University : Benha university

Faculty : Shoubra Faculty of Engineering

Department : Mathematics and Physics Engineering Department

1- Course Data

1- Course Name : Math 2A Code : EMP181
2- Specialization :
3- Study year :first year
4- Units/ Credit hours : Lecture : 4 Tutorial : 2
Date of specifications approval: 20/6/2010

2- Course Aim

For students undertaking this course, the aims are to:

2.1- Recognize the essential information as introduction about Advanced Calculus and their applications in Engineering.
2.2- Recognize the basic concepts of convergence and divergence of Infinite Series.
2.3- Recognize the basic concepts of Functions of Several Variables.
2.4- Deal with some applications and optimization problems.
2.5- Solve Ordinary Differential Equations.
2.6- Recognize the fundamental concepts of Vector Functions and vectors analysis.
2.7- Recognize the fundamental concepts of Multiple Integrals and its applications.
2.8- Recognize the basic concepts of Complex Functions and its applications.
2.9- Recognize the technology of using all the above items.

3- Intended Learning Outcomes of Course (ILOS)

a- Knowledge and Understanding

On completing this course, students will be able to:
a- 1 - Recognize concepts and theories of mathematics and sciences; appropriate to the Infinite series And Functions of several variables. (a-1)
a- 2 - Recognize methodologies of solving engineering problems, First order ordinary differential equations and Higher order differential equations. (a-5)

b- Intellectual Skills

At the end of this course, the students will be able to:
b- 1 - Select appropriate mathematical and computer-based methods for modeling and analyzing of the infinite series and differential equations problems. (b-1)
b- 2 - Select appropriate solutions for engineering problems based on analytical thinking using mathematical differential equations. (b-2)
b- 3 - Solve engineering problems, often on the basis of limited and possibly contradicting information by the helpful of different methods of integration and complex variable functions. (b- 7)

c- Professional Skills

On completing this course, the students are expected to be able to:

c- 1 - Use knowledge of mathematics, science, information technology, design, business context and engineering practice to solve engineering problems. (c-1)

c- 2 - Prepare numerical modeling methods to mathematical engineering problems. (c- 7)

4- Course Contents

No.	Topics	No. of hours	ILOs	Teaching/learning methods and strategies	Assessment method
1	Infinite series	12	a1, c1	Classroom board, computer and data show	Home Assignments, Quizzes, Oral Exam
2	Functions of several variables	18	a2, b2, c2	Classroom board, computer and data show	Home Assignments, Quizzes, Oral Exam
3	First order ordinary differential equations	18	a1, b2	Classroom board, computer and data show	Home Assignments, Quizzes, Oral Exam
4	Higher order differential equations	18	a1, b2	Classroom board, computer and data show	Home Assignments, Quizzes, Oral Exam
5	Vectors analysis	12	b1, c2	Classroom board, computer and data show	Home Assignments, Quizzes, Oral Exam
6	Multiple integrals	12	a1	Classroom board, computer and data show	Home Assignments, Quizzes, Oral Exam
7	Functions of complex variable	12	a1, b2	Classroom board, computer and data show	Home Assignments, Quizzes, Oral Exam

5- Teaching and Learning Methods

5.1- Modified Lectures

5.2- Tutorials

5.3- Class activity

6- Teaching and Learning Methods of Disables
None

7- Student Assessment

a- Student Assessment Methods

1	Assignment to assess a1,a2 - b1,b2,b3 - c1,c2
2	Mid-term exam to assess a1,a2 - b1,b2,b3
3	Quiz to assess a1,a2 - b1,b2,b3
4	Final exam to assess a1,a2 - b1,b2,b3 - c1

b- Assessment Schedule

No.	Assessment	Week
1	Assignment	1,3,5,7,9 and 11

2	Mid-term exam	8
3	Quiz	12
4	Final exam	15

c- Weighting of Assessments

Assessment	Weight
Mid_Term Examination	13.333 %
Final_Term Examination	66.667 %
Oral Examination	0 %
Practical Examination	0 %
Semester work	6.667 %
Other types of assessment	13.333 %
Total	100 %

8- List of References

a- Course Notes

1- Lecture material and training sheets

b- Books

1- Engineering Mathematics, Fifth Edition, K. A. Stroud, Industrial Press. Inc., New York, 2001.

c- Recommended Books

1- Advanced Engineering Mathematics, E. Kreyszig, John Wiley and Sons, New York 1999.

d- Web Sites

1- www.MathematicsResearch.com
2- www.Google.com

- Course Coordinator :

1 - Khaled Mamdouh Ibrahim Elnajjar Mohammed Elnajjar
2 - Elsaied Ahmed Mohammed Ghareeb

Matrix of Knowledge and Skills of the course

No.	Topics	No. of hours	Basic Knowledge	Intellectual Skills	Professional Skills
1	Infinite series	12	a1		c1
2	Functions of several variables	18	a2	b3	c2
3	First order ordinary differential equations	18	a1	b2	
4	Higher order differential equations	18	a1	b2	
5	Vectors analysis	12		b1	c2
6	Multiple integrals	12	a1		
7	Functions of complex variable	12	a1	b2	

- Course Coordinator :

Prof. Ibrahim Sakr

Matrix of course content and ILO's

Course Code : EMP181 Course Title : Math 2 Study Year : First Year
Specialization :
Teaching Hours:
Lecture : 4 Tutorial : 2 Practical : 0
Date of specifications approval: 16/3/2010

Course content	ILO a's		ILO b's			ILO c's	
	1	2	1	2	3	1	2
Infinite series	✓					✓	
Functions of several variables		✓			✓		✓
First order ordinary differential equations					✓	✓	✓
Higher order differential equations	✓			✓			
Vectors analysis			✓				✓
Multiple integrals	✓						
Functions of complex variable	✓			✓			

Matrix of course aims and ILO's

Course Code : EMP181 Course Title : Math 2A Study Year : First Year
Specialization :
Teaching Hours:
Lecture : 4 Tutorial : 2 Practical : 0

Date of specifications approval: 20/6/2010

Course Aims	ILO a's		ILO b's			ILO c's	
	1	2	1	2	3	1	2
Recognize the essential information as introduction about Advanced Calculus and their applications in Engineering.		✓			✓	✓	✓
- Recognize the basic concepts of convergence and divergence of Infinite Series.	✓	✓	✓	✓	✓	✓	✓
Recognize the basic concepts of Functions of Several Variables		✓			✓	✓	✓
Deal with some applications and optimization problems.	✓	✓		✓			✓
Solve Ordinary Differential Equation's.		✓			✓		✓
Recognize the fundamental concepts of Vector Functions and vectors analysis.	✓	✓	✓				
Recognize the fundamental concepts of Multiple Integrals and its applications		✓	✓				✓
Recognize the basic concepts of Complex Functions and its applications		✓	✓			✓	
Recognize the technology of using all the above items		✓	✓				✓

Course Instructor : Prof. Ibrahim Sakr

Head of department: Prof. Dr. Sayed A. Ward