



**MINISTRY OF HIGHER EDUCATION**



***University College in Umluj***

***2023|2024***

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## **KPIs**

### **According to KSA 2030 Vision**

- i. Increasing faculty members from 71.4% to 100%.
- ii. Reducing the ratio of students to teaching staff from 39.8 to 10.
- iii. Reducing the Average Class Enrollment from 37 to 20.
- iv. Reducing the average teaching load per week from 14 to 10 hours.
- v. Increasing the ratio of faculty to their research publications in refereed international journal from 1:0.4 to 1:5.
- vi. Increasing the number of papers or reports presented at academic conferences from 0 to 5/year
- vii. Increasing the number of seminars from 0 to 10/ week.
- viii. Increasing the number of training sessions from 0 to 10/ semester.
- ix. Increasing the percentage of student's satisfaction to academic advising services from 37% to 100%.
- x. Increasing the number of community education programs provided from 0 to 3/semester.

## Contents

Subject	Page
Preface	4
Introduction	5
Program Mission Statement	5
Goals and Objectives	5
Employments opportunities	6
Learning Outcomes	6
Student's Administration and Support	6
Academic Programs	6+7
The Study plan	7+8
Credit point system:	8
Courses Contents	9
Activities	17
Department Organizational Structure	18
Staff Members	19
Contact Information	19

## **Preface**

*The Department of Mathematics welcomes the students and provides them with this booklet which contains a brief summary, Vision, Mission and Goals. In addition to list the learning outcomes and opportunities of field of work. Booklet also offers a detailed explanation of the study plan and the contents of the courses. Finally, contact information and scientific activities of the department and organizational structure. I hope that this booklet answers all their questions and be a useful guide for them.*

**Introduction:**

The Department of Mathematics is the first scientific department that was established in the University College of Umluj, where it was established at the first term of the academic year 1430-1431<sup>H</sup>, with the establishment of the college. The department grants bachelor's degree in mathematics Sciences. Since its establishment the College has taken several steps in order to develop their scientific and sophistication level of laboratory and research facilities.

**Program Mission Statement**

Preparing graduates qualified in mathematics and its applications to meet labor market needs and serve the local community, as well as scientific research and innovation.

**Program Vision:**

Excellence in mathematics education and scientific research to serve the community locally and regionally.

**Goals and Objectives:**

- (1) Creating a curriculum and educational process that meets accreditation an standards of quality.
- (2) Motivating and assisting students in the learning, study, create, and contribute to a positive social interaction.
- (3) Strengthening and enhancing the skills of faculty and staff members.
- (4) Encouraging scientific and practical studies in various fields of mathematics.
- (5) Encourage successful collaboration and communication between the department and the community.
- (6) To create a collaborative environment between faculty and administrative staff in order to support the department's educational process.

**Employments opportunities:**

1. High school teachers .
2. Mathematicians in government ministries and institutions, and private sectors that require mathematical skills such as: Ministry of Finance, Saudi Arabian Monetary Agency, General Organization for Social Insurance, Central Department of Statistics and Information, Public Pension Agency, Banks, Research Centers, etc.
3. Meritorious students pursue higher studies and ultimately join as faculty in colleges, technical colleges and universities in the Kingdom of Saudi Arabia.

### **Learning Outcomes:**

- a. Summary description of the knowledge to be acquired
  - Fundamentals of different branches of pure and applied mathematics.
  - General sciences (Physics, Chemistry and Statistics).
  - Computer skills.
  - Social and ethical values.
  - English Language as a second language.
- b. Cognitive skills to be developed and level of performance expected
  - Reasonable and creative thinking, relating introductions to results and problem solving.
- c. Description of the level of interpersonal skills and capacity to carry responsibility to be developed
  - Ability to work individually or within a team.
  - Learn the initiative spirit and bear responsibility for different situations.
- d. Description of the communication, IT and numerical skills to be developed
  - Extract high benefits from the use of the worldwide web.
  - Using mathematical software such as Matlap and Mathematica and getting advantages of the World Wide Web.

### **Student's Administration and Support**

- Meeting new students.
- Provide counselling to students.
- A weekly office schedule is displayed on each faculty member's office and a total of 10 hours are specified for the students to provide them extra assistance and help in solving their academic problems.
- A follow-up committee exist in the department to look after the needs of the teaching staff and faculty members.
- Displaying the department handbook on the website of the department.

