

1-Course Specification of Mathematics 2

	I. Course Identification and General Information:					
1	Course Title:	Mathematics 2				
2	Course Code & Number:	FR003				
			C	.H		Credit
3	Credit hours:	Th.	Tu.	Pr.	Tr.	Hours
		2	2			3
4	Study level/ semester at which this course is offered:	1^{st} level / 2^{st} semester.				
5	Pre –requisite (if any):	Mathematics 1				
6	Co -requisite (if any):	Nil.				
8	Program (s) in which the course is offered:	Civil Engineering				
9	Language of teaching the course:	English and Arabic.				
10	I continue of the chine the common	Faculty of Engineering, Sana'a				
10	Location of teaching the course:	University.				
11	Prepared By:	Dr. Adel Mohammed Al-Odhari				
12	Date of Approval	Nover	nber 2019			

II. Course Description:

This course designed to support students of engineering in second semester for first Year. This course is prerequisite for Civil Engineering Department. Students are learning processes and techniques to develop mathematical models for engineering problems by applying the mathematical concepts like definite integrals and its applications. Students during learning summing series, ant-derivatives, computing indefinite integrals of various functions, in additions, solve problems contains area of solids of revolution, volumes by using disk method and cylindrical shells, arc length, surfaces of revolution, Moments and center of mass of a lamina. Also, how to finding the integrations of functions by using techniques of integrations. Moreover, evaluate integration to Rectilinear Motion, Work and Fluid Pressure and Force.

Head of Department Dr. Samir Mohsen Al-Sirry	Quality Assurance Unit Assoc. Prof. Dr. Mohammad	Dean of the Faculty Prof. Dr. Mohammed AL- Bukhaiti	Academic Development Center & Quality Assurance	Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas
•	Algorafi		Assoc. Prof. Dr.	
			Huda Al-Emad	



III.	Course Intended learning outcomes (CILOs) of the course	Referenced PILOs
a.1	Demonstrate knowledge of Average value of nonnegative functions and Finite sums, definite and indefinite integrals, area, volume, mass, center of mass, Integration to Rectilinear Motion, Work and Fluid Pressure and Force.	A1
a.2	Define appropriate techniques to computing integrals, area, volume, mass, center of mass, Integration to Rectilinear Motion, Work and Fluid Pressure and Force.	A1, A3
b.1	Recognize of integration, the regions and equations of area, volume, arc of length, mass, center of mass, Rectilinear Motion, Work and Fluid Pressure and Force.	B1, B2
c.2	Compute of integrals, the regions and equations of Area, volume, arc of length, mass, center of mass, Rectilinear Motion, Work and Fluid Pressure and Force	C3
c.1	Use some software programing and calculators to compute the integrals and sketching regions of Area, volume, arc of length, mass, center of mass.	C3
d.1	Work as groups in assignments, discussion to another groups to checking the correct solution	D1, D3

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
 a1- Demonstrate knowledge of Average value of nonnegative functions and Finite sums, definite and indefinite integrals, area, volume, mass, center of mass, Integration to Rectilinear Motion, Work and Fluid Pressure and Force. a2- Define appropriate techniques to computing integrals, area, volume, mass, center 	Lectures and Tutorials.	coursework assignments, final exam.

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Al-Sirry	Mohammad	Bukhaiti	Assurance	Mohammed Abbas
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of mass, Integration to Rectilinear Motion, Work and	
Fluid Pressure and Force.	

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Buildegies and Assessment Buildegies.		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1- Recognize of integration, the regions and equations of area, volume, arc of length, mass, center of mass, Rectilinear Motion, Work and Fluid Pressure and Force.	Lectures and Tutorials	Examinations, tests, coursework assignments final exam

© Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:						
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies				
C1- Use some software programing and calculators to compute the integrals and sketching regions of Area, volume, arc of length, mass, center of mass.	Lectures and Tutorials	Examinations, tests, coursework assignments final				
c2- Compute of integrals, the regions and equations of Area, volume, arc of length, mass, center of mass, Rectilinear Motion, Work and Fluid Pressure and Force	Tutoriais	exam				

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:					
Course Intended Learning Outcomes	Teac	hing strategies	Assessment Strategies		
d1- Work as groups in assignments, discussion to another groups to checking the correct solution	1	Small group	report		

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Al-Sirry	Mohammad	Bukhaiti	Assurance	Mohammed Abbas
	Algorafi		Assoc. Prof. Dr.	
			Huda Al-Emad	

Sana'a University Faculty of Engineering Department: Basic Engineering Sciences Title of the Program: B.Sc. Of Architectural Engineering



Head ofQualityDepartmentAssuranDr. Samir MohsenAssoc. IAl-SirryMoham

Quality Assurance Unit Assoc. Prof. Dr. Mohammad Algorafi Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti

Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas



	A – Theoretical	Aspect:				
Order	Units/Topics List	Learning Outcomes	Sub Top	ics List	Number of Weeks	contact hours
1	Unit-1: Calculus of one variable: Integrations	a1, b1 and c2	Ant derivatives indefinite integ Integration by s Sigma Notation integral and the Fundamental T integral calculu	ral and substitution. h, the definite first heorem of	2	4
2	Unit-2: Calculus of one variable: Techniques of Integration	a1 ,a.2, b1 and c2	Fundamental I Formulas and in parts and tabula Integration by Trigonometric and identities. I Rational function Long and Partia Integration by H formulae. Impres	ntegration by ar method. substitutions integration by ons (division al fractions). Reeducation	5	10
3	Unit-3: Calculus of one variable: Application of Definite Integral	a1 ,a.2, b1 ,c1, c2	Area and solid revolution. Volumes by Sli Disks and Wash length and surfa revolution. Mon Center of Mass	icing using her. Arc aces of ments and	4	8
4	Unit-4: Calculus of one variable: Further Application of Integration:	a1 ,a.2, b1 ,c1, c2,d1	Application of Rectilinear More Work and Fluid Force.	tion.	3	6
	Number of W	eeks /and Un	its Per Semeste	r	14	28
l of artment Samir Mc irry	Quality Assurance U ohsen Assoc. Prof. Mohammad Algorafi	Unit Prof Dr. Moh	ammed AL-	Academic Development Center & Qua Assurance Assoc. Prof. D Huda Al-Em	Univer lity Prof Mohan Dr.	of Sana'a sity . Dr. Al-Q nmed Abb



B - Tı	B - Tutorial Aspect:						
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes			
1	Unit-1: Solving problems about ant derivative, the integrals by substitutions, Finite sums and Fundamental Theorem of integral calculus.	2	4	a1 , b1 and C2			
2	Unit-2: Evaluate integrals by standard formulas, integrals by parts and tabular method, integrals by Trigonometric substitutions, identities, integrals by division Long, partial fractions, integrals by reeducation formulae and improper integrals.	5	10	a1 ,a.2, b1 and c2			
3	Unit-3: Solving problems about area and solid revolution. Evaluate volumes by using cylindrical shells and slicing. Compute Arc length and surfaces of revolution. Find Moments and Center of Mass of a Lamina	4	8	aı, a.2, bı ,c1, c2			
4	Unit-4: Solving problems about Integration to Rectilinear Motion. Solving problems about Work Force. Solving problems about Fluid Pressure.	3	6	a1, a.2, b1 ,c1, c2,d1			

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-	Algorafi		Assoc. Prof. Dr.	
			Huda Al-Emad	



Number of Weeks /and Units Per Semester	14	28

V. Teaching strategies of the course:

Lectures ,Tutorials small group

VI. Assignments:							
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark			
1	Assignment-unit-1	a ₁ , b ₁ and c ₂	2	3			
2	Assignment-unit-2	a1 ,a.2, b1 and c2	5	7			
3	Assignment-unit-3	a1 ,a.2, b1 ,c1, c2	4	3			
4	Assignment-unit-4	a1 ,a.2, b1 ,c1, c2,d1	3	2			

VII	VII. Schedule of Assessment Tasks for Students During the Semester:							
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes			
1	Exercises & Home works	3, 5,8,10,12	15	10%	a1 ,a.2, b1 ,c1, c2,d1			
2	Mid-Term-Exam	7	30	20%	a1,a.2, b1,c1, c2			
3	Final Exam	End of semester	105	70 %	a1,a.2, b1,c1, c2			
	Total		150	100 %				

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Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas



VIII. Learning Resources:

• Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).

1- Required Textbook(s) (maximum two).

1-Tomas calculus 12edition, Addison-Wesley pearson.2010.

2- John Bird, Engineering Mathematics. Published by Elsevier Ltd. Fifth edition 2007.

2- Essential References.

- 1-Mathematics for Engineers and Technologists, Elsevier (2002), 0750655445.
- 2-Calculus, Howard Anton, Fifth Edition, John Wiley & Sons, Inc. New York
 - Chi Chester Brisbane Toronto Singapore.1995.

3- Electronic Materials and Web Sites etc.

