



Tafila Technical University
College of Science
Department of Mathematics



Study Plan Approval Date	Mathematics Study Plan	Study Plan Code
06/11 / 2024		SCI._MATH.__0203



Tafila Technical University
College of Science

This study plan is applied to the students admitted into the Bachelor's program
in Mathematics for the academic year 2024/2025

Study Plan for B.Sc. in Mathematics

Offered Degree: B.Sc. in Mathematics



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College of Science
Department of Mathematics



Department	Program	Official Stamp
Department of Mathematics	B.Sc. in Mathematics	
The mathematics study plan was approved by the dean's council on 06/11/ 2024 / Decision Number (281/2024)		

TTU Mathematics Program

Vision and Mission	
Vision	Bringing the department's graduates to a significant level both locally and internationally in terms of science and technology
Mission	Provide highly skilled graduates with the appropriate science knowledge to meet the demands of job opportunities and scientific research.

Program Objectives (POs)	
PO_1	Provide the graduate with the necessary tools to develop their scientific and logical thought processes.
PO_2	Provide the needs of the market for specialists in mathematics.
PO_3	Prepare students to be qualified to further their education to higher levels.
PO_4	Encourage scientific research and sharing through publication in scientific journals.
PO_5	Provide support for participation in specialist conferences, seminars and workshops.
PO_6	Provide platforms of communications with groups of similar background and interest such as science and engineering.



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Program Educational Outcomes (PEOs)

PEO_1	Provide the requirements for a lucrative employment or be eligible for further education.
PEO_2	Ability to recognize and address technical or scientific issues using science, mathematics, and pertinent information.
PEO_3	Conduct scientific research, assess data, and make decisions based on scientific judgment.
PEO_4	Improve mathematics skills through self-learning and keep up with emerging technology relevant to your field.

Student Learning Outcomes (SLOs)

SLO_1	Identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.
SLO_2	Formulate or design a system, process, procedure or program to meet desired needs.
SLO_3	Develop and conduct experiments or test hypotheses, analyse and interpret data and use scientific judgment to draw conclusions.
SLO_4	Communicate effectively with a range of audiences.
SLO_5	Understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.
SLO_6	Work effectively on teams that establish goals, plan tasks, meet deadlines, and analyse risk and uncertainty.

Cognitive Domains for Mathematics Program

Domain	Fundamental Cognitive Domains
1	Pure Mathematics
2	Applied Mathematics
3	Statistics and Probability
4	Teaching and Research
	Supporting Cognitive Domains
	Courses support the mathematics program that are offered by other programs in the college of science or by other colleges



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Numbering System for Mathematics Program

College NO.	Program NO.	Course Level	Domain NO.	Course order within the cognitive Domain
02	03	From 1 to 4	From 1 to 4	From 1 to 9

Credit Hours Distribution for B.Sc. in Mathematics

Classification	Credit Hours		
	Obligatory	Elective	Total
University Requirements	21	6	27
College Requirements	21	0	21
Specialty Requirements	71	15	86
	113	21	134

Classification of the Requirements for the B.Sc. Degree in Mathematics
According to Teaching Mode (Online – Blended – Face to Face)

Requirements Classification	Specialty Requirements			College Requirements	Elective University Requirements	Obligatory University Requirements						
	Obligatory	Elective										
Credit Hours	71	15		21	6	21						
% Credit Hours	53 %	11 %		16%	4%	16 %						
% (Total)	64 %			16%	20%							
Teaching Methods	F-to-F	Blended	Online	F-to-F	Blended	Online	F-to-F	Blended	Online	F-to-F	Blended	Online
Credit Hours	59	27	0	3	18	0	0	0	6	0	0	21
% (Total)	44 %	20 %	0 %	2 %	13 %	0 %	0 %	0 %	5 %	0 %	0 %	16 %



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First: Obligatory University Requirements (21 Credit Hours)

Course NO.	Course Name	Number Of Credit Hours			Pre-requisite	Teaching Method
		Theoretical	Experimental	Total		
0501100	Communication Skills in Arabic Language	3	0	3	(1)	Online
0502100	Communication Skills in English Language	3	0	3	(2)	Online
0603099	Computer complementary course ⁽³⁾	3	0	0	-----	Online
0302100	Life skills	3	0	3	None	Online
0301199	Leadership and Social Responsibility	3	0	3	None	Online
0404199	Entrepreneurship and innovation	3	0	3	None	Online
0503101	National Education ⁽⁴⁾	3	0	3	None	Online
0503112	Military Science ⁽⁴⁾	3	0	3	None	Online

(1) "Arabic Placement Test" or Prerequisite Arabic Language 0501099.

(2) "English Placement Test" or Prerequisite English Language 0502099.

(3) "Computer skill placement test" 0602098 , If the student passes in placement test, the grade will record "pass".

(4) Obligatory course for Jordanian students and optional for non-Jordanians. Non-Jordanian students, who do not choose this course, must study another course from the elective university requirements and the grade for this course will not be included in the student's GPA, but will be counted as pass or fail.

Second: Elective University Requirements (6 Credit Hours)

Student can choose one course from each of the following groups:

Course NO.	Course Name	Number of Credit Hours			Pre-requisite	Teaching Method
		Theoretical	Experimental	Total		
Humanities Group						
Offered by College of Arts, College of Education and College of Business						
0302099	Islamic Culture	3	0	3	None	Online
0503108	Human Rights	3	0	3	None	Online
0503110	Introduction to Domestic Violence	3	0	3	None	Online
0301102	Principles of Thinking	3	0	3	None	Online
0301105	Family Counseling	3	0	3	None	Online
0404100	Work Ethics	3	0	3	None	Online
0403099	Development and Environment	3	0	3	None	Online
Applied Sciences Group						
Offered by College of Engineering, College of Science and College of Information Technology and Telecommunications						
0105103	Mineral Resources in Jordan	3	0	3	None	Online
0202103	Physics and Society ⁽⁵⁾	3	0	3	None	Online
0601104	E-Learning	3	0	3	None	Online
0602100	Digital Culture	3	0	3	None	Online
0106140	Traffic Safety	3	0	3	None	Online
0212111	Radiation Sources and its Applications ⁽⁵⁾	3	0	3	None	Online

(5) Can be chosen by all university students except students of Applied Physics Department.