### **Academic Programs:**

The department provides courses for undergraduate majoring in mathematics sciences where the student must study 132 credits hours to obtain a bachelor's degree in mathematics as follows:

Requirements		Credits hours
University requirements		12
Faculty requirements	Compulsory	47
	Optional	None
Department requirements	Compulsory	64
	Optional	9
Total		132

### Study Plan Courses & Levels

1 <sup>st</sup> Level		Preparatory Year					
Courses Title	Course Code	Contact Hours			Credit	Prerequisites	
		Theoretical	practical	Training			
1	MATH I	MATH 100	3			3	
2	General Chemistry	CHEM 101	3			3	
3	English I	ECS 001	15			5	
4	General Biology	BIO 101	3			3	
5	Learning, Thinking, and Research Skills	LTS 001	3			3	
Total			27			17	
2 <sup>nd</sup> Level		Preparatory Year					
Courses Title	Course Code	Contact Hours			Credit	Prerequisites	
		Theoretical	practical	Training			
1	General Physics	PHYS 101	3			3	0
2	MATH II	MATH 101	3			3	MATH 100
3	English II	ELS 002	15			5	ECS 001
4	Computer Skills and Its application	CSC 001	3			3	
5	Communication Skills	COMM 001	2			2	
Total			26			16	
3 <sup>rd</sup> Level		Second Year					
Courses Title	Course Code	Contact Hours			Credit	Prerequisites	
		Theoretical	practical	Training			
1	Fundamentals of inter Calculus	MATH 200	4	1		4	MATH 101
2	Basics of Mathematics	MATH251	3	1		3	MATH 101
3	Analytical Geometry	MATH261	3	-		3	MATH 101
4	Programming Language	CSC 112	3	2		4	CSC 001
5	Language Skills	ARB 101	2	-		2	-----
6	Islamic Culture (1)	ISLS101	2	-		2	
Total			21			18	
4 <sup>th</sup> Level		Second Year					
Courses Title	Course Code	Contact Hours			Credit	Prerequisites	
		Theoretical	practical	Training			
1	Advanced Calculus	MATH 203	4			4	MATH 200
2	Differential Equations	MATH 204	3	2		3	
3	Linear Algebra	MATH 241	3	-		3	MATH 251
4	General Statistics	STAT 201	4	-		4	
5	Writing Skills	ARB 201	2	-		2	ARB 101



6	Islamic Culture (2)	ISLS 201	2	-		2	ISLS101
Total			20			18	
<b>5<sup>th</sup> Level</b>			<b>Third Year</b>				
Courses Title		Course Code	Contact Hours			Credit	Prerequisites
			Theoretical	practical	Training		
1	Differential Equations 2	MATH 305	3			3	MATH 204
2	Real Analysis 1	MATH 311	3			3	MATH 251,
3	Probability theory (1)	STAT 311	3			3	STAT 201
4	Abstract Algebra 1	MATH 342	3			3	MATH 251
5	Islamic Culture (3)	ISLS 301	2	-		2	ISLS 201
Total			14			14	
<b>6<sup>th</sup> Level</b>			<b>Third Year</b>				
Courses Title		Course Code	Contact Hours			Credit	Prerequisites
			Theoretical	practical	Training		
1	Partial Differential Equations	MATH 406	3			3	MATH 305
2	Abstract Algebra 2	MATH 343	3			3	MATH 342
3	Introduction to Numerical Analysis	MATH 334	3			3	STAT 201 MATH 203,
4	Introduction to Operations Research	MATH 340	2			2	MATH 203
5	Optional Mathematics	MATH xxx	3			3	
Total			14			14	
<b>7<sup>th</sup> Level</b>			<b>Fourth Year</b>				
Courses Title		Course Code	Contact Hours			Credit	Prerequisites
			Theoretical	practical	Training		
1	Mathematics and Packages Programs	MATH 333	3			3	STAT 201 MATH 200
2	Integral Equations	MATH 408	3			3	MATH 305, MATH 311
3	Complex Analysis (1)	MATH 413	3			3	MATH 311
4	General Topology	MATH 464	3			3	MATH 251 MATH 311
5	History of Mathematics among the Arabs and Muslims	MATH 481	3			3	MATH 200
6	Optional Mathematics	MATH xxx	3			3	STAT 201
Total			18			18	
<b>8<sup>th</sup> Level</b>			<b>Fourth Year</b>				
Courses Title		Course Code	Contact Hours			Credit	Prerequisites
			Theoretical	practical	Training		
1	Discrete Mathematics	MATH 462	3			3	MATH 251
2	Differential Geometry	MATH 463	3			3	MATH 305 MATH 204
3	Functional Analysis	MATH 415	3			3	MATH 311
4	Optional Mathematics	MATH xxx	3			3	Passing level 6
5	** Research Project	MATH 491	6			3	MATH464
6	Islamic Culture (4)	ISLS 401	2	-		2	ISLS 301
Total			17			17	