- 1- https://www.khanacademy.org/
- 2- www.math.com/
- 3- https://ocw.mit.edu/courses/mathematics/
- 4- https://uwaterloo.ca/mathematics-online-learning/

IX. Course Policies:

All students enrolled at Sana'a University at the various levels of study are subject to disciplinary rules and regulations outlined in the common system for Yemeni Students Affairs in Universities (governmental) for the year 2007). The normal course administration policies and rules of the Faculty of Engineering apply. For the policy, see: Resolution No.284 for the year 2008 about Unified Regulation for the Students Affairs in Governmental Universities, The University Regulations on academic misconduct will be strictly enforced. Please refer to above Resolution No.284

Class Attendance:

1 The students should have more than 75 % of attendance according to rules and regulations of the faculty.

Tardy:

2 The students should respect the timing of attending the lectures. They should attend within 10 minutes from starting of the lecture.

3 Exam Attendance/Punctuality:

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2	Algorafi		Assoc. Prof. Dr.	
	-		Huda Al-Emad	



	The student should attend the exam on time. The unctuality should be implemented according to rules and regulations of the faculty for midterm exam and final exam.
4	Assignments & Projects: The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.
5	Cheating: If any cheating occurred during the examination, the student is not allowed to continue and he has to face the examination committee for enquires.
6	Plagiarism: The student will be terminated from the Faculty, if one student attends the exam on another behalf according to the policy, rules and regulations of the university.
7	Other policies: - All the teaching materials should be kept out the examination hall. - The mobile phone is not allowed. - There should be a respect between the student and his teacher.

Reviewed By	Vice Dean for Academic Affairs and Post Graduate Studies
	<u>Dr. Tarek A. Barakat</u>
	Dr. Mohammad Algorafi
	Deputy Rector for Academic Affairs Dr. Ibrahim AlMutaa
	Dr. Ahmed mujahed
	Dr. Munaser Alsubri

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<u>Template for Course Plan (Syllabus) of</u> <u>Mathematics 2</u>

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty	Dr. Adel Mohammed Office Hours						
Member	Al-Odhari	Office flours					
Location& Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail		8- 10			8-10		

	II. Course Identification and General Information:					
1-	Course Title:	Mathematics 2				
2-	Course Number & Code:	FR003				
			C.	.H		Credit
3-	Credit hours:	Th.	Tu.	Pr.	Tr.	Hours
		2	2			3
4-	Study level/year at which this course is	1^{st} level / 2^{st} semester.				
4-	offered:					
5-	Pre –requisite (if any):	Mathe	ematics 1			
6-	Co –requisite (if any):	Nil.				
7-	Program (s) in which the course is	Civil E	Engineering			
/-	offered					
8-	Language of teaching the course:	English and Arabic.				
9-	System of Study:	Regula	ar			
10-	Mode of delivery:	Lectur	e			
11-	Location of teaching the course:	Lectur	e hall			

Rector of Sana'a Head of Quality Dean of the Faculty Academic Department Assurance Unit Prof. Dr. Development University Dr. Samir Mohsen Assoc. Prof. Dr. Mohammed AL-Center & Quality Prof. Dr. Al-Qassim Al-Sirry Mohammad Bukhaiti Assurance Mohammed Abbas Assoc. Prof. Dr. Algorafi Huda Al-Emad



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This course designed to support students of engineering in second semester for first Year. This course is prerequisite for Civil Engineering Department. Students are learning processes and techniques to develop mathematical models for engineering problems by applying the mathematical concepts like definite integrals and its applications. Students during learning summing series, ant-derivatives, computing indefinite integrals of various functions, in additions, solve problems contains area of solids of revolution, volumes by using disk method and cylindrical shells, arc length, surfaces of revolution, Moments and center of mass of a lamina. Also, how to finding the integrations of functions by using techniques of integrations. Moreover, evaluate integration to Rectilinear Motion, Work and Fluid Pressure and Force.

IV. Intended learning outcomes (ILOs) of the course:

• Brief summary of the knowledge or skill the course is intended to develop:

a.1 Demonstrate knowledge of Average value of nonnegative functions and Finite sums, definite and indefinite integrals, area, volume, mass, center of mass, Integration to Rectilinear Motion, Work and Fluid Pressure and Force. A1

Define appropriate techniques to computing integrals, area, volume, mass, center of a.2 mass, Integration to Rectilinear Motion, Work and Fluid Pressure and Force. A1, A3 **b.1** Recognize of integration, the regions and equations of area, volume, arc of length, mass, center of mass, Rectilinear Motion, Work and Fluid Pressure and Force. B1. B2 Compute of integrals, the regions and equations of Area, volume, arc of length, c.2 mass, center of mass, Rectilinear Motion, Work and Fluid Pressure and Force C3 Use some software programing and calculators to compute the integrals and c.1 sketching regions of Area, volume, arc of length, mass, center of mass. C3 d.1 Work as groups in assignments, discussion to another groups to checking the correct solution D1. D3

