

Mathematics Department Course for the academic year (2019-2020).

Note: A short description of each course by the lecturer.

First Year(Freshman)-Fall

No.	Course code	Course Name	Hours	Unit	Course Lecturer	Mobile No.
1	MTH612	Foundation	6	6	Abubakir Mustafa Ahmed Pasha	.٧٧١٥٦.٤٤.٢
2	MTH611	Calculus I	6	6	Rozhan Moammad Haji	.٧٥.٨١٨٢١١٣
3	EDB211	Philosophy & Basic Education	2	2		
4	UNI511	IT	5	5		
5	UNI213	English language	2	2		

First Year (Freshman) - Spring

No.	Course code	Course Name	Hours	Unit	Course Lecturer	Mobile No.
1	MTH614	Calculus II	6	6	Sarbaz Hamza Abdulla	.٧٥.٣١٦١٧٨.
2	MTH313	Elementary Statistics	3	3	Kwestan Ahmad Ismael	.٧٥.٣٩٧.٤٣.
3	EDB212	General Psychology	2	2		
4	UNI414	Academic Debate	4	4	Bashdar Abdullah Salam	
5	UNI412	Kurdology	4	4		

No.	Course code	Course Name	Hours	Unit	Course Lecturer	Mobile No.
1	MTH 421	Calculus III	4	4	Ayub Haji Ahmed	
2	MTH223	Elementary Geometry	2	2	Hidayat Mohammad Sharif	.۷۵.۸۸۸۹۸۷۹
3	MTH622	Linear Algebra	6	6	Hidayat Mohammad Sharif	
4	EDB321	Educational Psychology	3	3	Liya Hussein Mohammad	
5	UNI021	English Language (I)	-	0		
6	UNI215	English language (PI)	2	2		

Second Year (Sophomore) – Autumn

Second Year (Sophomore) - Spring

No.	Course code	Course Name	Hours	Unit	Course Lecturer	Mobile No.
1	MTH624	Probability & Statistics	6	6	Kwestan Ahmad Ismael	
2	MTH426	Linear Programming	4	4	Abubakir Mustafa Ahmed Pasha	
3	MTH625	Computer Programming	6	4	Abubakir Mustafa Ahmed Pasha	
4	EDB322	Child Development Psychology	3	3		
5	EDB223	Psychological Health Guidance	3	2		
6	UNI022	English Language (AW)	-	0		

Third Year (Junior) - Autumn

No.	Course code	Course Name	Hours	Unit	Course Lecturer	Mobile No.
1	MTH532	Mathematical Analysis	5	5	Nafya Hamid Mohammad	٠٧٥٠٤٤٧٢٨٦٩
2	MTH531	Ordinary Differential	5	5	Rizgar Haji Salih	٠٧٧٣١٥٦٦٦٨٦
3	MTH333	Optional (Computing)	3	3		
4	EDB331	General Teaching Methods	3	3		

Third Year (Junior) - Spring

No.	Course code	Course Name	Hours	Unit	Course Lecturer	Mobile No.
1	MTH635	Numerical Analysis	6	6	Ayub Haji Ahmed	٠٧٥١٠٦٥٠٥٦٥
2	MTH236	Optional (Mathematics)	2	2		
3	MTH634	Abstract Algebra	6	6	Rebin Mohammad Hussein	٠٧٥٠٣٤٢٣٦٤٢
4	EDB332	Private Teaching Method	3	3	Peshawa Babakir Braim	
5	EDB333	Scientific Research Methodology	3	3		

Fourth Year

No.	Course code	Course Name	Hours	Unit	Course Lecturer	Mobile No.
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1		Topology	3	5	Rebin Mohammad Hussein	.٧٥.٣٤٢٣٦٤٢
2		Complex Analysis	3	5	Nafya Hamid Mohammad	.٧٥.٤٤٧٢٨٦٩
3		Administration & Educational Supervision	2	4		
4		Methods of Teaching	2	4	Bashdar Abdullah Salam	
		Advanced Calculus	2	4	Bashdar Abdullah Salam	
5		Geometry	3	5	Hidayat Mohammad Sharif	
6		Graduation Research	4	4		
7		Viewing Application	5	6		

Course Definitions

Fourth year courses

1-Topology: Topology is an important and interesting area of mathematics, the study of which will not only introduce you to new concepts and theorems, but also put into context old ones, such as continuous functions. However, to say just this is to understate the significance of topology. It is so fundamental that its influence is evident in almost every other branch of mathematics. Topology has several different branches—general topology (also known as point-set topology), algebraic topology, differential topology and topological algebra—the first, general topology, being the door to the study of the others.

