

Ministry of Higher Education and Scientific Research

Supervision and Scientific Evaluation Department

Quality Assurance and Academic Accreditation Office

Mathematics Course Description

The template provides a summary of the main course features and expected student learning outcomes.

1. Educational Institution	Shatt Al-Arab University
2. Department / Center	Department of Laser and Optoelectronics Engineering
3. Course Title /Code	Mathematics/ ATU15013
4. Lecturer Name	Amjad Hashim Faisal
5. Type of Teaching	Attendance
6. Academic Year /Term	Term
7. Total No. of Teaching Hours	150
8. Date of Preparing this Course Description	30/7/2025

1. Course Objectives

1. To introduce the student to the basic and advanced principles of calculus and integrations and its various applications
2. To develop his mental abilities when solving exercises.
3. Linking data with information to reach a solution to issues and benefit from them in other subjects.

2. Course Output, Methodology and Evaluation

(A) Cognitive Objectives

1. Define the determinants and be able to solution of linear equation
 2. Recognize trigonometric functions and some applications.
 3. Summarize what is meant by a scalar and vector product and projections.
 4. Discuss the Limit and continuity.
 5. Describe derivative theory.
 6. Define Chain rule.
 7. Identify the inverse function and its derivative.
 8. Discuss Derivative of logarithmic and hyperbolic functions.
 9. Discuss the definite and indefinite integral.
 10. Explain the Retail integration.
 11. Identify the Integration by completing the square.
- Discuss the approximate area using the trapezoidal rule and Simpsons.

(B) Skill Objectives Related to the Program:

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 that are interesting to the students.

(C) Methods of Teaching and Learning

- Delivering Pre-Prepared Lectures.
- Assigning Homework.
- Facilitating Group Discussions.

(D) Methods of Evaluation

- **Oral Tests:** Assessing students' understanding through verbal responses.
- **Monthly Tests:** Evaluating students' knowledge and progress on a monthly basis.
- **Daily Quizzes:** Regular quizzes to gauge students' grasp of material covered each day.
- **Regular Attendance:** Monitoring and evaluating students' consistent participation in classes.

(E) Sentimental and Value Objectives

- **Ethical Understanding:** Promoting respect, integrity, and social responsibility.
- **Attitudes and Values:** Fostering positive attitudes towards learning, collaboration, and ethical behavior.

(F) General and Qualitative Skills (other skills related to the ability of employment and personal development)

- Develop students' leadership skills.
- Improve students' proficiency in presenting technical information, writing reports, and explaining results.
- Encourage students to adapt to new technologies and methodologies related to mathematics.

3. Course Structure

Course Structure					
Week	No of Hours	Required Learning Output	Title of Subject	Teaching Method	Evaluation
١		Determinants and solution of linear equation by Gramer's rule	Gramer's rule	Lectures and discussions	Oral tests and questions
٢		Trigonometric functions and some applications.	functions	Lectures and discussions	Oral tests and questions
٣		Vectors, scalar and vector product and projections, mechanical applications to vectors	Vectors and scalar	Lectures and discussions	Oral tests and questions
٤		Limit and continuity, and some applications	Limits	Lectures and discussions	Oral tests and questions
٥		Derivative theory, derivatives of algebraic and implicit functions	Derivative theory	Lectures and discussions	Oral tests and questions
٦		Chain rule,	Chain rule	Lectures and	Oral tests

		mechanical applications on the derivative		discussions	and questions
٧		The inverse function and its derivative	The inverse function	Lectures and discussions	Oral tests and questions
٨		Derivative of logarithmic and hyperbolic functions	Derivative of logarithmic	Lectures and discussions	Oral tests and questions
٩		Integration, definite and indefinite integral, integration of trigonometric and logarithmic functions	Integration	Lectures and discussions	Oral tests and questions
١٠		Retail integration	Retail integration	Lectures and discussions	Oral tests and questions
11		Integration by division of fractions	Integration		
12		Integration by trigonometric function method	Integration		
13		Integration by completing the square	Integration		
14		Simplified differential equations	differential equations		
15		Approximate area using the trapezoidal rule and Simpsons	Approximate area		

5. Learning and Teaching Resources

Textbooks	1- Calculus, R. Mohammed and A. Abdulaali, 2002 2- Advanced calculus, Murray R. Splegel, 1962
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6. Course Improvement Plan

• Updating and expanding the curriculum content to include modern developments and applications related to mathematics.