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Third: Obligatory College Requirements (21 Credit Hours)

Course NO.	Course Name	Number of Credit Hours			Pre-requisite	Teaching Method
		Theoretical	Experimental	Total		
0213105	Calculus 1	3	0	3	(1)	Blended
0213106	Calculus 2	3	0	3	0213105	Blended
0213101	General Physics 1	3	0	3	(2)	Blended
0213107	General Chemistry 1	3	0	3	(3)	Blended
0213109	General Biology 1	3	0	3	None	Blended
0213115	Principles of Statistics 1	3	0	3	None	Blended
0213103	General Physics Lab. 1	0	3	1	0213101 ⁽⁴⁾	F-to F
0213108	General Chemistry Lab. 1	0	3	1	0213107 ⁽⁴⁾	F-to F
0213116	Principles of Statistics Lab. 1	0	3	1	0213115 ⁽⁴⁾	F-to F

(1) "High School Mathematics "or Prerequisite Mathematics 0213098.

(2) "High School Physics "or Prerequisite Physics 0213097.

(3) "High School Chemistry" or Prerequisite Chemistry 0213099.

(4) or concurrent

Fourth: Obligatory Specialization Requirements (71 credit hours)

Course NO.	Course Name	Number of Credit Hours			Pre-requisite	Teaching Method
		Theoretical	Experimental	Total		
0213102	General Physics 2	3	0	3	0213101	Blended
0213104	General Physics Lab.2	0	3	1	0213102 ⁽⁴⁾	F-to F
0203211	Linear Algebra 1	3	0	3	0213106	F-to F
0203212	Logic and Set Theory	3	0	3	0213106	F-to F
0203213	Euclidean & non-Euclidean Geometry	3	0	3	0203212	F-to F
0203220	Calculus 3	3	0	3	0213106	Blended
0203222	Advanced Calculus	3	0	3	0203220	Blended
0203223	Ordinary Differential Equations 1	3	0	3	0213106	F-to F
0203224	Mathematical Methods 1	3	0	3	0203223	F-to F
0203231	Principles of Statistics 2	3	0	3	0213115	F-to F
0203232	Introduction to Probability	3	0	3	0203222	F-to F
0203326	Real Analysis 1	3	0	3	0203212	F-to F
0203310	Complex Analysis 1	3	0	3	0203222	F-to F
0203314	Modern Algebra 1	3	0	3	0203212	F-to F
0203315	Topology 1	3	0	3	0203213	F-to F
0203321	Partial Differential Equations 1	3	0	3	0203223	F-to F
0203322	Numerical Analysis 1	3	0	3	0203223	F-to F
0203330	Mathematical Statistics	3	0	3	0203231 & 0203232	F-to F
0203419	Real Analysis 2	3	0	3	0203326	F-to F
0203414	Modern Algebra 2	3	0	3	0203212	F-to F
0203418	Number Theory	3	0	3	0203212	F-to F
0203420	Numerical Analysis 2	3	0	3	0203322	F-to F
0203425	Mathematical Packages	3	0	3	0203322	F-to F
0203448	Seminar in Mathematics	1	0	1	(5)	F-to F



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0203446	Mathematical Methods in Artificial Intelligent	2	3	3	0203232	F-to F
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(4) or concurrent

(5) Successfully complete a minimum of 90 credit hours.

Fifth: Elective Specialization Requirements (15 Credit Hours)

A- First Group: The student can choose any **FOUR** courses from the following list:

Course NO.	Course Name	Number of Credit Hours			Pre-requisite	Teaching Method
		Theoretical	Experimental	Total		
0203225	Applied Calculus	3	0	3	0203220 & 0203223	F-to F
0203230	Mathematics for Finance	3	0	3	0213115	F-to F
0203235	Time Series	3	0	3	0203231	F-to F
0203319	Linear Algebra 2	3	0	3	0203211	F-to F
0203326	Functional Analysis	3	0	3	0203326	F-to F
0203310	Matrix Theory	3	0	3	0203211	F-to F
0203319	Graph Theory	3	0	3	0203314	Blended
0203323	Linear Programming & Game Theory	3	0	3	0203211	Blended
0203324	Differential Geometry	3	0	3	0203222	F-to F
0203325	Mathematical Modelling	3	0	3	0203223	Blended
0203349	Design of Experiments & Analysis of Variance	3	0	3	0203231	F-to F
0203348	Statistical Packages	1	6	3	0203231	Blended
0203419	Complex Analysis 2	3	0	3	0203310	F-to F
0203415	Topology 2	3	0	3	0203315	F-to F
0203416	Algebraic Topology	3	0	3	0203315	F-to F
0203417	Applied Algebra	3	0	3	0203314	F-to F
0203421	Partial Differential Equations 2	3	0	3	0203321	F-to F
0203423	Ordinary Differential Equations 2	3	0	3	0203223	F-to F
0203424	Mathematical Methods 2	3	0	3	0203224	F-to F
0203447	Methods in Mathematics Teaching	3	0	3	(6)	Blended
0203449	Research Project	3	0	3	(6)	F-to F
0203448	Special Topics in Mathematics	3	0	3	(6)	F-to F

(6) Successfully complete a minimum of 90 credit hours.



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B- Second Group: The student can choose **One** course from the following list:

Course NO.	Course Name	Number of Credit Hours			Pre-requisite	Teaching Method
		Theoretical	Experimental	Total		
0202221	Electronics 1	3	0	3	0213102	F-to F
0202211	Waves and Light	3	0	3	0213102	F-to F
0202212	Geometrical Optics	3	0	3	0213102	F-to-F
0202315	Introduction to Astronomy	3	0	3	-	F-to F
0213118	Fundamentals of Information Technology	3	0	3	-	F-to F



Advisory Plan for Bachelor of Science Students in Mathematics

First Academic Year							
The First Semester				The Second Semester			
Course Number	Course Name	No. of Credit Hours	Pre-Requisite	Course Number	Course Name	No. of Credit Hours	Pre-Requisite
0213105	Calculus 1	3	(1)	0213106	Calculus 2	3	0213105
0213101	General Physics 1	3	(2)	0213102	General Physics 2	3	0213101
0213103	General Physics Lab.1	1	0213101 (3)	0213109	General Biology 1	3	None
0213115	Principles of Statistics 1	3	None	0213104	General Physics Lab. 2	1	0213102 (3)
0213116	Principles of Statistics Lab.1	1	0213115 (3)		University Elective Requirement	3	
	University Elective Requirement	3			Obligatory University Requirement	3	
	Obligatory University Requirement	3					
Total		17		Total		16	

Second Academic Year							
The First Semester				The Second Semester			
Course Number	Course Name	No. of Credit Hours	Pre-Requisite	Course Number	Course Name	No. of Credit Hours	Pre-Requisite
0213107	General chemistry 1	3	(4)	0203231	Principles of Statistics 2	3	0213115
0213108	General Chemistry Lab. 1	1	0213107 (4)	0203212	Logic & Set Theory	3	0213106
0203220	Calculus 3	3	0213106	0203213	Euclidean & non-Euclidean Geometry	3	0203212
0203223	Ordinary Differential Equations 1	3	0213106	0203224	Mathematical Methods 1	3	0203223
0203211	Linear Algebra 1	3	0213106	0203222	Advanced Calculus	3	0203220
---	Obligatory University Requirement	3		---	Obligatory University Requirement	3	
Total		16		Total		18	

(1) (High School Mathematics) or Prerequisite Calculus 0213098.

