



Course Specifications: Mathematics 1 MTH001

1. Basic Information

Program Title	Biomedical Engineering
Department offering the Program	Biomedical Engineering
Department Responsible for the Course	Mathematics and Engineering Physics
Course Code	MTH001
Year/ Level	Level 000
Specialization	Minor
Requirements	None
Authorization data of course specification	

Teaching Hours	Lectures	Tutorial	Practical
	2	2	0

2. Course aims:

No.	aim
1	Apply knowledge of mathematics and methods of differential calculus to solve different engineering problems.
5	Use modern mathematical techniques and skills to design and control biomedical systems.

3. Intended Learning Outcomes (ILOs):

a. Knowledge and Understanding:

No.	Knowledge and Understanding
A ₁	Identify the concepts and theories of transcendental functions, different methods of differentiation, elementary row operation on matrices using standard techniques of elimination and algebra of matrices.
A ₅	State the methodologies of differentiation and matrix algebra.

b. Intellectual Skills

No.	Intellectual Skills
B ₁	Select appropriate methods of differentiation for modeling and analyzing problems.
B ₂	Investigate appropriate solutions of engineering problems based on analytical thinking.

c. Professional Skills

No.	Professional Skills
C ₁	Apply appropriate methods of differentiation and matrix algebra to solve simple engineering problems.

d. General Skills

No.	General Skills
D ₃	Communicate effectively through reports.

4. Course Contents:

No.	Topics	Weeks
1	Limits and continuity - the derivative	1
2	Transcendental functions	2
3	derivative of transcendental functions	3
4	higher order derivatives	4
5	L'hospital rule and Taylor series	5
6	problems of extrema and curve sketching	6
7	functions of several variables and applied theorems on partial differentiation	7
8	mathematical induction	9
9	binomial theorem	10
10	the remainder theorem and synthetic division	11
11	theory of equations	12
12	partial fraction decomposition methods	13
13	algebra of matrices, determinants and vectors	14
14	solution of linear systems of equations and eigenvalue problems	

5. Teaching and Learning Methods:



Course Specifications: Mathematics 1 MTH001

No.	Teaching Method
1	Lectures
2	Discussion Sessions

6. Teaching and Learning Methods Disabled Students:

No.	Teaching Method	Reason
1	Extra oral meetings	To answer their questions

7. Student Evaluation:

7.1 Student Evaluation Methods:

No.	Evaluation Method	ILOs
1	Mid Term Examination	A ₁ , B ₁ , C ₁
2	Semester work	B ₂ , C ₁ , D ₃
3	Final Term Examination	A ₁ , A ₅ , B ₁ , B ₂

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Mid Term Examination	8
2	Semester work	Every week
3	Final Term Examination	15

7.3 Weighting of Evaluations:

No.	Evaluation Method	Weights
1	Mid Term Examination	20%
2	Semester work	30%
3	Final Term Examination	50%
Total		100%

8. List of References

No.	Reference List
1	Robert A., Adams, "Calculus: a complete course" 6th ed, 2006.
2	Adrian Banner, "The Calculus Lifesaver" Princeton University press princeton and Oxford 2007.
3	Larson, Ron, and Bruce H. Edwards. Calculus. Boston, MA: Brooks/Cole, Cengage Learning, 2014.
4	Stewart, James. Calculus. Australia Belmont, CA: Brooks/Cole Pub Co, 2012.
5	Lecture notes

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Sound System

10. Matrix of Knowledge and Skills of the Course:

No.	Topic	aim	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
1	limits and continuity - the derivative	1,5	A ₁	-	-	
2	transcendental functions	1	A ₁	-	-	
3	derivative of transcendental functions	1	A ₁ , A ₅	B ₁	-	
4	higher order derivatives	1	A ₁ , A ₅	B ₁	-	D ₃
5	l'hopital rule and Taylor series	1,5	A ₁	-	-	D ₃
6	problems of extrema and curve sketching	1,5	A ₁ , A ₅	B ₁	C ₁	D ₃



Course Specifications: Mathematics 1 MTH001

7	functions of several variables and applied theorems on partial differentiation	1	A ₁	-	-	D ₃
8	mathematical induction	1	A ₁	-	C ₁	D ₃
9	binomial theorem	1	A ₁	-	-	D ₃
10	the remainder theorem and synthetic division	1	A ₁	-	-	D ₃
11	theory of equations	1	A ₁	-	C ₁	D ₃
12	partial fraction decomposition methods	1	A ₁	B ₁	-	D ₃
13	algebra of matrices, determinants and vectors	1	A ₁ , A ₅	B ₂	-	D ₃
14	solution of linear systems of equations and eigenvalue problems	5	A ₁ , A ₅	B ₂	C ₁	D ₃

Course Coordinator: Prof. Dr.

Head of Department: Assoc. Prof. Hossam Eldeen Moustafa

Date of Approval: