

Department offering the program:
Department offering the course:

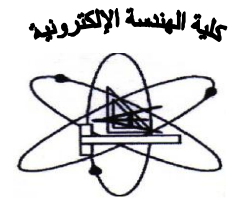
Electronics and Electrical Communications
Computer Sciences and Engineering

Course Specification

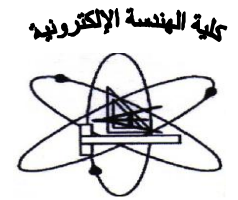
1- Course basic information :		
Course Code: PME 021 Department requirement	Course Title: Mathematics (2)	Academic year: 2015-2016 Level (0) – Semester : 2 nd
Field: Mathematics and Basic Science	Teaching hours: Lecture [3]	Tutorial [2]

2- Course Objectives	<ol style="list-style-type: none"> 1. To introduce students to Calculus of integration, Infinite and definite integrals, and Methods of integration. 2. To provide students with the basics of Theory of equations. 3. To equip students with Matrices and its applications. 4. To teach students the principles of linear algebraic equations. 5. To acquire students a good idea to use iterative methods.
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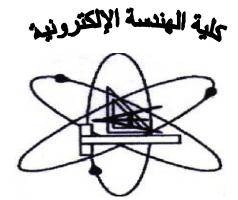
3- Intended Learning Outcomes: ARS		Course ILOs
A- Knowledge and Understanding:	<p>A.1. Explain concepts and theories of mathematics and sciences, appropriate to the Engineering Mathematics (2).</p> <p>A.5. Demonstrate methodologies of solving engineering problems, data collection and interpretation.</p>	<p>A1.1 Explain concepts and theories of mathematics and sciences, appropriate to Infinite and definite integrals.</p> <p>A1.2 Explain Concepts of Theory of equations.</p> <p>A1.3 Explain Concepts of Algebra of matrices, Inverse matrix, Rank of matrix and Reduced of matrix.</p> <p>A1.4 Explain Concepts of linear algebraic equations.</p> <p>A1.5 Explain Concepts of using iterative methods in solving engineering problems.</p> <p>A5.1 Demonstrate methodologies of solving Infinite and definite integrals problems using Integration by parts.</p> <p>A5.2 Demonstrate methodologies of solving Infinite and definite integrals problems using Integration by substitution.</p> <p>A5.3 Demonstrate methodologies of solving Infinite and definite integrals problems using Integration by partial fractions.</p> <p>A5.4 Demonstrate methodologies of solving engineering problems using Theory of equations by Graphical methods or Newton's method.</p> <p>A5.5 Demonstrate methodologies of solving engineering problems using inverse matrix.</p> <p>A5.6 Demonstrate methodologies of solving engineering problems using linear algebraic equations</p> <p>A5.7 Demonstrate methodologies of solving engineering problems using iterative methods through using Jacobi's method or Gauss-Seidel's method.</p>



B- Intellectual Skills	B.2. Select appropriate solutions for engineering problems based on analytical thinking.	B2.1 Select appropriate solutions for integration problems based on using different methods of integration such as Integration by parts, Integration by substitution, and Integration by partial fractions. B2.2 Select appropriate solutions for a system of linear algebraic equations using Matrices. B2.3 Select appropriate Solution of homogenous and non-homogenous algebraic systems of square equations using Gauss-Jordan method. B2.4 Select appropriate solutions for engineering problems based on analytical using iterative methods.
C- Professional Skills	C.1. Apply knowledge of mathematics to solve engineering problems. C.12. Prepare and present technical reports.	C1.1 Apply knowledge of different Methods of integration to solve Infinite and definite integrals problems. C1.2 Apply knowledge of Theory of equations, and Matrices to solve engineering problems. C1.3 Apply knowledge of linear algebraic equations, and iterative methods to solve engineering problems. C12.1) Prepare and present technical reports about solving engineering problems different Methods of integration. C12.2) Prepare and present technical reports about application of matrices to solve engineering problems. C12.3) Prepare and present technical reports about use of iterative methods to solve engineering problems.
D- General Skills	D.3. Communicate effectively. D.6. Effectively manage tasks, time, and resources. D.7. Search for information and engage in life-long self-learning Mathematics (2).	D3.1) Communicate effectively in tutorial class room with the demonstrator. D6.1) Effectively manages tasks, time, and resources, when solving mathematics problems, and in exams. D7.1) Search for information and engage in life-long self-learning relevant to Matrices, and linear algebraic equations. D7.2) Search for information and engage in life-long self-learning relevant to iterative methods.
4- Course Contents	Calculus of integration: Infinite and definite integrals –Methods of integration - Integration by parts– Integration by substitution – Integration by partial fractions- Application of integrations– Improper integrals. Theory of equations: Fundamental theorem – Relation between roots and the coefficients – Repeated roots – Rational roots – Approximate roots of equations (Graphical methods – Newton's method). Matrices – Algebra of matrices – Inverse matrix – Rank of matrix – Reduced of matrix – Solution of system of equations using inverse matrix – Eigenvalues and Eigenvectors of a matrix. Systems of algebraic equations: Solution of homogenous and non-homogenous algebraic systems of square equations using (Gauss-Jordan method) – Iterative methods for solving algebraic systems of square equations using (Jacobi's method – Convergence conditions – Gauss-seidel's method – Convergence conditions).	