(2) (High School Physics) or Prerequisite Physics 0213097.

(3) (High School Chemistry) or Prerequisite Chemistry 0213099.

(4) or concurrent



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Third Academic Year							
The First Semester				The Second Semester			
Course Number	Course Name	No. of Credit Hours	Pre-Requisite	Course Number	Course Name	No. of Credit Hours	Pre-Requisite
0203232	Introduction to Probability	3	0203222	0203330	Mathematical Statistics	3	0203231
0203326	Real Analysis 1	3	0203212	0203314	Modern Algebra 1	3	0203212
0203310	Complex Analysis 1	3	0203222	0203315	Topology 1	3	0203213
0203321	Partial Differential Equations 1	3	0203223	0203322	Numerical Analysis 1	3	0203223
	Elective Specialization Requirement	3			University Specialisation Requirement	3	
	University Elective Requirement	3			Elective Specialisation Requirement	3	
Total		18		Total		18	

Fourth Academic Year							
The First Semester				The Second Semester			
Course Number	Course Name	No. of Credit Hours	Pre-Requisite	Course Number	Course Name	No. of Credit Hours	Pre-Requisite
0203419	Real Analysis 2	3	0203326	0203446	Mathematical Methods in Artificial Intelligent	3	0203322
0203420	Numerical Analysis 2	3	0203322	0203414	Modern Algebra 2	3	0203314
0203425	Mathematical Packages	3	0203322	0203448	Seminar in Mathematics	1	(1)
0203418	Number Theory	3	0203212		Elective Specialization Requirement	3	
	University Elective Requirement	3			Elective Specialization Requirement	3	
					University Elective Requirement	3	
Total		15		Total		16	

(1) Successfully complete a minimum of 90 credit hours.



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The Courses Offered by the Department of Mathematics Cover the Essential Compulsory & Elective Cognitive Areas for the Specialization of Mathematics

Cognitive Domain	Course Number	Course Name	Number of Credit Hours			Pre-requisite
			Theoretical	Experimental	Total	
(1) Pure Mathematics	0203211	Linear Algebra 1	3	0	3	0213106
	0203212	Logic & Set Theory	3	0	3	0213106
	0203213	Euclidean & non-Euclidean Geometry	3	0	3	0203212
	0203319	Linear Algebra II	3	0	3	0203211
	0203326	Real Analysis 1	3	0	3	0203212
	0203310	Complex Analysis 1	3	0	3	0203222
	0203314	Modern Algebra 1	3	0	3	0203212
	0203315	Topology 1	3	0	3	0203213
	0203326	Functional Analysis	3	0	3	0203326
	0203310	Matrix Theory	3	0	3	0203211
	0203319	Graph Theory	3	0	3	0203314
	0203419	Real Analysis II	3	0	3	0203326
	0203419	Complex Analysis II	3	0	3	0203310
	0203414	Modern Algebra II	3	0	3	0203314
	0203415	Topology II	3	0	3	0203315
	0203416	Algebraic Topology	3	0	3	0203315
0203417	Applied Algebra	3	0	3	0203314	
0203418	Number Theory	3	0	3	0203212	
(2) Applied Mathematics	0203220	Calculus III	3	0	3	0213106
	0203222	Advanced Calculus	3	0	3	0203220
	0203223	Ordinary Differential Equations 1	3	0	3	0213106
	0203224	Mathematical Methods 1	3	0	3	0203223
	0203225	Applied Calculus	3	0	3	0203220 & 0203223
	0203321	Partial Differential Equations 1	3	0	3	0203223
	0203322	Numerical Analysis 1	3	0	3	0203223
	0203323	Linear Programming & Game Theory	3	0	3	0203211
	0203324	Differential Geometry	3	0	3	0203222
	0203325	Mathematical Modelling	3	0	3	0203223
	0203421	Partial Differential Equations II	3	0	3	0203321
	0203420	Numerical Analysis II	3	0	3	0203322
	0203423	Ordinary Differential Equations II	3	0	3	0203223
0203424	Mathematical Methods II	3	0	3	0203224	
0203425	Mathematical Packages	3	0	3	0203322	
(3) Statistics & Probability	0203231	Principles of Statistics II	3	0	3	0213115
	0203232	Introduction to Probability	3	0	3	0203222
	0203230	Mathematics for Finance	3	0	3	0213115
	0203235	Time Series	3	0	3	0203231



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	0203349	Design of Experiments & Analysis of Variance	3	0	3	0203231
	0203348	Statistics Packages	1	6	3	0203231
	0203330	Mathematical Statistics	3	0	3	0203232 & 0203231
(4) Teaching & Research	0203447	Methods in Mathematics Teaching	3	0	3	(1)
	0203442	History of Mathematics	3	0	3	(2)
	0203449	Research Project	3	0	3	(1)
	0203448	Seminar in Mathematics	1	0	1	(1)
	0203448	Special Topics in Mathematics	3	0	3	
	0203446	Mathematical Methods in Artificial Intelligent	2	3	3	0203232

(1) Successfully complete a minimum of 90 credit hours.

(2) Department Approval.

Supporting Courses for the Mathematics Program that are Offered by other Programs in the College of Science

Cognitive Domain	Course Number	Course Name	Number of credit hours			Pre-requisite
			Theoretical	Experimental	Total	
Supporting Domains	0213101	General Physics I	3	0	3	(3)
	0213103	General Physics Lab. I	0	3	1	0213101 (6)
	0213102	General Physics II	3	0	3	0213101
	0213104	General Physics Lab. II	0	3	1	0213102 (6)
	0213107	General Chemistry I	3	0	3	(4)
	0213108	General Chemistry Lab. I	0	3	1	0213107 (6)
	0213105	Calculus I	3	0	3	(5)
	0213106	Calculus II	3	0	3	0213105
	0213115	Principles of Statistics I	3	0	3	None
	0213116	Principles of Statistics Lab. I	0	3	1	0213115 (6)
	0213109	General Biology I	3	0	3	None
	0202221	Electronics I	3	0	3	0213102
	0202211	Waves and Light	3	0	3	0213102
	0212212	Geometrical Optics	3	0	3	0213102
	0202315	Introduction to Astronomy	3	0	3	-
	0213118	Fundamentals of Information Technology	3	0	3	-
	0213097	Prerequisite Physics (7)	3	0	0	None
	0213098	Prerequisite Calculus (7)	3	0	0	None
0213099	Prerequisite Chemistry (7)	3	0	0	None	

(3) (High School Physics) or Prerequisite Physics 0213097.

