Philadelphia University
Faculty of Engineering
Department of Computer Engineering
First Semester, 2015/2016

Course Syllabus

Course Title: Engineering Analysis II	**Course code:** (630262)
Course Level: Second Year	**Course prerequisite:** (650260)
Lecture Time: 11:15 - 12:45 Monday, Wednesday.	**Credit hours:** 3

Academic Staff Specifics

Name	Rank	Office Number / Location	Off. Hs	E-mail Address
Eng. Sultan Al-Rashdan	Eng	6/719	14:00-16:00	Sultanrashdan@live.com

Course module description:
Engineers are always faced with solving mathematical problems, in order to optimize the design of certain objectives. Unfortunately, there is not always an analytical solution for such problems. One available alternative is to utilize numerical solutions. This course describes the most popular numerical techniques in solving frequently encountered engineering mathematical problems.

Course module objectives:
After completing this course, the student should be familiar with:
- Estimating Different Approximation Errors.
- Different Numerical Algorithms and their Flow Charts.
- Solving systems of Linear and Non-Linear equations numerically.
- Finding the Best Curve Fitting Polynomials.
- Finite Difference Techniques and Isolating Data taken in mistakes
- Using MATLAB and/or C/C++ Program. Languages to implement various algorithms

Course/ module components

Text Book: Numerical Methods using MATLAB, Mathews and K. Fink, 4th Edition, Prentice Hall, 2004.

Teaching methods:

The course will be taken 3 hours lectures a week plus one hour tutorial a week. During the course, the students will have 2 homeworks and 2 quizzes. At the end of the course the students should supply one final project. Two Mid Term Examinations will be held during the course.

Learning outcomes:

At the end of the course the student should acquire the following learning outcomes:

A - Knowledge and Understanding:

1- The ability to use different numerical techniques in solving practical problems.
2- The ability to use any programming language (VB, C++, and MatLab) in implementing the required numerical algorithms.
3-The ability to use software to simulate the numerical algorithms.

B - Intellectual Skills:

1- The ability to understand the physical problem and analyze it or decompose it to several small problems easier to understand and be analyzed.
2- The ability to find the suitable algorithms that solve these problems.
3- The ability to search and find a good numerical solution to solve these algorithms.
4- The ability to use scientific calculator in a fast and efficient way during quizzes and exams.
5- The ability to setup any programming language and use it fast and effectively during homework and the final project.

C - Practical Skills:

1- The ability to understand the final project requirement.
2- The ability to use the suitable numerical algorithm for solving the project.
3- The ability to implement these algorithms using any programming language.
4- The ability to handle the output results, fitting them into curves or into charts.
5- The ability to find the conclusion from these results and comment on it.
6- The ability to present his/her works in an academic and scientific way, and write his/her report according to official format from the department.

D - Transferable Skills:

1- Show the ability to rely on him/her self as well as to participate in a team work.
2- Display personal responsibility by working to multiple deadlines.
3- Show the ability to use library, the text book and other references.
4- Apply numerical algorithms in other subjects

Course Intended Learning Outcomes									
A - Knowledge and Understanding									
A1.	A2.	A3.	A4.	A5.	A6.	A7.	A8.		
■	■	■							
B - Intellectual Skills									
B1.	B2.	B3.	B4.	B5.	B6.	B7.	B8.	B9.	
■	■		■						
C - Practical Skills									
C1.	C2.	C3.	C4.	C5.	C6.	C7.	C8.	C9.	C10.
■		■		■					
D - Transferable Skills									
D1.	D2.	D3.	D4.	D5.	D6.	D7.			
		■		■					

Assessment instruments

- Quizzes.
- Home Works
- Final Project
- Two Mid Term Exams
- Final Examination: 50 Marks

Allocation of Marks	
Assessment Instruments	**Mark**
First examination	**20**
Second examination	**20**
Final examination: 50 marks	**40**
Reports, research projects, Quizzes, Homeworks, Projects	**20**
Total	**100**

Documentation and academic honesty

This course is given from the text book given above. It is copyright protected. Students are encouraged to purchase this text book from the university bookshop. Students are also advised to avoid plagiarism during different home works and assignments.

Course/module academic calendar

week	**Basic and support material to be covered**	**Homework/reports and their due dates**
(1), (2)	Errors	
(3	Solution of nonlinear equations	Homework1
(4)	Numerical Differentiations	
(5)	Numerical Integrations	Quiz1
(6) First examination	**18-26\11\2015**	
(7),(8)	Solution of Differential Equations	Homework2
(9), (10)	Solution of system of Linear equations	
(11) Second examination	**27\12\2015-5\1\2016**	
(12)	Finite Difference Problems	Quiz2
(13)	Curve Fitting.	
(14)	Interpolations and Extrapolations	
(15)	Course Review	
(16) Final Examination	**30\1-7\2\2016**	

Expected workload:
On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy:
Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the faculty shall not be allowed to take the final examination and shall receive a mark of 35 for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Module references:
Books:
1. Applied Numerical Methods with MATLAB for Engineers and Scientists, by Steven Chapra. 2010
2. Numerical Analysis, R. Burden and J. Douglas, Brooks/Cole, 2001.
3. Applied Numerical Analysis, Curtis F. Gerald et al, Pearson Education, 2002.