### Credit point system:

- Study system is on the basis of levels.
- The program consists of 8 levels (4 years).
- One level lasts for one semester.
- Total credit hours are 132 hour.
- One credit hour equivalent to one hour lecture or two tutorial/lab hours per week.

## Courses Contents

<b>Course Title:</b>	Fundamentals of Integral calculus
<b>Course Code:</b>	MATH 200
<b>Level/year at which this course is offered:</b>	L3/Y2
<b>Pre-requisites for this course :</b>	<b>MATH 101</b>
<b>Contact Hours</b>	75[Lecture :60 Hours+ Tutorial :15 Hours]

### Course Objectives and Learning Outcomes

#### Course Description

This course is designed to help students develop calculus skills, where the course help students to master the basic methods of integration and their applications. The course also introduce students to sequences and Infinite Series and their convergence.

#### Course Main Objective

- Students will be able to recall basic rules and theorems of integral calculus.
- Students will be able to apply integration methods to solve geometrical and physical problems.
- Students will be able to analyze the convergence of infinite series.

<b>Course Title:</b>	Basic Mathematics
<b>Course Code:</b>	MATH 251
<b>Level/year at which this course is offered:</b>	L3/Y2
<b>Pre-requisites for this course :</b>	MATH 101
<b>Contact Hours</b>	60 [Lecture :45 Hours+ Tutorial :15 Hours]

### Course Objectives and Learning Outcomes

#### 1.Course Description

This course is designed to provide students with the basic concepts of mathematical logic, study mathematical induction and acquire and develops skills on theory of sets.

#### 2.Course Main Objective

- . -Students will be able to recall basic rules and concepts of set theory, mathematical logic and induction and Boolean algebra.
- Students will be able to apply mathematical logic and Boolean algebra rules and induction to solve problems.

<b>Course Title:</b>	Analytic Geometry
<b>Course Code:</b>	MATH 261
<b>Level/year at which this course is offered:</b>	L3/Y2
<b>Pre-requisites for this course :</b>	MATH 101
<b>Contact Hours</b>	45

### Course Objectives and Learning Outcomes

#### 1.Course Description

This course is designed to introduce students to Polar Coordinates, Vectors in the plane, and Cartesian coordinates and vectors in space, Scalar Products, the Cross Product, Lines and Planes in Space, Ellipse, Hyperbola, and Parabola, Polar Equation of Conic Sections and Integration in Polar coordinates

#### 2.Course Main Objective

- Students will be able to recognize the importance of the analytic geometry and its applications in Physics, Astronomy and Engineering Science.
- Students will demonstrate proficiency in solving physical problems..

<b>Course Title:</b>	Advanced Calculus
<b>Course Code:</b>	MATH 203
<b>Level/year at which this course is offered:</b>	L4/Y2
<b>Pre-requisites for this course :</b>	MATH 200
<b>Contact Hours</b>	60
<b>Course Objectives and Learning Outcomes</b>	
<b>1.Course Description</b> The main purpose of this course is to present the fundamental concepts of multivariable calculus and to develop student understanding and skills in the topic necessary for its applications to science and engineering.	
<b>2.Course Main Objective</b> -Students will be able to recognize the geometry of three-dimensional Euclidian space. -Students will be able to develop calculus concepts of vector-valued functions, motion (in the 3D space) and the notion of curvature.	

<b>Course Title:</b>	Linear Algebra
<b>Course Code:</b>	MATH241
<b>Level/year at which this course is offered:</b>	L4/Y2
<b>Pre-requisites for this course :</b>	MATH251
<b>Contact Hours</b>	45
<b>Course Objectives and Learning Outcomes</b>	
<b>1.Course Description</b> The course is designed to study systems of linear equations, matrices, vector spaces, subspaces, bases and dimensions, inner product spaces, Eigen values, Eigenvectors Eigen spaces, and linear transformations.	
<b>2.Course Main Objective</b> The main objective of this course is to provide students with a comprehensive applied understanding of the common advantage of the technical method in the field of mathematics related to linear algebra.	

<b>Course Title:</b>	General Statistics
<b>Course Code:</b>	STAT201
<b>Level/year at which this course is offered:</b>	L4/Y2
<b>Pre-requisites for this course :</b>	-
<b>Contact Hours</b>	60
<b>Course Objectives and Learning Outcomes</b>	
<b>1.Course Description</b> This course includes an introduction to statistics, statistical descriptions, frequency distributions, possibilities and probabilities, probability distributions, Topics studied include descriptive measures for empirical data, theory of probability, probability distributions and types of random variables, correlation, and simple regression..	
<b>2.Course Main Objective</b> <ul style="list-style-type: none"> <li>● Listen and analyze student's feedback about the course.</li> <li>● Analyze the student's results well.</li> <li>● Listen to colleague's criticisms.</li> <li>● Periodic review of the course plan to keep up new topics and teaching methods. Follow up scientific conferences and specialized workshops .</li> </ul>	

<b>Course Title:</b>	Differential Equations 1
<b>Course Code:</b>	Math 204
<b>Level/year at which this course is offered:</b>	L4/Y2
<b>Prerequisite:</b>	Fundamentals of integral calculus (Math 200)
<b>Credit Hours:</b>	75[Lecture :45 Hours+ Tutorial :30 Hours]

### Course Objectives and Learning Outcomes

#### 1. Course Description

The course will demonstrate the usefulness of ordinary differential equations for modeling physical and other phenomena. Complementary mathematical approaches for their solution will be presented, including analytical methods, graphical analysis and numerical techniques. The basic content of the course includes.

#### 2. Course Main Objective

- Students will be able to recall the basic concepts and theories of ordinary differential equations.
- Students will demonstrate proficiency in applying various techniques to solve ordinary differential equations.
- Students will be able to recognize the importance of ordinary differential equations in modeling physical problems.

<b>Course Title:</b>	Differential Equations II
<b>Course Code:</b>	MATH305
<b>Level/year at which this course is offered:</b>	L5/Y3
<b>Pre-requisites for this course :</b>	MATH204
<b>Contact Hours</b>	45

### Course Objectives and Learning Outcomes

#### 1.Course Description

The main purpose of this course is to provide students with the importance of advanced differential equations in mathematical and Engineering Science, knowledge by learning the System of first-order differential equations, Series solutions of first-order differential equations with some applications, derivatives, and integrals of Laplace transform.

#### 2.Course Main Objective

- Student will be able to recognize the importance of the advanced differential equations in mathematical and Engineering Science, by learning a variety of methods of solving differential equations..

<b>Course Title:</b>	Real Analysis 1
<b>Course Code:</b>	MATH311
<b>Level/year at which this course is offered:</b>	L5/Y3
<b>Pre-requisites for this course :</b>	Math 251
<b>Contact Hours</b>	45

### Course Objectives and Learning Outcomes

#### 1.Course Description

In this course students will learn real numbers – algebraic properties, Completeness- arrangement properties, Open sets- closed sets, Limit points– Compact sets, Heine-Borel theorem and Weirstrass theorem, Uniform continuity, Differentiation, Mean value theorem –L'Hopital's rule, Convergent sequences, Limits - Theorem of limits, Upper and lower limit of sequences , Cauchy sequence, Tests of convergence : Comparison test – Root test ratio – Abel's test –Alternating series test, etc..

#### 2.Course Main Objective

The main Objective of this course is to provide students with the basic concept of real analysis, classify uniform convergence and uniform continuity, the difference between Cauchy and convergence sequences, different types of convergence tests, some applications of real analysis.