(4) (High School Chemistry) or Prerequisite Chemistry 0213099.

(5) (High School Mathematics) or Prerequisite Calculus 0213098.

(6) or concurrent.

(7) This course is marked **PASS** or **FAIL**.



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Description of the Courses that Cover Fundamental Cognitive Domains of the Mathematics Program Obligatory Requirements

Course Name: General Physics 2		Course Number: 0213102	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213101		Teaching language: English	Offered by: Applied Physics Program
Course Description	This course will provide students with the fundamental knowledge and skills necessary to understand and apply the basic concepts of electricity and magnetism Electric force: Coulomb's law Electric field, Gauss's law, Electric potential, Capacitance and dielectric materials, Direct current and resistance Ohm's law, Electromotive force and electrical circuits: Kirchhoff's laws, Magnetic field: Lorentz force law. Sources of magnetic fields: Biot-Savart law, Ampere's law, Electromagnetic induction: Faraday's law.		
Course Name: General Physics Lab.2		Course Number: 0213104	NO.of credit hours:1(3Experimental Hrs)
Pre-requisite: 0213102		Teaching language: English	Offered by: Applied Physics Program
Course Description	This course contains experiments that test the determination of the values and direction of the electric field, Ohm's law, Wheatstone bridge, voltage divider, electrical power, galvanometer, resistance and capacitance circuit, the specific charge of a copper ion, and the horizontal component of the Earth's magnetic field.		
Course Name: Linear Algebra 1		Course Number: 0203211	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213106		Teaching language: English	Offered by: Mathematics Program
Course Description	System of a linear equation and its solutions. Matrices and arithmetic matrices, inverse of a matrix, Determinants, Cramer's rule. Vector spaces, subspaces, linear independence, bases and dimensions, row and column spaces, null space, inner product spaces, orthogonally bases, and change of bases. Eigenvalues and eigenvectors, diagonalization, linear transformations and matrices, Kernel and range, invertible transformation.		
Course Name: Logic & Set Theory		Course Number: 0203212	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213106		Teaching language: English	Offered by: Mathematics Program
Course Description	Mathematical logic, proof techniques, mathematical induction. Sets and subsets, operations on sets, indexed families of sets, Cartesian product of two sets. Relations and equivalence relations, partial and total ordered relation. Functions, inverse functions, injective, surjective and bijective functions, finite and infinite sets, equivalence of Sets.		
Course Name: Euclidean and non- Euclidean Geometry		Course Number: 0203213	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203212		Teaching language: English	Offered by: Mathematics Program
Course Description	Axiomatic system, Euclid's axioms, continuity axioms, distance, angles measurements, parallel axioms, similarity axioms, area, circle, lines and planes in space, three-dimensional geometry.		
Course Name: Calculus 3		Course Number: 0203220	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213106		Teaching language: English	Offered by: Mathematics Program
Course Description	Analytical geometry in calculus: Three-dimensional space and vectors, rectangular coordinate in 3-space, polar coordinate, conic sections, cylindrical surfaces, quadric surfaces, functions of two or more variables: domain, limits, and continuity, partial derivatives, differentiability, total differentials, the chain rule, the gradient, directional derivatives, tangent planes, normal line, maxima and minima of functions of two variables, double integrals, double integrals in polar coordinates.		
Course Name: Advanced Calculus		Course Number: 0203222	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203220		Teaching language: English	Offered by: Mathematics Program
Course Description	Calculus of vector valued functions: triple integrals in Cartesian, spherical and cylindrical coordinates, gradient, curl, curvilinear coordinates, line integral, surface integral, volume integral, Green's and Stoke's theorems, Divergence theorem.		



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Course Name: Ordinary Differential Equations 1		Course Number: 0203223	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213106		Teaching language: English	Offered by: Mathematics Program
Course Description	Classification of differential equations, first order differential equation, Separable, exact homogeneous, linear, difference between linear and non-linear, Application of first order ordinary differential equation. Second order ordinary differential equation. Homogeneous with constant coefficient, non-homogeneous differential equation and their solutions and applications. Higher order differential equation, homogeneous and their solutions. Series solution about regular area and singular points, Bessel equation, Legendre equation. Solution by Laplace transform, step function, delta function.		
Course Name: Mathematical Methods 1		Course Number: 0203224	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203223		Teaching language: English	Offered by: Mathematics Program
Course Description	Fourier series, finite and infinite Fourier transformations, Beta and Gamma and other functions, Bessel, Lagrange, Chebyshev, Laggere and Hermit functions. Laplace Transform; its properties, and applications in differential equations.		
Course Name: Principles of Statistics 2		Course Number: 0203231	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213115		Teaching language: English	Offered by: Mathematics Program
Course Description	Inferences about two means, proportions, and variances. χ^2 test for goodness of fit and independence. Design and analysis of experiment (one way and two-way), Categorical data analysis in contingency tables. Regression and correlation, inference on the Least-Squares Regression Model. Introduction to nonparametric statistics.		
Course Name: Introduction to Probability		Course Number: 0203232	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203222		Teaching language: English	Offered by: Mathematics Program
Course Description	Sets, Random Experiment, Sample Space and Events. Counting methods, axioms of probability, conditional probability and independence, Bayes' theorem. Random variables, probability distributions and expectation. Moment generating function. Binomial, geometric, Poisson, uniform, normal, gamma, Chi-square and other continuous and discrete distributions, Chebyshev's Inequality, Multivariate distributions, marginal and conditional distributions, moments of linear combinations of random variables., conditional expectation, Independent random variables, multinomial distribution.		
Course Name: Real Analysis 1		Course Number: 0203326	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203212		Teaching language: English	Offered by: Mathematics Program
Course Description	Algebraic, order, completeness properties of real numbers, nested interval properties, Archimedean property and density theorem. Sequences, limits of sequences, subsequence, Cauchy sequences. Limit and continuity of a real valued functions, properties of continuous functions, uniform continuity.		
Course Name: Complex Analysis 1		Course Number: 0203310	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203222		Teaching language: English	Offered by: Mathematics Program
Course Description	The complex number system, Cauchy-Riemann equation, polar coordinates and harmonic function, Elementary functions, exponential, logarithmic, and trigonometric functions and their inverses. Integrals, Cauchy-Goursat theorem and Cauchy integral formula. Series, convergence residues and poles.		
Course Name: Modern Algebra 1		Course Number: 0203314	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203212		Teaching language: English	Offered by: Mathematics Program
Course Description	Groups and subgroups, cyclic groups, permutation groups, isomorphism groups, Direct product of groups, cosets and Lagrange theorem, normal subgroups and factor groups, homomorphism of groups, the first isomorphism theorem.		



