Ministry of Higher Education and Scientific Research
Supervision and Scientific Evaluation Authority
Department of Quality Assurance and Academic Accreditation

Academic Program Description Form for Colleges and Institutes Academic Year

University: Shatt Al-Arab
College/Institute: Engineering
Scientific Department: Civil
Date of Form Completion: 01/09/2024

Signature
Name of Head of Department:

Asst. Lecturer Nabeel Najm Abdullah

Signature

Name of Scientific Assistant: Dr. Jawad Kadhim

Reviewed by:
Quality Assurance and University Performance Division
Name of Division Director: Dr. Jasem Mohsen Yasser

Signature:

الدكتور
جاسم محسن ياسر
Dr.Jasim Al-Battat

جامعة شط العرب
كلية الهندسة
العمادة
SHATT AL-ARAB UNIVERSITY

أ.م.د.احسان قاسم محمد
عميد كلية الهندسة

Dean's Approval

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

Gain complete knowledge of modeling differential equations and how to solve them and their physical and engineering applications

1. Teaching Institution	Shatt Al-Arab University -Eng. College
2. University Department/Centre	Civil Engineering Department
3. Course title/code	Engineering Analysis
4. Modes of Attendance offered	Class attendance
5. Semester/Year	1st semester / 3th year
6. Number of hours tuition (total)	60 hrs
7. Date of production/revision of this specification	2024
8. Aims of the Course	
The course aims to identify the following: 1- First order ordinary differential equations. 2- Engineering applications of first order differential equations 3- Second and higher order ordinary differential equations with fixed and variable coefficients 4- Engineering applications of second order differential equations 5- Fourier series 6- Partial differential equations	

9· Learning Outcomes, Teaching, Learning and Assessment Method
A- Knowledge and Understanding A1-Preparing applied engineers in the field of civil engineering who are distinguished by a high level of knowledge and analytical creativity in line with the solid standards adopted globally in ensuring quality and academic accreditation of corresponding engineering programs while adhering to the ethics

of the engineering profession.
A2- Enabling knowledge and understanding of practical applications according to the course objectives.
A3- The ability to build a mathematical model to represent various engineering processes.A3-

B. Subject-specific skills
B1 - The ability to know and understand the mathematical model of the problem through the differential equation and its solution
B2 - The ability to think about solving any problem.
B3 - The ability to solve problems using analytical methods for differential equations.
B4 - The ability to gain experience in dealing with initial problems and boundary 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 their capabilities.
• Conducting seminars to explain and analyze a specific issue and find solutions to it

Assessment methods

• Interacting 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 display.
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.
C 5- 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.

Teaching and Learning Methods

- The usual theoretical presentation method using the writing board and depending on the style (how and why) of the subject and according to the curriculum of the subject.
- The theoretical presentation method using the (data show) device and depending on the method (how and why) of the subject and according to the subject curriculum.
- The method of laboratory display using special devices for measuring the different properties of the substance under experiment.

Assessment methods

- Direct questions in a manner (how and why) for the subject during the theoretical and practical lecture.
- Sudden exams during the theoretical and practical lecture.
- Quarterly exams for the theoretical and practical side.
- Final exams for the theoretical and practical side.

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 programmatic 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

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	The types and classifications of differential equations	Introduction to Differential Equations	The Lecture	Class work
2	4	Ordinary differential equations and types of solutions	First order ordinary differential equations	The Lecture	Class work and quiz
3	4	DE with separable variables and homogeneous equations	First order ordinary differential equations	The Lecture	Class work
4	4	Exact differential equations	First order ordinary differential equations	The Lecture	Class work and quiz
5	4	Linear and Bernoulli DEs	Applications of DEs	The Lecture	Class work

6	4	Various applications	Applications of differential equations	The Lecture	Class work
7	4	Various applications	Higher order ordinary differential equations	The Lecture	Class work
8	4	Homogeneous DE with constant coefficients	Higher order ordinary differential equations	The Lecture	Class work and quiz
9	4	Non-homogeneous DE with constant coefficients	Higher order ordinary differential equations	The Lecture	Class work
10	4	HDEs with variable coefficients	Applications of higher order ordinary differential equations	The Lecture	Class work
11	4	Various applications	Applications of higher order ordinary differential equations	The Lecture	Class work
12	4	Various applications	Applications of higher order ordinary differential equations	The Lecture	Class work and quiz
13	4	Fourier series	Fourier Series	The Lecture	Class work
14	4	The types and solutions of partial differential equations	Partial Differential Equations	The Lecture	Class work
15	4	Applications of PDE	Partial Differential Equations	The Lecture	Class work

11. Infrastructure	
1- Required reading: · Books · COURSE MATERIALS	ERWIN KREYSZIG, ADVANCED ENGINEERING

· OTHER	
2. Key references (sources)	
A- Recommended books and references (scientific journals, reports ,....	MATHEMATICS, NINTH EDITION, JOHN WILEY & SONS, INC., 2006
B- Electronic references, websites	Reputable websites. Libraries sites in some international universities.

12. Course development plan
Adding new subjects to the curricula within the development of the course by no more than 5%. Adding new references