Course Specification
— (Bachelor)

Course Title: Introduction to mathematics

Course Code: **202112-3**

Program: Bachelor in Mathematics.

Department: Mathematics and Statistics Department

College: Faculty of sciences

Institution: Taif university

Version: 1

Last Revision Date: 20/05/2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 3 (3,0,0)

2. Course type

A.	☐University	☒ College	☐ Department	☐Track	☐Others
B.	☒ Required			☐Elective	

3. Level/year at which this course is offered: Level 1/ First Year

4. Course general Description:

This course introduces a collection of several basic topics which serve in general the most courses of mathematics. These basic topics are: Linear equations and Inequalities, Mathematical Induction, The Binomial Theorem, Partial Fractions, The Theory of Equations, relations and functions-combination of functions -composition of functions, inverse function and exponential and Logarithmic Functions, an Introduction to Analytic Geometry. By acquiring basic concepts in mathematics that make them more involved in the new educational environment within the university institution.

5. Pre-requirements for this course (if any):

 None

6. Co -requirements for this course (if any):

None

7. Course Main Objective(s):

Personal student cognitive building capable of understanding and comprehension, analysis and inference, and the development of math., study skills among students of the Faculty of Science in the first level.
Students will learn how to develop mathematical reasoning and to solve problems using mathematical concepts and techniques. They will also learn to apply these concepts and techniques to real-world problems.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	**3Hr /Week**	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	NA
3.	**Field**	NA
4.	**Tutorial**	NA
5.	**Others (specify)**	NA
Total		45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Outline exponential and Logarithmic Functions.	**K1**	• Lectures • Self-learning through the website	• Quizzes
1.2	Recognize simplification of mathematical expressions.	**K1**	• Lectures • Group discussions	• Exams
2.0	**Skills**			
2.1	Demonstrate different mathematical tools in mathematics.	**S1**	• Problem based learning • Lectures	• Assignments
2.2	Plan polynomial equations using the Rational Root Theorem, the generation of binomial theorem, partial fraction decomposition.	**S1**	• Lectures • Self-learning through the website	• Exams
3.0	**Values, autonomy, and responsibility**			
3.1	**Work effectively within groups and independently.**	**V1**	• Projects	• Through the oral presentation of the projects
3.2	**Demonstrate act responsibility and ethically in conducting their work.**	**V3**	• Lectures	• Assignments

C. Course Content

No	List of Topics	Contact Hours
1	Basic concepts revision, including (sets operations and intervals)	3
2	Basic concepts, linear equation and linear inequalities: properties of inequality in R – solution of linear equation - properties of inequality in R –Real intervals – solution of inequality – absolute value of a real number – absolute value equations and inequalities.	3
3.	Theory of Equations: general 2nd order equation, higher order equations, polynomial, Division Algorithm – synthetic division – Evaluating polynomial functions using the Remainder Theorem	3
4.	Factor Theorem-Finding zeros of polynomial functions — Rational Zeros Theorem – Fundamental Theorem of Algebra.	3
5.	Complex conjugate Theorem –Descartes' Rule of signs.	3
6.	The Binomial Theorem: n-Factorial - Binomial coefficient – Binomial Theorem – Pascal's Triangle - k^{th} Term of Binomial expansion	3
7.	Mathematical Induction: Principle of mathematical induction – proving statements – Generalized Principle of mathematical induction	3
8.	**First Midterm exam**	3
9.	Partial Fractions: dividing polynomials by a polynomial – proper fraction – decomposition of rational expressions – distinct linear factors – repeated linear factors – distinct linear and quadratic factors.	3
10.	Repeated quadratic factors.	3
11.	Relations and functions-combination of functions – composition of the functions, inverse function and exponential and Logarithmic Functions	3
12	Introduction to Analytic Geometry: Ordered pairs – The Rectangular Coordinate system – The Distance Formula – Midpoint Formula – The Equation of a Circle.	3
13.	**Second Midterm exam**	3
14.	The Slope of a line – Equations of lines (Point-slope form, slope-intercept form) – Equations of vertical and horizontal lines.	3
15	Parallel lines – perpendicular lines.	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	Continuous Evaluation	10 %

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
2.	Assignments	Continuous Evaluation	10 %
3.	Midterm 1 Exam	8-9	15%
4.	Midterm 2 Exam	12-13	15%
5.	Final Exam	15-16	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	1-Lial, Hornsby, and Schneider; College Algebra and Trigonometry, (3ed), Addison Wesley,2005.
	2-R.N. Aufmann, V. C. Barker, R.D. Nation; College Algebra and Trigonometry, (7ed), BROOKS/COLE,2011.0172-6056, Department of Mathematics Saint Joseph's University Philadelphia, PA, USA
Supportive References	J. Stewart, (2012), Calculus: Early Transcendentals,7th edition, USA, Brooks/Cole.
Electronic Materials	https://theswissbay.ch/pdf/Gentoomen%20Library/Maths/Calculus/Calculus%20-%20J.%20Stewart.pdf
Lectures available in Blackboard.	Lectures available in Blackboard.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (Projector, smart board, software)	Data show, Blackboard
Other equipment (Depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Program Leader	Direct & Indirect

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Students assessment	Faculty, Program Leader	Direct
Quality of learning resources	Students, Faculty	Indirect
The extent to which CLOs have been achieved	Faculty	Direct & Indirect
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Department Council
REFERENCE NO.	4
DATE	October 2023

قسم الرياضيات والإحصاء
Mathematics and Statistics Department
TU
جامعة الطائف
TAIF UNIVERSITY