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V.	V. Course Content:						
•]	• Distribution of Semester Weekly Plan of Course Topics/Items and Activities.						
A – Tł	A – Theoretical Aspect:						
Order	Topics List	Sub Topics List	Week Due	Contact Hours			
1	Unit-1: Calculus of one variable: Integrations	Ant derivatives, the indefinite integral and Integration by substitution. Sigma Notation, the definite integral and the first Fundamental Theorem of integral calculus	1,2	4			
2	Unit-2: Calculus of one variable: Techniques of Integration	Fundamental Integration Formulas and integration by parts and tabular method. Integration by Trigonometric substitutions and identities. Integration by Rational functions (division Long and Partial fractions). Integration by Reeducation formulae. Improper integrals.	3,4,5,6,7	10			
3	Midterm Exam		8	2			
4	Unit-3: Calculus of one variable: Application of Definite Integral	Area and solids of revolution. Volumes by Slicing using Disks and Washer. Arc length and surfaces of revolution. Moments and Center of Mass of a Lamina	9,10,11,12	8			
5	Unit-4: Calculus of one variable: Further Application of Integration:	Application of Integration to Rectilinear Motion. Work and Fluid Pressure and Force.	13,14,15	6			
6	Final Exam		16	2			
	Number of Wee	ks /and Units Per Semester	16	32			

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			Huda Al-Emad	



B - Tutorial Aspect:				
Order	Topics List	Week Due	Contact Hours	
1	Unit-1: Solving problems about ant derivative, the integrals by substitutions, Finite sums and Fundamental Theorem of integral calculus.	2	4	
2	Unit-2: Evaluate integrals by standard formulas, integrals by parts and tabular method, integrals by Trigonometric substitutions, identities, integrals by division Long, partial fractions, integrals by reeducation formulae and improper integrals.	5	10	
3	Unit-3: Solving problems about area and solid revolution. Evaluate volumes by using cylindrical shells and slicing. Compute Arc length and surfaces of revolution. Find Moments and Center of Mass of a Lamina	4	8	
4	Unit-4: Solving problems about Integration to Rectilinear Motion. Solving problems about Work Force. Solving problems about Fluid Pressure.	3	6	
Numbe	r of Weeks /and Units Per Semester	14	28	

VI. Teaching strategies of the course: Lectures ,Tutorials small group

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Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti

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VII. Assignments:						
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark		
1	Assignment-unit-1	a1, b1 and c2	2	3		
2	Assignment-unit-2	a1 ,a.2, b1 and c2	5	7		
3	Assignment-unit-3	a ₁ ,a.2, b ₁ ,c1, c ₂	4	3		
4	Assignment-unit-4	a1 ,a.2, b1 ,c1, c2,d1	3	2		

VIII.	Schedule of Assessment Tasks for Students During the Semester:			
Assessm ent	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Exercises & Home works	3, 5, 8, 10, 12	15	10%
2	Mid-Term-Exam	7	30	20%
3	Final Exam	End of semester	105	70 %
	Total		150	100 %

IJ	K. Learning Resources:
	tten in the following order: (Author – Year of publication – Title – Edition – Place of cation – Publisher).
1- Re	equired Textbook(s) (maximum two).
	1 Tomas calculus 12edition, Addison-Wesley pearson.2010.
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	2- Calculus, Howard Anton, Fifth Edition, John Wiley & Sons, Inc. New York
	Chi Chester Brisbane Toronto Singapore.1995.
3- El	ectronic Materials and Web Sites etc.
	1- 1- <u>https://www.khanacademy.org/</u>
	2- <u>www.math.com/</u>
	3- <u>https://ocw.mit.edu/courses/mathematics/</u>
	https://uwaterloo.ca/mathematics-online-learning/
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G	overnmental Universities, The University Regulations on academic misconduct will be					
stı	rictly enforced. Please refer to above Resolution No.284					
	Class Attendance:					
1	The students should have more than 75 % of attendance according to rules and					
	regulations of the faculty.					
	Tardy:					
2	The students should respect the timing of attending the lectures. They should attend					
	within 10 minutes from starting of the lecture.					
	Exam Attendance/Punctuality:					
3	The student should attend the exam on time. The unctuality should be implemented					
	according to rules and regulations of the faculty for midterm exam and final exam.					
	Assignments & Projects:					
4	The assignment is given to the students after each chapter; the student has to submit all					
	the assignments for checking on time.					
5	Cheating: If any cheating occurred during the examination, the student is not allowed					
3	to continue and he has to face the examination committee for enquires.					
	Plagiarism:					
6	The student will be terminated from the Faculty, if one student attends the exam on					
	another behalf according to the policy, rules and regulations of the university.					
	Other policies:					
7	- All the teaching materials should be kept out the examination hall					
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- There should be a respect between the student and his teacher.

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