

## Course Objectives and Outcomes

Course Number: Math382

Course Name: Real Analysis (1)

Prepared by: Dr. Adel Zaki

Table 1: Relationship of course objectives/outcomes with PLO and ASIIN Criteria

Course Objectives:	Course Outcomes:	ASIIN	PLO
Have the knowledge of basic properties of the field of real numbers.	<b>Define</b> and <b>recognize</b> the basic properties of the field of real numbers	a, b, e, m	
	<b>Improve</b> and <b>outline</b> the logical thinking.	b, c	
	<b>Illustrate</b> how to communicating with: Peers, Lecturers and Community.	l, n	
Have the knowledge of the series of real numbers and convergence.	<b>Define</b> and <b>recognize</b> the series of real numbers and convergence	a, b, c, g, m, j	
	<b>Shown</b> the ability of working independently and with groups.	n	
	<b>Illustrate</b> how take up responsibility.	l, n	
Studying Bolzano –Weirstrass theorem and Cauchy criteria.	<b>Define</b> and <b>recognize</b> Bolzano- Weirstrass theorem	a, b, f, h	
	ability to <b>apply the theorem</b> in a correct mathematical way	a, j, g	
Studying the basic topological properties of the real numbers .	<b>Define</b> and <b>recognize</b> the basic topological properties of $\mathbb{R}$	a, c, h	
	<b>Appraise</b> how to Use the computer skills and library.	d, h	
	<b>Illustrate</b> how to Search the internet and using software programs to deal with problems	d, h	
Have the knowledge of real functions-limits of functions and their properties.	<b>Define</b> and <b>recognize</b> the real functions and its limits	a, e, i	
	<b>interpret</b> how to Know the real functions using the internet	k, h, g	
Studying the notion of continuous functions and their properties.	<b>Define</b> and <b>recognize</b> the continuity of real functions	a, i	
	<b>interpret</b> how to Know the continuity using the internet	h, k	
Studying the differentiability of real functions and related theorems .	<b>Define</b> and <b>recognize</b> the differentiability of real functions and its related theorems	a, i	
	<b>interpret</b> how to Know the differentiability and related theorems using the internet	k, h, g	

Course Objectives and Outcomes

**Table 2:** Methods of assessment of course syllabus

Assessment Method	Number/Type				Instructor Assessed	TA/Grader Assessed	Peer/Self Assessed
Homework	5 homework assignments				x		
Mid Terms/Final Exams	2 mid-term; 1 final exam				x		
Quizzes	One biweekly				x		
Individual Projects	1-2 wks	3-4 wks	1/2 sem	Full sem			
Team Projects	1-2 wks	3-4 wks x	1/2 sem	Full sem x	x		x
Lab Assignments							
Computer Assignments							
Computer Tools Used							
Oral Presentations	One				x		x
Written Reports	One				x		
Other	Design project (project binder)				x		

## Outcome of ASIIN

<b>a</b>	Graduates have sound mathematical knowledge. They have a profound overview of the contents of fundamental mathematical disciplines and are able to identify their correlations.
<b>b</b>	Graduates are able to recognize mathematics-related problems, assess their solvability and solve them within a specified time frame.
<b>c</b>	Graduates have a basic ability to work in a scientific way. They are in particular able to formulate mathematical hypotheses and have an understanding of how such hypotheses can be verified or falsified using mathematical methods.
<b>d</b>	Graduates can flexibly apply mathematical methods of fundamental component areas of mathematics and are able to transfer the findings obtained to other component areas or applications.
<b>e</b>	Graduates have abstraction ability and are able to recognize analogies and basic patterns
<b>f</b>	Graduates are able to think in a conceptual, analytical and logical manner.
<b>g</b>	Graduates have an extensive comprehension of the significance of mathematical modeling. Are able to create mathematical models for mathematical problems as well as for problems in other areas of science or everyday life, and have a selection of problem solving strategies at their disposal.
<b>h</b>	Graduates can use basic methods of computer-aided simulation, mathematical software and programming to solve mathematical problems
<b>i</b>	Graduates are in a position to solve more extensive mathematical
<b>j</b>	Graduates can classify, recognize, formulate and solve mathematics-related problems
<b>k</b>	Graduates use electronic media competently
<b>l</b>	Graduates can implement lifelong learning strategies. A prerequisite for this is that the students are per-severing and that they have developed persistence.
<b>m</b>	Graduates can recognize, formulate, classify and solve problems in a mathematical context
<b>n</b>	Graduates can communicate, possibly also in a foreign language, and contribute their work effectively in teams

## Instructor Course Evaluation Form

The purpose of this evaluation is to collect instructor feedback for improving this course and the Mathematics program. Information will also be used for program accreditation purposes.

