Syrian Arab Republic		الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليـم العـالـــــي
Syrian Virtual University		الجامعة الافتراضية السورية

Mathematical Analysis GMA102 Course Description

1-Basic information

Course Name	Mathematical Analysis
Course ID	GMA102
Contact Hours (Registered Sessions)	36
Contact Hours (Synchronized Sessions)	18
Mid Term Exam Hours	0
Exam Hours	1.5
Registered Sessions Work Load	36
Synchronized Session Work Load	18
Credit Hours	6
Level	1
Home Work numbers	1

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2- Pre-Requisites

Course	ID
Mathematical Algebra	GMA101

3- Course General Objectives

Mathematical Analysis aims to study real numbers, functions, continuity, limits, sequences, series, derivatives, integrals and differential equations.

4- Intended Learning Outcomes (ILO)

Code	Intended Learning Outcomes
ILO1	Understanding Real numbers field
ILO2	Knowing Functions, Limits and Continuity concepts and properties
ILO3	Understanding real sequences and knowing evaluation of sequences convergence or divergence and limits
ILO4	Understanding infinite series, and knowing evaluation of series limits, convergence or divergence
ILO5	Understanding Derivatives, knowing how to make differentiation of simple, combined and implicit functions.
ILO6	Knowing definite Integrals and indefinite integrals, knowing how to evaluate integrals using analytical and numerical methods

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ILO7	Understanding and knowing how to resolve First- and second- order Linear Differential Equations with constant coefficients

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5- Course Syllabus (**18 hours of total synchronized sessions SS, 36 hours of Recorded Sessions RS**)

Number	Title	Description	RS [h]	SS [h]
1	Real Numbers Field	Numbers sets, Mathematical Induction, Field properties, ordered field, bounds, absolute values, intervals	3	3
2	Functions, Limits and Continuity	Functions, Bounded functions, Monotonic functions, Function limits, Maxima and minima, Continuity	6	3
3	Real Sequences	Definition of a Sequence, Arithmetic and Geometric Sequences, Limit of Sequences, Bounded and Monotonic Sequences,	6	3
4	Series	Notation of sums, Properties of sums, Definition of Series, Convergence of Series, Tests for Convergence, Absolute and conditional convergence, Power series, Expansion of functions in Power	6	3

		series, Taylor’s Theorems		

5	Derivatives	The Concept and definition of a derivative, Right and Left derivation, Differentiability in an interval, The differentiation of composite functions, Implicit differentiation, Rules for differentiation, Derivatives of Elementary functions, Higher order Derivatives, Applications: Relative Extrema and points of inflection, Velocity, Newton's Method	6	3
6	Integrals	Properties of Definite Integrals, Mean Value Theorem for Integrals, Primitive, antiderivative or indefinite integrals, The fundamental theorem of the Calculus, Integrals of elementary functions, Change of variable of integration, Integration by Parts, Rational functions integration,	9	3

		Numerical methods for evaluating definite integrals, First and Second order linear differential equations.		

6- Assessment Criteria

Code	Intended Learning Outcomes	Home Work	Interaction during Synchronized Sessions	Exam
ILO1	Understanding Real numbers field	√	√	√
ILO2	Knowing Functions, Limits and Continuity concepts and properties	√	√	√
ILO3	Understanding real sequences and knowing evaluation of sequences convergence or divergence and limits	√	√	√
ILO4	Understanding infinite series, and knowing evaluation of series limits, convergence or divergence		√	√
ILO5	Understanding Derivatives, knowing how to make differentiation of simple, combined and implicit functions.		√	√

ILO6	Knowing definite Integrals and indefinite integrals, knowing how to evaluate integrals using analytical and numerical methods		√	√
ILO7	Understanding and knowing how to resolve First- and second- order Linear Differential Equations with constant coefficients		√	√

References

[1] Bagby, Richard J. Introductory Analysis: A Deeper View of Calculus. Academic Press, 2000.

[2] Ross, Kenneth A. Elementary analysis. New York: Springer-Verlag, 1980.

[3] Omran Kuba, Analysis 1, Damascus University Press, Third Edition 2003 (in Arabic).

[4] Wrede, Robert C., and Murray R. Spiegel. Advanced calculus. McGraw-Hill, 2010