<b>Course Title:</b>	Probability Theory 1
<b>Course Code:</b>	STAT311
<b>Level/year at which this course is offered:</b>	L5/Y3
<b>Pre-requisites for this course :</b>	STAT 201
<b>Contact Hours</b>	45
<b>Course Objectives and Learning Outcomes</b>	
<b>1.Course Description</b>	
1. Course Description The course covers the basic principles of the probability theory and its applications. Topics include the axioms of probability, conditional probability and independence of events; discrete and continuous random variables; joint, marginal, and conditional densities, moment generating function and some discrete, continuous distributions.	
<b>2.Course Main Objective</b>	
The course aims to teach students the meaning of random variables, distributions and applications of random variables intermittent relating to life in the process. Also study of bivariate and multivariate random variables and the expense of the relationship between them and the study of function of random variables, the Sum random variables and its application in working life.	

<b>Course Title:</b>	Abstract Algebra (1)
<b>Course Code:</b>	MATH342
<b>Level/year at which this course is offered:</b>	L5/Y3
<b>Pre-requisites for this course :</b>	Math 251
<b>Contact Hours</b>	45
<b>Course Objectives and Learning Outcomes</b>	
<b>1.Course Description</b>	
The main purpose of this course is to provide students with the fundamental concepts and structures of abstract algebra.	
<b>2.Course Main Objective</b>	
<ul style="list-style-type: none"> <li>. -Students will be able to recall the basic properties of sets, relations and groups.</li> <li>-Students will be able to perform algebraic operations on groups and sets.</li> <li>- Students will be able to apply the tools and theorems of group theory to solve problems.</li> </ul>	

<b>Course Title:</b>	PARTIAL DIFFERENTIAL EQUATIONS
<b>Course Code:</b>	MATH406
<b>Level/year at which this course is offered:</b>	L6/Y3
<b>Pre-requisites for this course :</b>	Math 305
<b>Contact Hours</b>	45
<b>Course Objectives and Learning Outcomes</b>	
<b>1.Course Description</b>	
The main purpose of this course is to provide students with the basic concept of Partial Differential Equations (PDE's) ,general integral and singular integral for first-order Partial Differential Equations (PDE's) ,complementary functions for both Homogeneous and Nonhomogeneous partial differential equations of the second and higher order with constant coefficient ,the applications of Partial Differential Equations (PDE's) ,the Fourier expansion and Fourier complex for many functions.	
<b>2.Course Main Objective</b>	
<ul style="list-style-type: none"> <li>•Student will be able to recall the concept of Partial Differential Equations (PDE's), and find general integral and singular integral for a first order Partial Differential Equations (PDE's).</li> <li>• Student will be able to apply Partial Differential Equations (PDE's) to solve real-world problems.</li> </ul>	

<b>Course Title:</b>	Abstract Algebra (2)
<b>Course Code:</b>	MATH343
<b>Level/year at which this course is offered:</b>	L6/Y3
<b>Pre-requisites for this course :</b>	Math 342
<b>Contact Hours</b>	45
<b>Course Objectives and Learning Outcomes</b>	
<b>1.Course Description</b>	
The main purpose of this course is to provide students with the basic definitions in abstract algebra, abstract and logic thinking, the algebraic structures with more than one binary operation (rings and fields), an integral domain, the proofs in abstract algebra, and methods of solution.	
<b>2.Course Main Objective</b>	
-Students will be able to recognize the basic concepts of abstract algebra. -Students will be able to solve problems using the properties of rings and fields.	

<b>Course Title:</b>	Introduction to operation research
<b>Course Code:</b>	MATH 340
<b>Level/year at which this course is offered:</b>	L6/Y3
<b>Pre-requisites for this course :</b>	Math 203
<b>Contact Hours</b>	30
<b>Course Objectives and Learning Outcomes</b>	
<b>2.Course Main Objective</b>	
By the end of this course, the student will be able to recognize the importance of the operation research in practical life problems. Acquire knowledge by learning, algorithms, and methods of solution in mathematical programming and learn the methods of solving linear programming and transportation model.	

<b>Course Title:</b>	Mathematics and Packages Programs
<b>Course Code:</b>	MATH333
<b>Level/year at which this course is offered:</b>	L7/Y4
<b>Pre-requisites for this course :</b>	Math-200; Stat 201
<b>Contact Hours</b>	45
<b>Course Objectives and Learning Outcomes</b>	
<b>1.Course Description</b>	
The main purpose for this course is to provide student with computational skills through problem solving using computer package.	
<b>2.Course Main Objective</b>	
-Students will be able to recognize the importance of using mathematical software to solve problems. -Students will be able to demonstrate proficiency in applying computational tools to a variety of mathematical and physical problems.	