### I. Program Learning Outcomes Evaluations

Course Number/Name	Maths 382 Real Analysis 1	Semester	2nd 1434/1435				
Instructor	Prof/Dr Adel Mohamed Zaki.						
<b>The course listed above is designed for students to achieve the following outcomes at a Not At All, Low, Low- Medium, Medium, Medium-High or High level.</b>							
<b>Please mark (or type) High (5), Medium-High (4), Medium (3), Low-Medium (2), Low (1) or Not At All (0) indicating the level to which you believe, as an instructor, the students have achieved these outcomes in this course.</b>							
Program Learning Outcomes	Relevant Activities	5	4	3	2	1	0
a1. Apply fundamentals and concepts of mathematics.	- Lectures - assignments	5					
a2. Apply fundamentals and concepts General sciences and Computer skills.	- assignments on logic statements			3			
a3. Realize Social and ethical values.							0
b1. Read and construct mathematical arguments and proofs.	- Lectures - assignments		4				
b2. Apply critical thinking skills to solve problems that can be modeled mathematically.	- Lectures - assignments - Oral discussion	5					
c1. Work independently and within a team	Divided students into groups and using oral discussion with homework			3			
c2. Bear responsibility for different situations.					2		
c3. Realize codes of ethics and their importance.							0
d1. Communicate a depth and breadth of mathematical knowledge, both orally and in writing.	- Lectures - assignments - Oral discussion		4				
d2. Ability to Organize, connect and communicate mathematical and algorithmic ideas.	- Lectures - assignments		4				
d3. Critically interpret numerical and graphical data.	- assignments on information data and represented data			3			
e1. Use computer and its applications as an office tool	- assignments on Logical expression			3			

**Instructor Course Evaluation Form**

**II. Catalog Description , and Course Prerequisites Evaluations:**

Based on your experiences in the course, please respond by circling the most appropriate number. Circle N/A for items that are not applicable, or if you have no opinion.

<b>Catalog Description 1434-1435</b>	<ul style="list-style-type: none"> <li>• <b>Basic Properties of the field of real numbers</b></li> <li>• <b>Real Functions and their properties + Limits of a function +continuous functions</b></li> <li>• <b>Series and their convergence</b></li> <li>• <b>Basic topological properties of the real line</b></li> <li>• <b>The derivative of a function –compact sets and its properties</b></li> <li>• <b>Related theorems ( Mean value theorem-Taylor theorem –L Hospital rule )</b></li> </ul>					
Course Prerequisites:	Math 203	<b>Circle One (5=Strongly Agree; 1=Strongly disagree)</b>				
2a. Do you believe that the catalog description (above) is accurate for this course?	(5)	4	3	2	1	N/A
2b. Do you believe that the course prerequisites (above) are appropriate for this course?	5	(4)	3	2	1	N/A
2c. If not, please list any prerequisites you believe are not appropriate for this course.						

**III. Textbook(s) and/or Lab Manuals (if applicable) Evaluations:**

<b>Textbook(s) and/or Lab Manuals (if applicable):</b>	<ul style="list-style-type: none"> <li>• <b>R.Bartle and D.Sherbert : Introduction to Real Analysis ,John –Wiely and sons ,New York</b></li> <li>• <b>J.Mikusiuski and P.Mikusiuski :An introduction to Analysis,John Wiley and sons ,New York,1993</b></li> </ul>					
	<b>Circle One (5=Strongly Agree; 1=Strongly Disagree)</b>					
3a. In general, do you believe this to be an appropriate textbook for this course?	(5)	4	3	2	1	N/A
3b. Was the organization of the textbook appropriate for this course?	5	(4)	3	2	1	N/A
3c. Was the level of the textbook appropriate for this course?	5	(4)	3	2	1	N/A

**IV. Computer usage (if applicable) Evaluations:**

<b>Computer usage (if applicable):</b>	<b>Circle One (5=Strongly Agree; 1=Strongly Disagree)</b>					
5a. Was the use of computer well integrated with the course?	5	4	(3)	2	1	N/A
5b. Was the computer lab adequately equipped with well-maintained and updated computers?	5	4	3	2	(1)	N/A
5c. Was the computer lab equipped with sufficient number of computers?	5	5	5	2	1	(N/A)
5d. Were the special software packages (MATLAB, SPSS, C+, FORTRAN, etc) available and accessible?	5	4	3	2	1	(N/A)
5e. Was adequate technical support available when needed?	5	4	3	2	1	(N/A)

## Student Course Evaluation Form

The purpose of this evaluation is to collect instructor feedback for improving this course and the Mathematics program. Information will also be used for program accreditation purposes.