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Course Name: Topology 1		Course Number: 0203315	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203213		Teaching language: English	Offered by: Mathematics Program
Course Description	Topological space, open and closed sets, Closure, interior and boundary of a points, Topology operator on functions, subspaces topology, Bases and sub-bases, Finite product, Continuous function, open and closed functions, Homomorphism topology, Metric spaces, Connectedness, and compactness.		
Course Name: Partial Differential Equations 1		Course Number: 0203321	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203223		Teaching language: English	Offered by: Mathematics Program
Course Description	Classification of partial differential equations. Solving P.D.E by discriminant. Some physical models: heat, wave, and Laplace equation. Separation of variables, Sturm-Liouville BVP. Fourier series, Fourier transforms. BVP involving rectangular and circular regions. BVP involving cylindrical and spherical coordinates.		
Course Name: Numerical Analysis 1		Course Number: 0203322	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203223		Teaching language: English	Offered by: Mathematics Program
Course Description	Introduction, error analysis, solutions of equations in one variable: Bisection method, Fixed-point, Newton's method, Interpolation polynomial approximation, Numerical differentiation and Integration, numerical solution of initial value problem for ordinary differential equations.		
Course Name: Mathematical Statistics		Course Number: 0203330	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203231, 0203232		Teaching language: English	Offered by: Mathematics Program
Course Description	The distribution of functions of random variables, distribution function technique, transformation technique, moment-generating function technique, sampling distributions, order statistics, point estimation, estimation methods, confidence interval; unbiased estimator, sufficient statistics and its properties, complete statistics, exponential family, Fisher Information and the Rao-Cramer inequality. Neyman-Pearson lemma, Likelihood ratio test.		
Course Name: Real Analysis 2		Course Number: 0203419	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203326		Teaching language: English	Offered by: Mathematics Program
Course Description	Differentiation: Differentiable functions, Roll's theorem, mean-value theorem, L'Hôpital's rule, Taylor's theorem, Darboux's theorem. Riemann integral: definition and properties, improper integral, integral approximation. Sequences of functions, point-wise convergences, uniform convergence, interchange of limits. Series of functions and convergence tests.		
Course Name: Modern Algebra 2		Course Number: 0203414	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203314		Teaching language: English	Offered by: Mathematics Program
Course Description	Rings, subrings, fields, factor rings and ideals, ring-homomorphism, Polynomial rings, Unique factorization domains, quotient fields, Principles ideal domains, Euclidean domain.		
Course Name: Number Theory		Course Number: 0203418	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203212		Teaching language: English	Offered by: Mathematics Program
Course Description	This course covers the basics of divisibility, including the division algorithm, greatest common divisor (GCD), and least common multiple (LCM). It also explores prime numbers, their distribution, and the Fundamental Theorem of Arithmetic. Key topics include Diophantine equations, congruences, and linear congruence equations. Chinese Remainder Theorem, Fermat's Little Theorem, Wilson's Theorem, and Pell's Theorem. Arithmetic functions, Pythagorean triples, infinite descent, and Fermat's Last Theorem for $n=4$.		



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Course Name: Numerical Analysis 2		Course Number: 0203420	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203322		Teaching language: English	Offered by: Mathematics Program
Course Description	Iterative techniques in matrix algebra, approximation theory, approximation eigenvalues, numerical solution of linear and nonlinear systems of equations, Approximation theory, Numerical solution of partial differential equations.		
Course Name: Mathematical Packages		Course Number: 0203425	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203322		Teaching language: English	Offered by: Mathematics Program
Course Description	One or more of the packages like MATLAB, Mathematical, Maple and other use in computer lab to illustrate selected mathematical concepts (Numerical solutions for nonlinear equations, linear systems, interpolation and approximations, differentiation and integration ordinary and partial differential equation, optimization, graph theory, integral transform, and other concepts).		
Course Name: Seminar in Mathematics		Course Number: 0203448	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: The student must have successfully finished 90 credit hours.		Teaching language: English	Offered by: Mathematics Program
Course Description	The course aims to develop students' cognitive skills by preparing and presenting a topic in one of the cognitive fields in mathematics. The teaching staff determines the titles of the topics to be discussed at the beginning of the semester.		
Course Name: Mathematical Methods in Artificial Intelligent		Course Number: 0203446	NO. of credit hours: 3 (2 Theoretical & 3 Experimental Hrs.)
Pre-requisite: 0203232		Teaching language: English	Offered by: Mathematics Program
Course Description	Continuous Optimization, Data, Models, and Learning. Empirical Risk Minimization, Parameter Estimation, Probabilistic Modelling and Inference, Directed Graphical Models. Linear Regression and Bayesian Linear Regression. Dimensionality Reduction with Principal Component Analysis. Density Estimation with Gaussian Mixture Models. Classification with Support Vector Machines. Regularization and Kernel Methods. Decision Trees and Ensemble Methods.		

Description of the Courses that Cover Fundamental Cognitive Domains of the Mathematics Program Elective Requirements

Course Name: Applied Calculus		Course Number: 0203225	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203220, 0203223		Teaching language: English	Offered by: Mathematics Program
Course Description	Introduction to discrete dynamical systems, applications of derivatives, applied definite integral in average value, producer surplus and growth rates. using geometric series in business, economics, and life sciences.		
Course Name: Mathematics for Finance		Course Number: 0203230	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213115		Teaching language: English	Offered by: Mathematics Program
Course Description	The course offers an introduction to basic financial mathematics like simple interest, compound interest, loan calculation and their simple applications. Mathematical and numerical models used to price financial securities and make risk estimates. Topics include time value of money, annuities. Amortization and sinking funds and bonds.		