2-Complex Analysis: This course is an introductory course on Complex Analysis. It is designed for students in the disciplines of Mathematics and Physics. It may, however, be useful to students in Engineering and other related fields. It introduces students to the complex numbers system and varieties of operations, analyses and problems that may arise within this context. It also equips students with mathematical techniques and skills to handles such cases.

3-Geometry: The primary goal of this semester is to familiarize students with axiomatic geometry and teach them how to create a model for an axiomatic system and use axioms and undefined terms to prove theorems.

4-Advanced Calculus: Calculus is the study of how things change. It provides a framework for modelling systems in which there is change and a way to deduce the predictions of such models.

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5_ Special Methods of Teaching: This subject aims to prepare and familiarize lecturers with methods of teaching which are needed in every teaching sector.

6_ Administration & Educational Supervision: This is to familiarize students with the concepts of administration and supervision in both practical and theoretical fields. This is achieved through studying administration and development concepts in relation to general and educational administration and schools. Through discussions of these concepts, prospective lecturers collect all the skills and basic principles needed for successful administration in terms of skills and effectiveness.

Third stage Courses:

1-Mathematical analysis: By the end of this module, students should be familiar with the following subjects: real numbers, the density of rational and irrational numbers, sequences of real numbers, convergent sequences, bounded sequences, monotone sequences and Cauchy sequences and the relationship between these types of sequences. In addition, they will have an understanding of metric spaces, open and closed sets, derived sets, compact sets with some important theorems continuity of functions between metric spaces, sequences of functions, Riemann integral, differentiation, measure theory, Lebesgue theory of integration and measurable and integrable functions.

2-Numerical Analysis: This course will emphasize the development of numerical algorithms to provide solutions to common problems formulated in science and engineering. The primary objective of the course is to develop a basic understanding of the construction of numerical algorithms, and, perhaps more importantly, the applicability and limits of their appropriate use. The emphasis of the course will be a thorough study of numerical algorithms to understand the guaranteed accuracy that various methods provide.

3-Abstract Algebra : plays an increasing role in the pure sciences as well as in mathematics. This course is intended to familiarize the student with the basic concepts, axioms, principles and methods of Abstract Algebra. This course is an introductory course that covers the foundations of Abstract Algebra in the context of Set Theory, Group Theory, Ring Theory and Field Theory

4-Scientific Research Methodology: This course will introduce the student to the basic language and ideas of scientific research methodology which are essential for the completion and submission of graduation research by fourth year students in the department of Mathematical Science required as a condition of graduation for obtaining a B.Sc. degree. This unit deals with the concepts of scientific research and research methodology used in research in general and in mathematics in particular. This will provide students with a solid preparation for their BSc graduation projects and further research projects. They will learn how to review critically and evaluate scientific writing, from books to research papers. Students will receive training in writing academic reports in an appropriate style and structure and will learn how to make and deliver oral presentations.

5-Differential Equations: In this module, we describe the main ideas to solve certain differential equations, such as first-order and higher-order linear equations. We use power series methods to solve variable coefficients second-order linear equations. We introduce Laplace transform methods to find solutions to constant coefficients equations.

6- General Teaching Methods:

This subject is all about providing lecturers with suitable methods of teaching which are needed in every teaching sector, and also tries to provide an academic teaching environment leading to teachers equipped with knowledge of modern developments in both education and teaching.

7- Optional (Computing):

Computing is one of the most important subjects that everybody needs to know about nowadays, especially those who intend to pursue further studies in the future or those who would like to be teachers. Computing is an electronic tool which is crucially needed for the development of each nation.

Second stage Courses:

1-English Language: Our main aim is to help all our students learn as much English as they need for whatever they plan to do when they leave college, whether that means following a course of academic study, or becoming involved in business, or simply for personal use.