### I. Program Learning Outcomes Evaluations

Course Number/Name	Math 382 Real Analysis (1)	Semester	Second 1434/1435					
Instructor	Prof. Dr /. Adel Zaki							
Student Name	-----	Student ID	-301110122-----					
The course listed above is designed for students to achieve the following outcomes at a Not At All, Low, Low- Medium, Medium, Medium-High or High level.								
Please mark (or type) High (5), Medium-High (4), Medium (3), Low-Medium (2), Low (1) or Not At All (0) indicating the level to which you believe, as an instructor, the students have achieved these outcomes in this course.								
Program Learning Outcomes			5	4	3	2	1	0
a1. Apply fundamentals and concepts of mathematics.			X					
a2. Apply fundamentals and concepts General sciences and Computer skills.			X					
a3. Realize Social and ethical values.			x					
b1. Read and construct mathematical arguments and proofs.			X					
b2. Apply critical thinking skills to solve problems that can be modeled mathematically.			X					
c1. Work independently and within a team				x				
c2. Bear responsibility for different situations.			X					
c3. Realize codes of ethics and their importance.				X				
d1. Communicate a depth and breadth of mathematical knowledge, both orally and in writing.				x				
d2. Ability to Organize, connect and communicate mathematical and algorithmic ideas.			x					
d3. Critically interpret numerical and graphical data.			X					
e1. Use computer and its applications as an office tool				X				

## Student Course Evaluation Form

### II. Catalog Description , and Course Prerequisites Evaluations:

Based on your experiences in the course, please respond by circling the most appropriate number. Circle N/A for items that are not applicable, or if you have no opinion.

<b>Catalog Description 1434-1435</b>	<ul style="list-style-type: none"> <li>• Basic properties of the field of real numbers</li> <li>• Series of real numbers and convergence</li> <li>• Bolzano-Weirstrass theorem</li> <li>• Topological properties of the real line</li> <li>• Real functions –limits and continuity</li> <li>• Differentiability and related theorems</li> </ul>						
<b>Course Prerequisites:</b>	PMTH 112 + PMTH127	<b>Circle One (5=Strongly Agree; 1=Strongly disagree)</b>					
2a. Do you believe that the catalog description (above) is accurate for this course?		5	X	3	2	1	N/A
2b. Do you believe that the course prerequisites (above) are appropriate for this course?		X	4	3	2	1	N/A
2c. If not, please list any prerequisites you believe are not appropriate for this course.							

### III. Textbook(s) and/or Lab Manuals (if applicable) Evaluations:

<b>Textbook(s) and/or Lab Manuals (if applicable):</b>	<ul style="list-style-type: none"> <li>• R.Bartle and D.Sherbert .Introduction to real analysis,John Wiley and sons,New York</li> <li>• J. Mikusiuki and P.Mikusiuki. An introduction to analysis ,John Wiley and sons ,New York,1993</li> </ul>	<b>Circle One (5=Strongly Agree; 1=Strongly Disagree)</b>					
3a. In general, do you believe this to be an appropriate textbook for this course?		X	4	3	2	1	N/A
3b. Was the organization of the textbook appropriate for this course?		X	4	3	2	1	N/A
3c. Was the level of the textbook appropriate for this course?		X	4	3	2	1	N/A

### IV. Computer usage (if applicable) Evaluations:

<b>Computer usage (if applicable):</b>		<b>Circle One (5=Strongly Agree; 1=Strongly Disagree)</b>					
4a. Was the use of computer well integrated with the course?		5	X	3	2	1	N/A
4b. Was the computer lab adequately equipped with well-maintained and updated computers?		5	4	X	2	1	N/A
4c. Was the computer lab equipped with sufficient number of computers?		X	4	3	2	1	N/A
4d. Were the special software packages (MATLAB, SPSS, C+, FORTRAN, etc) available and accessible?		5	X	3	2	1	N/A
4e. Was adequate technical support available when needed?		X	4	3	2	1	N/A