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Course Name: Time Series		Course Number: 0203235	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203231		Teaching language: English	Offered by: Mathematics Program
Course Description	Descriptive techniques; types of variations: trend, cycle and seasonal fluctuations, autocorrelation; probability models for time series; stationary processes; autocorrelation function; estimation in time domain; fitting an autoregressive process; fitting a moving average process; forecasting; box and Jenkin's methods; stationary processes in the frequency domain; spectral analysis.		
Course Name: Linear Algebra 2		Course Number: 0203319	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203211		Teaching language: English	Offered by: Mathematics Program
Course Description	Matrix representation of linear transformation, Change of basis, similarity, characteristic and minimal polynomials of a linear operator, Cayley-Hamilton theorem, Conical forms, Inner product spaces, Orthogonal and unitary operator, Jordan form, Linear functional and the dual spaces.		
Course Name: Functional Analysis		Course Number: 0203326	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203326		Teaching language: English	Offered by: Mathematics Program
Course Description	Metric spaces, open set, closed set, neighbourhood, sequences and continuity in metric spaces, completeness, normed linear Spaces, sequences and continuity in normed spaces, completeness of normed linear spaces, Bounded linear operators, space of bounded linear operators, incomplete spaces, Dual spaces, Banach spaces, inner product space, Hilbert spaces.		
Course Name: Matrix Theory		Course Number: 0203310	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203211		Teaching language: English	Offered by: Mathematics Program
Course Description	Kronecker product of matrices; matrix functions; matrix equations, matrix differential equations; eigenvalues and eigenvectors; the characteristic polynomial; the minimal polynomial; Cayley-Hamilton theorem; canonical forms; Gershgorin's discs; strictly diagonally dominant matrices; Hermitian and unitary matrices; Schur's triangularization theorem; the spectral theorem for normal matrices; positive semidefinite matrices; quadratic forms; the polar decomposition and the singular value decomposition; the Moore-Penrose generalized inverse; matrix norms; QR factorization		
Course Name: Graph Theory		Course Number: 0203319	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203314		Teaching language: English	Offered by: Mathematics Program
Course Description	This course introduces Graphs, Paths and Cycles, Distance and Intervals, Binary Operations on Graphs, Blocks, Trees, Planer Graphs, Chromatic Number, four colors Conjecture, Directed Graphs.		
Course Name: Linear Programming & Game Theory		Course Number: 0203323	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203211		Teaching language: English	Offered by: Mathematics Program
Course Description	Basics linear programming, the simplex method, Matrix representation, of the simplex method, the dual simplex algorithm, Integer linear programming transformation problem, decision making in game theory, The fundamental theorem, utility theory, The axioms of Nash, computational techniques.		
Course Name: Differential Geometry		Course Number: 0203324	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203222		Teaching language: English	Offered by: Mathematics Program
Course Description	Euclidean space, tangent vectors, curve in \mathbb{R}^n , differential forms, covariant derivation, functional surfaces in \mathbb{R}^3 , Patch computations, differentiable functions and tangent vectors, Differential forms, Integral forms, Manifolds, Gaussian curvature, computational techniques.		



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Course Name: Mathematical Modeling		Course Number: 0203325	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203223		Teaching language: English	Offered by: Mathematics Program
Course Description	Modeling with Discrete Dynamical Systems. The Modeling Process, Proportionality and Geometric Similarity. Model Fitting. Experimental Modeling. Simulation Modeling. Discrete Probability Modeling. Discrete Optimization Modeling Linear Programming and Dimensional Analysis and Similitude. Graphs of Functions as Models. Modeling with Systems of Differential Equation. Modeling with Systems of Differential Equations., Continuous Optimization Modeling.		
Course Name: Design of Experiments & Analysis of Variance		Course Number: 0203349	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0203231		Teaching language: English	Offered by: Mathematics Program
Course Description	Multiple comparisons, one-way analysis of variance, modelling, proportional and geometric similarity, ensuring the suitability of the mathematical model, experimental modelling, simulation modelling, random complete block analysis, linear programming modelling for discrete optimization, and dimensional analysis and analogy. Association drawing models. Differential equation systems models, continuous optimization modelling.		
Course Name: Statistical Packages		Course Number: 0203348	NO. of credit hours: 3 (1 Theoretical & 6 Experimental Hrs.)
Pre-requisite: 0203231		Teaching language: English	Offered by: Mathematics Program
Course Description	Introducing some basic programming SPSS, SAS, Minitab and other Programming Packages, Preparation of input, Implementation of commands, Interpretation of output, programming some algorithm to solve some pure and applied statistical problems.		
Course Name: Complex Analysis II		Course Number: 0203419	NO. of credit hours: 3 Theoretical Hrs
Pre-requisite: 0203310		Teaching language: English	Offered by: Mathematics Program
Course Description	Residues and poles, evaluation of improper integral involving trigonometric functions, integration through Banach cut, logarithmic residues, Rouche's theorem, Harmonic transformation, singularities, and the argument principle.		
Course Name: Topology 2		Course Number: 0203415	NO. of credit hours: 3 Theoretical Hrs
Pre-requisite: 0203315		Teaching language: English	Offered by: Mathematics Program
Course Description	Local basis and first countable spaces, second countable spaces, Separable spaces, Connected spaces, Locally Connected spaces, Metric Spaces, Equivalent metric spaces, Continuity and uniform continuity in metric spaces, countable compact spaces.		
Course Name: Algebraic Topology		Course Number: 0203416	NO. of credit hours: 3 Theoretical Hrs
Pre-requisite: 0203315		Teaching language: English	Offered by: Mathematics Program
Course Description	Homotopy, Homotopy of path, Fundamental group, covering spaces, simply connected spaces, the fundamental group of the circle, the fundamental group of the punctured plan, the fundamental group of product spaces, Van Kampen theorem, Homotopy equivalence of spaces, Formation retracts. Essential and Inessential maps; map pf spheres into S_n , Brouwer fixed point theorem, Boursuk theorem.		
Course Name: Applied Algebra		Course Number: 0203417	NO. of credit hours: 3 Theoretical Hrs
Pre-requisite: 0203314		Teaching language: English	Offered by: Mathematics Program
Course Description	This course covers the fundamentals of Boolean algebra and its applications in digital logic design, including transistor gates. It explores crystallographic groups and Burnside's method of enumeration, which are applied to problems such as necklace enumeration and polyhedral coloring. The course also includes an introduction to finite-state machines, error-correcting codes, and cryptology, providing a comprehensive understanding of these areas within discrete mathematics and computer science.		