<b>Course Title</b>	Introduction to Numerical analysis
<b>Course Code:</b>	MATH334
<b>Level/year at which this course is offered:</b>	L6/Y3
<b>Pre-requisites for this course :</b>	Math 203
<b>Contact Hours</b>	45
<b>Course Objectives and Learning Outcomes</b>	

**1.Course Description**

The main purpose of this course is to study nonlinear equations of one variable, the polynomial interpolation and differentiate and integrate numerically.

**2.Course Main Objective**

- Students will be able to recognize the importance of using numerical methods to solve problems.
- Students will be able to demonstrate proficiency in applying numerical methods to a variety of mathematical and physical problems.
- Students will be able to interpret results of numerical solutions and draw conclusions.

<b>Course Title:</b>	Integral Equations
<b>Course Code:</b>	MATH 408
<b>Level/year at which this course is offered:</b>	L7/Y4
<b>Pre-requisites for this course :</b>	Math 305; Math 311
<b>Contact Hours</b>	45

**Course Objectives and Learning Outcomes****1.Course Description**

The main purpose of this course is to present the fundamental concepts of integral equations and the different methods of solutions of integral equations as well as discussing the relation between integral and differential equations.

**2.Course Main Objective**

- Student will be able to solve integral equations by different methods.
- Student will be able to recognize the applications of integral equations directly from setting up the physical relationship in a physical problem.

<b>Course Title:</b>	Complex Analysis I
<b>Course Code:</b>	MATH 413
<b>Level/year at which this course is offered:</b>	L7/Y4
<b>Pre-requisites for this course :</b>	Math 311
<b>Contact Hours</b>	45

**Course Objectives and Learning Outcomes****1.Course Description**

The main purpose of this course is to introduce students to Complex Numbers & Variables, Complex Root, Complex Functions & Mapping by it, Exponential, Complex differentiation and Complex Integration: Complex Series and Singularities & Residue Theories (Cauchy's residue theorem).

**2.Course Main Objective**

- Students will be able to recall the basic concept of complex analysis.
- Students will be able to perform calculus on complex functions.
- Students will be able to apply analytic functions using Cauchy Riemann equations.
- Students will be able to compute Radius of convergence of a complex functions..

<b>Course Title:</b>	General Topology
<b>Course Code:</b>	MATH 464
<b>Level/year at which this course is offered:</b>	L7/Y4
<b>Pre-requisites for this course :</b>	MTH 311 , MATH 251
<b>Contact Hours</b>	45

**Course Objectives and Learning Outcomes****1.Course Description**

The course is designed to study the basic concepts of the general topology such as closure of a set, interior, boundary, exterior and derived set, and generated topology on a set, Quotient space, topological invariant, homeomorphism spaces, separation axioms, compactness and

connectedness.

## 2.Course Main Objective

What is the main purpose for this course? The main purpose of this course is to provide students with a comprehensive applied understanding of the concepts of General Topology.

<b>Course Title:</b>	History of Mathematics
<b>Course Code:</b>	MATH 481
<b>Level/year at which this course is offered:</b>	L7/Y4
<b>Pre-requisites for this course :</b>	Math 200
<b>Contact Hours</b>	45

### Course Objectives and Learning Outcomes

#### 1.Course Description

This course is designed to improve the students' understanding of the historical development of mathematics. To emphasize the role of Arabs and Muslims in the development of mathematics.

#### 2.Course Main Objective

- Students will be able to recall the historical development of mathematics.
- Students will recognize the role of Arabs and Muslims in development of mathematics.
- Students will be able to do some calculations using Babylonian and ancient Egyptian, Greek and Hindi numerals.

<b>Course Title:</b>	Differential Geometry
<b>Course Code:</b>	MATH 463
<b>Level/year at which this course is offered:</b>	L8/Y4
<b>Pre-requisites for this course :</b>	Math 305; Math 204
<b>Contact Hours</b>	45

### Course Objectives and Learning Outcomes

#### 1.Course Description

This course provides students with theoretical knowledge and practical skills in the subject of differential geometry, such as the concept of curve and surface to study their curvature and torsion. Students will also learn how to apply these concepts to solve mathematical problems.