2- Elementary Geometry: On completion of this course, students will be able to:

- 1 Understand the concept of systems, definition, theorem and undefined terms;
- 2 Understand the properties of systems;
- 3 Separate the different statements of either proof (methods of proof), disprove or **not both**;
- 4 Apply geometric modelling to modern mathematical problems;
- 5 Understand the historical background of Euclidean and non-Euclidean (finite) geometry and the development of Euclidean geometry.

3- Calculus III: In this course, we will begin by covering the basic concepts of vector spaces. Then, we will study the functions of several variables. After that we will give definitions of limit and continuity for several variables. Furthermore, partial derivatives of such functions will be given. At the end of this course, we will present an introduction about multiple integrals with applications.

4-Probability & Statistics: In this course, we will begin by outlining the basic concepts of Statistics Notation, types of data and chart. Then, we will study the mean and types of mean measures of variation. After that, sample space, events, Probability Function, and Conditional Probability. At the end of this course we will discuss Probability Distribution Prerequisites.

5- Linear Algebra: This course aims to introduce the basic ideas and techniques of linear algebra for use in many other lecture courses. The course will also introduce some basic ideas of abstract algebra and techniques of proof which will be useful for future courses in pure mathematics.

6-Computer Programming: The course has two primary goals: (a) To introduce students to simple computer programming for the solution of mathematical problems that typically arise in a variety of engineering and physics disciplines, (b) and to provide students with basic elements of programming using the MATLAB program.

Educational Psychology -7

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This course focuses on:

1. Students' general knowledge of educational psychology;
2. Learning about educational psychology, its definitions, origins and development;
3. Identifying theories of educational psychology;
4. Learning about terms of educational psychology as well as developing knowledge about basic topics in educational psychology from which students will benefit in their daily and academic lives.

1-Foundations of mathematics: the study of the logical and philosophical basis of mathematics, including whether the axioms of a given system ensure its completeness and its consistency. Because mathematics has served as a model for rational inquiry, it is used extensively in the sciences. Foundational studies have far-reaching consequences for the reliability and extensibility of rational thought itself.

2-Calculus I: In this course, we will begin by outlining the basic concepts of functions and their graphs. Then, we will study the limits and continuity for various functions. After that, differentiation rules will be defined with their applications, such as extreme values of functions, concavity and curve sketching, applied optimization, and Newton's method. At the end of this course, we will present a brief introduction about integration and their rules, with some applications.

3-Calculus II is the second course involving calculus, after Introduction to Calculus I. This course includes basic rules of integrations with applications. We will also cover sequence and series in this course. Furthermore, polar coordinates and vectors will also be presented in more detail in Calculus II.

4- English Language: Our main aim is to help all our students to learn as much English as they need for whatever they plan to do when they leave college, whether that means pursuing a course of academic study, becoming involved in business or simply for personal use.

5-Elementary Statistics: This course concentrates on the importance and uses of statistical tools needed in different types of research. It includes (1) descriptive statistics that deals with the collection, organization and presentation of data and (2) inferential statistics that deals with the analysis and interpretation of data which is the main focus. This course provides an overview of descriptive and inferential statistics in the behavioral sciences, social sciences, health sciences, and education. It presents the methods and unifying ideas of data analysis, and the usefulness of data analysis; discusses random sampling which is an important idea in statistics and research; presents the central idea of sampling distribution which is an important fact of probability; describes the reasoning of statistical inference which is the cornerstone of this course; and presents methods of inference for various settings, with a strong emphasis on the practical aspects of using these methods.

6_ IT

Computing is one of the most important subjects that everybody needs to know about nowadays, especially those who intend to pursue further studies in the future or those who would like to be a teacher. Computing is an electronic tool which is crucially needed for the development of each nation.

7_ Philosophy and Education Principles:

Familiarizing students with the most important types and philosophical reasoning behind each educational system, teaching them how to adapt modern educational systems.

Running a workshop entitled “Towards the Bologna Process by the Mathematics Department”.

Link to the workshop:

<https://www.facebook.com/408152872665380/posts/1321434874670504?s=100008650059936&sfns=mo>

<https://www.facebook.com/408152872665380/posts/1320306324783359?s=100008650059936&sfns=mo>