Course Specifications   (2011 - 2012)

A. Basic Information

Course Title	Mathematics & Numerical Analysis		Course Code:	EMP 251	
Lecture:	2	Tutorial:	2	Practical	0	Total	4

Programme (s) on which this course is given:	B.Sc. Civil Engineering (General)	
Major or minor element of program:	Major	
Department offering the program:	Civil Engineering	
Department offering the course:	Engineering Mathematics Physics	
Academic Year of program:	Second	Level of program:	First Semester
Date of specifications approval:		16/3/2010	

B. Professional Information

1. Overall aims of course

By the end of the course the students will be able to:

- **Recognize the essential information as introduction about Advanced Calculus and their applications in Engineering.**
- **Recognize the basic concepts of Numerical Analysis and Numerical Methods.**
- **Deal with Optimization Problems and Linear Programming.**
- **Solve Partial Differential Equations.**
- **Recognize the basic concepts of Complex Functions and its applications.**
- **Recognize the technology of using all the above items.**

2. Intended Learning outcomes of Course (ILOs)

a. Knowledge and Understanding:

a.1) Recognize concepts and theories of mathematics and sciences, appropriate to the discipline.

a.5) Recognize methodologies of solving engineering problems, data collection interpretation.

b. Intellectual Skills

b.1) Select appropriate mathematical and computer-based methods for modeling and analyzing problems.

b.2) Select appropriate solutions for engineering problems based on analytical thinking.

b.7) Solve engineering problems, often on the basis of limited and possibly contradicting information.

c. Professional and Practical Skills

c.1) Apply knowledge of mathematics, science, information technology, design, business context and engineering

c.7) Apply numerical modeling methods to engineering problems.

d. General and Transferable Skills

d.1) Collaborate effectively within multidisciplinary team.

d.5) Lead and motivate individuals.

3. Contents

Week #	Topics	No. of Hours	ILOS	Teaching / learning methods and	Assessment method
			a1	Lectures	

1	Curve fitting and interpolation	2		Class activity	
			c7		
2	Curve fitting and interpolation	2	a1	Lectures	
				Class activity	
			c7		
3	Methods for solving equations of one variable and differential equations	2	a5	Lectures	Assignments
			b1	Class activity	
4	Methods for solving equations of one variable and differential equations	2	a5	Lectures	
			b1	Class activity	
5	System of linear equations	2		Lectures	Assignments
			b2	Class activity	
			d1		
6	First order and second order partial differential equations	2	a1	Lectures	
				Class activity	
			c1		
7	First order and second order partial differential equations	2	a1	Lectures	Assignments
				Class activity	
			c1		
8	Midterm Exam	1			
9	Heat and wave equations	2		Lectures	Assignments
			b2,b7	Class activity	

9	Heat and wave equations	2				
					Lectures	
10	**Optimization theory and linear programming**	2			**Class activity**	
			c7			
					Lectures	Assignments
11	**Optimization theory and linear programming**	2			**Class activity**	
			c7			
					Lectures	
12	**Optimization theory and linear programming**	2			**Class activity**	
			c7			
			a1		Lectures	
13	**Functions of complex variable**	2			**Class activity**	
			c1			
			a1		**Lectures**	
14	**Functions of complex variable**	2			**Class activity**	
			c1			
15	Final Exam	3				
Total		**30**				

4- Teaching and Learning Methods:
Check using the symbol √

√	Lectures
	Practical training / laboratory
	Seminar / workshop
√	Class activity

	Case study
	Project work
	Tutorial
	Computer based work
	Other :

5- Student Assessment Methods:

Check using the symbol   √

			a1,a5	b1,b2,b7	c1,c7	d1,d5
√	Assignments	to assess				
	Quiz	to assess				
√	Mid-term exam	to assess				
	Oral exam	to assess				
√	Final exam	to assess				
	Design Project	to assess				
	Report	to assess				
	Experimental write up	to assess				
	Informally assessment	to assess				
	Other	to assess				

6. Assessment schedule

Assessment 1 Assignments on weeks	3,5,7,9,11
Assessment 2 Quizzes on weeks	
Assessment 3 Mid-term exam on week	8
Assessment 4 Oral Exam on week	
Assessment 5 Final exam on week	15
Assessment 6 Design Project on weeks	
Assessment 7 Report on weeks	
Assessment 8 Experimental write up on weeks	
Assessment 9 Informally assessment	

7. Weighting of Assessments

Assignments	15%
Quiz	
Mid-term exam	15%
Oral exam	
Final exam	70%
Design Project	

Report	
Experimental write up	
Informally assessment	
Other	
Total	100%

8. List of References

8.1 Course Notes

• Lecture material and training sheets

8.2 Essential Books (Text Books)

• Advanced Engineering Mathematics, C.R. Wylie & L.C Barrett, McGraw-Hill,

8.3 Recommended Books

• Numerical Analysis, R.L. Burden & J.D Faired, Weber & Schmidt, Boston, 1998.

8.4 Periodicals Web sites, etc

• www.MathematicsResearch.com
• www.Google.com

9. Facilities Required for Teaching and learning

White board, prepared notes, Sheets and solving problems.

Course Coordinator:	Dr. Mohamed Hussein Mohamed Mohamed Eid
Course instructor:	Dr. Mohamed Hussein Mohamed Mohamed Eid
Head of department:	Associate Prof. Ahmed Mohamed Abdullah Hayawar

Signature:

	D	M	Y
Date:		9	2011