



Course Specifications

Course Title:	Precalculus
Course Code:	MAT 122
Program:	Bachelor of Science in Engineering
Department:	Engineering
College:	Engineering
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification

1. Credit hours: 5 (4 Lectures, 0 Lab, 3 Tutorial)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: Level 1 / Year 1
4. Pre-requisites for this course (if any): None
5. Co-requisites for this course (if any): None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	70	100%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	40
2	Laboratory/Studio	0
3	Tutorial	30
4	Others (specify)	0
	Total	70

B. Course Objectives and Learning Outcomes

1. Course Description

This course describes the most basic mathematical tools needed further in coming courses especially MAT 1115 - Calculus (1) for engineers. The course includes the essential fundamentals of equations, inequalities, functions and graphs, polynomial and rational functions, exponential and logarithmic functions, introduction to trigonometry and applications, and sequences. The emphasis is on calculations, and some applications are mentioned.

2. Course Main Objective

The main purpose of this course is to provide the student with the basic understanding of fundamental notions and computations needed further in coming courses.

3. Course Learning Outcomes

	CLOs	Aligned-PLOs
1	Knowledge and Understanding	
1.1	To acquire basics of equations, inequalities, and classical types of functions.	
1.2	To introduce trigonometry, and sequences.	
2	Skills:	

CLOs		Aligned-PLOs
2.1	To develop techniques of problem solving.	
2.2	To communicate mathematics clearly and precisely both orally and in writing.	
2.3	To use Internet in searching for scientific information	
2.4	To carry out calculations orally and mentally.	
3	Values:	
3.1	To work individually.	
3.2	To work in groups.	

C. Course Content

No	List of Topics	Contact Hours
1	Equations and Inequalities: Linear Equations; Linear Inequalities; Absolute value, Equations and Inequalities involving Absolute value; Complex Numbers; Quadratic Equations and Factoring.	7
2	Functions and Graphs: The Coordinate Plane; Distance in the Plan; Circles; Equation of a Line; Functions; Graphs of Functions; Getting Information from the Graph of a Function; Transformations of Functions; Quadratic Functions; Combining Functions; One-to-One Functions and Their Inverses.	14
3	Polynomial and Rational Functions: Polynomial Functions and Their Graphs; Dividing Polynomials; Rational Functions; Polynomial and Rational Inequalities.	7
4	Exponential and Logarithmic Functions: Exponential Functions; The Natural Exponential Function; Logarithmic Functions; Laws of Exponents and Logarithms; Exponential and Logarithmic Equations.	10
5	Trigonometry: The Unit Circle; Angles and their measurements; Right Triangles Trigonometry; Trigonometric Functions and Their Graphs; Inverse Trigonometric Functions and Their Graphs.	10
6	Analytic Trigonometry and Applications: Trigonometric Identities; Addition and Subtraction Formulas; Double-Angle, Half-Angle, and Product-Sum Formulas; Trigonometric Equations; The Law of Sines and the Law of Cosines; Complex Numbers in Polar Form; Demoivre's Theorem.	11
7	Sequences and Series: Sequences and Summation notation; Arithmetic sequences and series; Geometric sequences and series; Mathematical Induction.	11
Total		70

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	To acquire basics of equations, inequalities, and classical types of functions.	<ul style="list-style-type: none"> • 4 lecture hours\week • 3 tutorial hours\week 	<ul style="list-style-type: none"> • Regular Exams • Assignments

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.2	To introduce trigonometry, and sequences.	• Self-study	• Short Quizzes
2.0	Skills		
2.1	To develop techniques of problem solving.	• Self-study • Real-life problems	• Participations • Short Quizzes
2.2	To communicate mathematics clearly and precisely both orally and in writing.		
2.3	To use Internet in searching for scientific information		
2.4	To carry out calculations orally and mentally.		
3.0	Values		
3.1	To work individually.	Personal questions	Participation
3.2	To work in groups.	Team work	Homework and Mini-projects

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homeworks, Quizzes, Mini-projects	During the semester	20%
2	First Midterm	Week 3-4	20%
3	Second Midterm	Week 7-8	20%
4	Final Exam	Week 12	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

- There are 6 office hours per week reserved by each professor, planed on his timetable, to help the students on their problems.
- All department students are assigned two academic advisors who will act as a mentor, providing academic and career advice, and general counseling.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Precalculus , Ron Larson and Robert P. Hostetler, Seventh Edition 7th Edition Brooks Cole; 7th edition, 2006.
Essential References Materials	<ul style="list-style-type: none"> ▪ Precalculus, R. Barnett, M. Ziegler, K. Bylenn, D. Sobecky, McGraw Hill; 7th edition, 2010. ▪ Precalculus, Robert F. Blitzer, Pearson; 6th edition, 2017.
Electronic Materials	None
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> ▪ Each class room should be equipped with a whiteboard and a projector. ▪ Laboratories should be equipped with computers and an internet connection.
Technology Resources (AV, data show, Smart Board, software, etc.)	The rooms should be equipped with data show and Smart Board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment, Quality of learning resources	Students	During the semester and at the end of the course each student will complete two evaluation forms.
Extent of achievement of course learning outcomes, Quality of learning resources	Instructor	At the end of each semester the course instructor should complete the course report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

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

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Mathematics and Statistics Department Council
Reference No.	2/1444
Date	10/02/1444 (06/09/2022)