#### 2.Course Main Objective

- Students will be able recall basic concepts of regular curves, arc length, torsion, curvature, parameterization, tangent vectors, tangent space and forms.
- Students will be able to use differential and integral calculus to perform calculations on curves and surfaces.

<b>Course Title:</b>	Functional Analysis
<b>Course Code:</b>	MATH 415
<b>Level/year at which this course is offered:</b>	L8/Y4
<b>Pre-requisites for this course :</b>	Math 311
<b>Contact Hours</b>	45

### Course Objectives and Learning Outcomes

#### 1.Course Description

The aim of the course is to introduce students to the basic concepts and fundamental theorems of functional analysis, and learn how to apply these theorems to solve problems..

#### 2.Course Main Objective

- Students will be able to recall the basic concepts of functional analysis through the study of function spaces, functions, operators and functional and real-valued functions on the function spaces such as metric, norm and inner-product.
- Students recognize different types of operators and their applications..



<b>Course Title:</b>	Research Work
<b>Course Code:</b>	MATH 491
<b>Level/year at which this course is offered:</b>	L8/Y4
<b>Pre-requisites for this course :</b>	Math 200
<b>Contact Hours</b>	90

**Course Objectives and Learning Outcomes**

**1.Course Description**

In this senior research projects students practice different techniques and principles of mathematics, submit a final project report and conduct an oral presentation..

**2.Course Main Objective**

- Students will be able to use library and other tools to carry out research project independently and in collaboration with others.
- Students will be able to report research findings.
- Students will be able to demonstrate an understanding of the research ethics.
- Students will be able to present mathematical concepts and theories effectively..

<b>Course Title:</b>	Discreet Mathematics
<b>Course Code:</b>	MATH 462
<b>Level/year at which this course is offered:</b>	L8/Y4
<b>Pre-requisites for this course :</b>	Math 251
<b>Contact Hours</b>	45

**Course Objectives and Learning Outcomes**

**1.Course Description**

The main purpose of this course is to improve the student's logical thinking and skills in solving problems by using the basic concepts of discrete mathematics. The course also offers an opportunity for students to apply their knowledge and understanding to solve practical problems..

**2.Course Main Objective**

- Students will be able recall basic concepts of mathematical reasoning, set and graph theories.
- Students will be able to use mathematical reasoning techniques to perform logic proofs.
- Students will be able to recognize graphs and trees and in solving real world problems..