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Course Name: Partial Differential Equations 2		Course Number: 0203421	NO. of credit hours: 3 Theoretical Hrs
Pre-requisite: 0203321		Teaching language: English	Offered by: Mathematics Program
Course Description	Linear, quasi-Linear and nonlinear PDE's, solution of first order linear and quasi linear, solution of heat, wave, and Laplace in infinite domain (two and three dimension), System of first order PDE's, Cauchy-Kovalevsky existence theorem, conditions for the uniqueness theorem for initial boundary problem, Harmonic functions Mean-Value property (MVP), Mean-Value Problem maximum principle, harmonic-MVP, sub harmonic and super harmonic functions, D'Alembert's solution.		
Course Name: Ordinary Differential Equations 2		Course Number: 0203423	NO. of credit hours: 3 Theoretical Hrs
Pre-requisite: 0203223		Teaching language: English	Offered by: Mathematics Program
Course Description	Linear ordinary differential equations; existence and uniqueness theorems; infinite series solutions (Frobenious method); Bessel functions and Legendre Polynomials; Strum-Liouville theory; Green's functions; linear systems with constant coefficients; non-linear differential equations and stability.		
Course Name: Mathematical Methods 2		Course Number: 0203424	NO. of credit hours: 3 Theoretical Hrs
Pre-requisite: 0203224		Teaching language: English	Offered by: Mathematics Program
Course Description	Calculus of variation, Lagrange – Euler equation, Solving Partial differential equations by Variations, Definition of first and second kind integral equation, Relation between differential equation and integral equation, 1 st , 2 nd , and 3 rd Fredholm theorem. Fredholm solutions method, Exact methods, series method, numerical method. Vollterra equation of first and second kind. Vollterra 1st and 2nd kind solution integral equation. Fredholm first kind equation.		
Course Name: Methods in Mathematics Teaching		Course Number: 0203447	NO. of credit hours: 3 Theoretical Hrs
Pre-requisite: The student must have successfully to finish 90 credit hours.		Teaching language: English	Offered by: Mathematics Program
Course Description	The course covers perceptions and beliefs about the nature of mathematics, aiming to familiarize students with the principles and standards of the global Councils of Teachers of Mathematics. It also aims to acquaint students with the latest trends in teaching methods appropriate for different age groups. The course introduces selected models for teaching mathematical knowledge and skills related to various mathematical content standards and operations, as well as addressing some assessment methods.		
Course Name: History of Mathematics		Course Number: 0203442	NO. of credit hours: 3 Theoretical Hrs
Pre-requisite: Department Approval.		Teaching language: English	Offered by: Mathematics Program
Course Description	This course looks at important events and developments in mathematics from ancient times to the present. Students will learn about key mathematicians, significant discoveries, and how mathematical ideas have changed. The course highlights how mathematics has influenced various fields and society as a whole.		
Course Name: Research Project		Course Number: 0203449	NO. of credit hours: 3 Theoretical Hrs
Pre-requisite: The student must have successfully finished 90 credit hours.		Teaching language: English	Offered by: Mathematics Program
Course Description	The course aims to develop the student's self-learning, interpersonal skills, critical thinking, and problem-solving through conducting a scientific review or computer modelling within the Mathematics discipline in coordination with a supervisor assigned by the department council. This course includes a fortnightly two-hour discussion session to follow up on the student's progress in the project and to enable the student to demonstrate, discuss and evaluating his/her achievement with peers and the department faculty members.		



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Course Name: Special Topics in Mathematics		Course Number: 0203448	NO. of credit hours: 3 Theoretical Hrs
Pre-requisite: The student must have successfully finished 90 credit hours.		Teaching language: English	Offered by: Mathematics Program
Course Description	This course forms an introduction to a selection of mathematical topics that are not covered in traditional mathematical courses, such as differential geometry, integral geometry, discrete computational geometry, graph theory, optimization techniques and calculus of variations. The topics vary from semester to semester.		

Description of the Courses Offered by other Programs in the College of Science and Cover the Supporting Domains of the Mathematics Program

Cours Name: Prerequisite Physics *		Course number: 0213097	NO. of credit hours: 0 (3 Theoretical.)
Pre-requisite: None		Teaching language: English	Offered by: Basic Sciences Department
Course Description	The course covers measurement and system of units; Vectors; motion in one and two dimensions; Particle dynamics and Newton's laws of motion; Work and energy; Conservation of energy; Collisions, impulse; Conservation of linear momentum; Electric charge; Coulomb's law; Electric field; Gauss law; Electric potential: electric potential energy and electric potential of point charges; Current and resistance; Ohm's law; Kirchoff's laws; Magnetic field: Magnetic force and concept of magnetic field.		
Cours Name: Prerequisite Calculus *		Course number: 0213098	NO. of credit hours: 0 (3 Theoretical.)
Pre-requisite: None		Teaching language: English	Offered by: Basic Sciences Department
Course Description	The course covers real numbers, Inequalities; Cartesian plane; Distance formula; Straight lines; Parabola; Graph of curves; Composition functions, Polynomials, Rational functions; Long division; Roots of polynomials Exponents; Logarithms; Trigonometric functions, Limits, Continuity, Limits at infinity, Definition of derivative; Differentiation rules; Applications; chain rule; Implicit differentiation; Derivatives of logarithmic and trigonometric functions; Definite integration; Principles of integration; Fundamental theorem of calculus; Applications of integration; Area between two curves.		
Cours Name: Prerequisite Chemistry *		Course number: 0213099	NO. of credit hours: 0 (3 Theoretical.)
Pre-requisite: None		Teaching language: English	Offered by: Basic Sciences Department
Course Description	The course covers basic concepts in chemistry: The study of change; Mass relationships in chemical reactions, Gases, Physical periodic relationships among the elements; Chemical bonding; Physical properties of solutions; Acids, Bases and their equilibria. The course emphasizes on developing the student's problem-solving skills by introducing examples on everyday examples whenever possible.		
Course Name: General Physics 1		Course number: 0213101	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213097		Teaching language: English	Offered by: Basic Sciences Department
Course Description	The course covers units and measurement, scalar and vector quantities, vectors, motion in one dimension, projectiles, circular motion, laws of motion and their applications, work and energy, linear momentum, collisions, kinematics of rotational motion, center of mass, torque, angular momentum, applications of static and dynamic equilibrium.		

