class. 3.Foster discussion and dialogue surrounding the vocabulary pertinent to the subject matter.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 2	3 2 1		• Introduction to the basic principle of the mechanical vibrations • 1st degree of freedom of Mass-spring systems • Tutorial		

3 3 4 4 5 5 6 6 7 7 8 9 9 10 10 11 12 12 13 13 14 15	2 1 2 1 2 1 2 1 2 1 3 2 1 2 1 3 2 1 2 1 3 3		• 2nd degree of freedom of Mass-spring systems • Tutorial • 3rd degree of freedom of Mass-spring systems • Tutorial • 1st degree of freedom of Mass-spring-damper systems • Tutorial • 2nd degree of freedom of Mass-spring-damper systems • Tutorial • 3rd degree of freedom of Mass-spring-damper systems • Tutorial • Mid Exam • The response to external forcing of a single degree of freedom mass-spring system. • Tutorial • The response to external forcing of a single degree of freedom mass-spring system. • Tutorial • Mid Exam • The response to external forcing of a second degree of freedom mass-spring system. • Tutorial • The response to external forcing of a multi degree of freedom mass-spring system. • Tutorial • Mid Exam • Seminars		

11. Course Evaluation

Mid-term exam, Quizzes, class and home assignments, lab reports and seminars

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	N/A
Main references (sources)	
Recommended books and references (scientific journals, reports…)	1. Mechanical Vibrations by Singiresu S. Rao. 2. Vibration Analysis for Electronic Equipment by Dave S. Steinberg. 3. Dynamics of Structures by Anil K. Chopra.

Electronic References, Websites	https://vibrationdata.com/