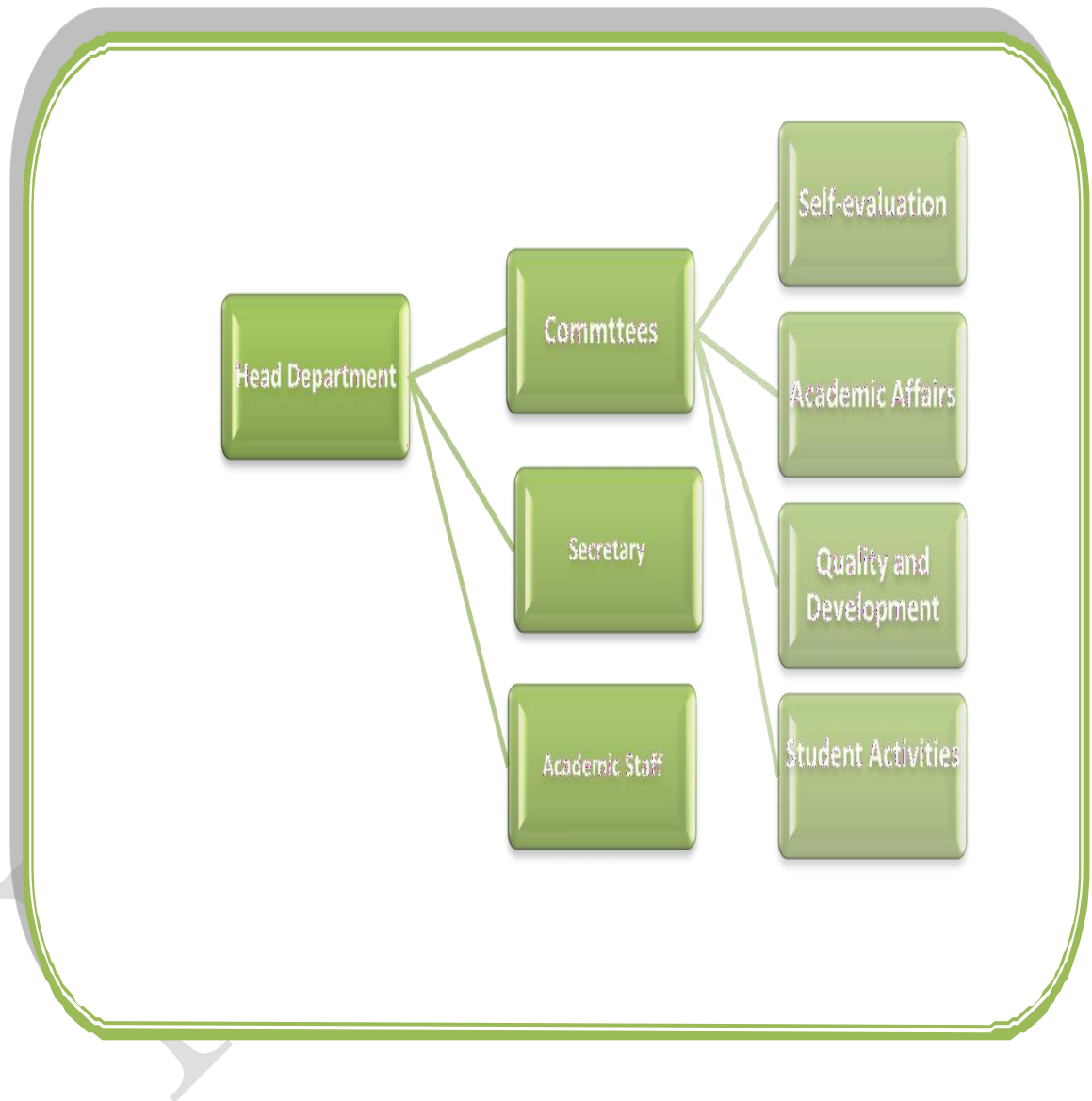
### Optional Courses:

Course Title:	Course Code	Pre-requisites	Contact Hours
Partial differential equations and special functions	MATH 307	MATH 305	3
Real analysis 2	MATH 312	MATH 311	3
Financial mathematics	MATH 322	MATH 200	3
Applied mathematics	MATH 332	MATH 311	3
Linear Algebra (2)	MATH 344	MATH 241	3
Number theory	MATH 346	MATH 311	3
Complex analysis (2)	MATH 414	MATH 251	3
Measure Theory	MATH 416	MATH 413	3
Special functions	MATH 427	MATH 311	3
Introduction to approximation theory	MATH 434	MATH 311	3
Theory of rings and modules	MATH 445	MATH 305	3
Euclidean and non-Euclidean geometry	MATH 465	MATH 311	3

### Activities:

- Supporting education classes.
- Lectures in research method and report writing.
- Research activities for the academic staff members in the field of education, scientific and social researches.
- Participations of the staff member in the college's activities such as workshops, training programs and cultural lectures.
- Department of Mathematics aspires now to get the Academic Accreditation.

# Department Organizational Structure



## Staff members

Name	Academic Title	Specialization	Email
<b>Dr. Mahjoub Awad</b>	Assistant Professor	Applied statistics	<a href="mailto:Malshaygi@ut.edu.sa">Malshaygi@ut.edu.sa</a>
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<b>Dr. Reda Shahin</b>	Assistant Professor	Topology	<a href="mailto:rshahin@ut.edu.sa">rshahin@ut.edu.sa</a>
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<b>Dr. Amal Elhassan</b>	Assistant Professor	Pure Mathematics	<a href="mailto:a.mohammed@ut.edu.sa">a.mohammed@ut.edu.sa</a>
<b>Dr. Huwaida Mohammed</b>	Assistant Professor	Pure Mathematics	<a href="mailto:h.mohammed@ut.edu.sa">h.mohammed@ut.edu.sa</a>
<b>Amal Elsir</b>	Lecturer	Mathematics	<a href="mailto:aabdalla@ut.edu.sa">aabdalla@ut.edu.sa</a>
<b>Nawal Al-Lohaibi</b>	Lecturer	Algebra	<a href="mailto:n-allohaibi@ut.edu.sa">n-allohaibi@ut.edu.sa</a>
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