* This course is marked **PASS** or **FAIL**
 ** or concurrent



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Course Name: General Physics Lab. 1		Course number: 0213103	NO.of credit hours: 1(3 Experimental Hrs.)
Pre-requisite: 0213101 **		Teaching language: English	Offered by: Basic Sciences Department
Course Description	This experimental course covers an introduction on measurements, accuracy and precision, collection and analysis of data, measurements and uncertainties, vectors: force table, kinematics of rectilinear motion, projectiles, newton's second law of motion with digital cart, force and displacement on a fixed pully, centripetal force/centrifugal force, coefficients kinetic and static friction, conservation of mechanical energy, conservation of momentum with digital-cart, simple pendulum, spring constant, moment of inertia of rigid object.		
Course Name: General Physics 2		Course number: 0213102	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213101		Teaching language: English	Offered by: Basic Sciences Department
Course Description	The course covers the electric force, the electric field, Coulomb's law, Gauss's law, electric potential, electric potential energy, capacitance and dielectric materials, current and resistance, Ohm's law, electromotive force, electric circuits and Kirchhoff laws, the magnetic field, magnetic force acting on an electric charge, Lorentz law, sources of magnetic field, Biot-Savart law, Ampère's law, electromagnetic induction, Faraday's law, and Lenz's law.		
Course Name: General Physics Lab. 2		Course number: 0213104	NO.of credit hours: 1(3 Experimental Hrs.)
Pre-requisite: 0213102 **		Teaching language: English	Offered by: Basic Sciences Department
Course Description	This experimental course covers experiments on electricity and magnetism: specific charge of the copper ion, electric field mapping and equipotential surfaces, Coulomb potential and Coulomb field of metal spheres, Wheatstone bridge, potentiometer, Ohm's law, power transfer, conversion of galvanometer to an ammeter and a voltmeter, charging and discharging of a capacitor, magnetic field of a straight conductor, Magnetic field of single coils / Biot-Savart's law with a teslameter, and the horizontal component of the Earth's magnetic field.		
Cours Name: General Chemistry 1		Course number: 0213107	NO.of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213099		Teaching language: English	Offered by: Basic Sciences Department
Course Description	The course covers chemistry and measurement, stoichiometry of atoms and molecules, stoichiometry of chemical reactions, properties of solutions, periodic table and electronic configurations of atoms and ions, molecular structure, chemical bonding, molecular shapes, gases, thermochemistry.		
Cours Name: General Chemistry Lab. 1		Course number: 0213108	NO.of credit hours: 1(3 Experimental Hrs.)
Pre-requisite: 0213107 **		Teaching language: English	Offered by: Basic Sciences Department
Course Description	This experimental course covers Lab. safety and basic Lab. techniques, formula of hydrate, empirical formula of a compound, limiting reactant, periodic chart and periodic law, spectroscopy and molecular geometry, properties of inorganic compounds and metathesis reactions, molecular weight of a volatile liquid, preparation of an alum, aspirin synthesis, standardization of NaOH solution and equivalent weight of an acid, bleach analysis.		
Cours Name: Calculus 1		Course number: 0213105	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213098		Teaching language: English	Offered by: Basic Sciences Department
Course Description	The course covers functions and their properties, types of functions, equation of a straight line, curves of functions, average equations, limits and continuity, derivative, definition of the derivative, trigonometric functions, implicit differentiation, applications to derivatives, Rolle's theorem, mean value theorem, properties of integration, the first and second fundamental theorems, the fundamental theorem of calculus, applications to integration (area, volume, surface area, arc length).		

* This course is marked **PASS** or **FAIL**

** or concurrent



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Cours Name: Calculus 2		Course number: 0213106	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213105		Teaching language: English	Offered by: Basic Sciences Department
Course Description	The course covers exponential and logarithmic functions, Hyperbolic functions, Inverse functions, trigonometric and hyperbolic inverse functions, Integration techniques by parts, Trigonometric substations, fractions, integration of partial trigonometric functions, and improper integrals. Sequences test, series convergence test, ratio test, comparison test, root test conditional convergence, Maclaurin and Taylor series and their convergences, power series, differentiation and integration of power series.		
Cours Name: Principles of Statistics 1		Course number: 0213115	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: None		Teaching language: English	Offered by: Basic Sciences Department
Course Description	The course covers Data collection, survey, types of data, sampling techniques, data representations, measure of central location, measure of dispersion, probability, random variables and distribution, methods of counting, Independence, conditional probability, Bayes theorem, binomial distribution, normal distribution, expectations, Point estimation, interval estimation for mean, hypothesis testing for mean.		
Cours Name: Principles of Statistics Lab. 1		Course number: 0213116	NO.of credit hours: 1(3 Experimental Hrs.)
Pre-requisite: 02013115 **		Teaching language: English	Offered by: Basic Sciences Department
Course Description	This experimental course covers data representation by graphs and tables for ungrouped and grouped data, Measures of central location (mean, median, and mode), measures of dispersion (range, variance, and standard deviation), probability distribution curves, binomial distribution, normal distribution, central limit theorem (CLT), Estimations of the confidence interval and hypothesis testing about the mean of one population, and correlation and regression. Statistical packages such as SPSS and Minitab are used for the above calculations.		
Cours Name: General Biology 1		Course number: 0213109	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: None		Teaching language: English	Offered by: Basic Sciences Department
Course Description	This course cover chemical context of life, water and the fitness of the environment, carbon and the molecular diversity of life, the structure and function of large biological molecules, cell structure and function, membrane structure and function, introduction to metabolism, cellular respiration and fermentation, photosynthesis, the cell cycle, mitosis, meiosis and sexual life cycles, Mendel and the gene idea, and the chromosomal basis of inheritance.		
Cours Name: Electronics 1		Course number: 0202221	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213102		Teaching language: English	Offered by: Applied Physics Program
Course Description	The course part covers AC and DC circuits, semiconductors, semiconductor diodes and applications, bipolar transistor, transistor fundamentals and transistor biasing, field effect transistors, voltage amplifiers, power amplifiers, and operational amplifiers.		
Cours Name: Waves and Light		Course number: 0202211	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213102		Teaching language: English	Offered by: Applied Physics Program
Course Description	The course covers mechanical oscillations: simple harmonic motion, simple pendulum, spring. Waves: traveling, longitudinal waves, waves in stretched rope sound waves. Electromagnetic oscillations and its comparison with mechanical oscillations. Electromagnetic waves: transverse and longitudinal nature of electromagnetic waves. Light: light as electromagnetic wave, interference, diffraction, and polarization		

* This course is marked **PASS** or **FAIL**

** or concurrent



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Cours Name: Geometrical Optics		Course number: 0202212	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213102		Teaching language: English	Offered by: Applied Physics Program
Course Description	The course covers nature of light, speed of light, index of refraction, concept of a ray, reflection and refraction on surfaces, total reflection, Huygens' principle, Fermat's principle, prism, the dispersion of light. Plane and spherical mirrors and image formation, lenses: convex and concave lenses, thin lenses, thick lenses, and lens defects, optical devices: camera, eye, simple microscope, compound microscope, telescope, fibre optics and communications		
Cours Name: Introduction to Astronomy		Course number: 0202315	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: 0213101		Teaching language: English	Offered by: Applied Physics Program
Course Description	The course covers ancient and modern astronomy, astronomical equipments, the earth motions, composition and atmosphere, the movements of the sun and of the moon, lunar and solar eclipse, tides, the solar system, and the universe: creation and development.		