5- Teaching and Learning Methods	<ul style="list-style-type: none"> - Lectures - Tutorials. - Homework Exercises - Reports
6- Teaching and Learning Methods for disable students	<ul style="list-style-type: none"> • Official low cost special classes for developing student skills, arranged by the faculty administration. • Assign a portion of the office hours for those students. • Face-to-face intermediate solving the problems and quizzes during the tutorial • Give them specific tasks. • Repeat the explanation of some of the material at lecture and tutorial times.
7- Student Assessment	
Assessment Methods	<ul style="list-style-type: none"> - Weekly sheet exercises at class room. - Quizzes. - Homework exercises and reports. - Mid-term and final exams.
b- Assessment Schedule	<ul style="list-style-type: none"> - Quiz 1: 5th week. - Mid-term examination: 8th week. - Quiz 2: 10th week. - Final written examination : 16th -17th weeks
c- Weighting of Assessment	<ul style="list-style-type: none"> - Mid-term examination: 17% - Final-term examination: 67% - Semester work /reports/quizzes: <u>16%</u> -Total: 100 %
8- List of text books and references:	
a- Course notes	There are lectures notes on engineering mathematical prepared in the form of a book authorized by the department.
b- Text books	<ul style="list-style-type: none"> 1-R. B. Allenby, "Linear Algebra", Edward Arnold, London Sydney, 1995. 2-F. Chatelin, "Eigenvalues of Matrices", New York: Wiley-Interscience, 1993. 3-E. Kreyszig, "Advanced Engineering Mathematics", 8th ed. New York: John Wiley & sons, 1999. 4- Jim Hefferon, "Linear Algebra", Mathematics, Saint Michael's College Colchester, Vermont USA 05439, 2014
c- Recommended books	<ul style="list-style-type: none"> 1-G. James, D. Burley, P. Dyke, J. Searl, N. Steele and N. Wright, "Advanced Modern Engineering Mathematics", 1993, Addison-wesley. 2- E. Hill, "Analytic Function Theory", 2 Vols. 2nd ed. New York: Chelsea, 1990. 3- Minoresky, "Problems in Higher Mathematics", Mir publisher, Moscow, 1980.
d- Periodicals, Web sites ...etc	Web Sites related to engineering mathematical

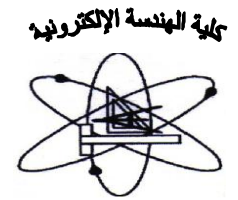


Course contents - ILOs Matrix

Content Topics	Week	A- Knowledge & Understanding	B- Intellectual skills	C- Professional and practical skills	D- General and transferable skills
Calculus of integration , Infinite and definite integrals	1	A1.1			D3.1, D6.1
Methods of integration - Integration by parts– Integration by substitution	2,3	A5.1, A5.2	B2.1	C1.1, C12.1	D3.1, D6.1
Integration by partial fractions- Application of integrations– Improper integrals	4,5	A5.3	B2.1	C1.1, C12.1	D3.1, D6.1
Theory of equations	6-7	A1.2, A5.4		C1.2	D3.1, D6.1
Matrices – Algebra of matrices – Inverse matrix	9	A1.3	B2.2	C1.2	D3.1, D6.1, D7.1
Solution of system of equations using inverse matrix	10-11	A5.5		C1.2, C12.2	D3.1, D6.1, D7.1
Systems of algebraic equations: Solution of homogenous and non-homogenous algebraic systems	12- 13	A1.4, A5.6	B2.3	C1.3	D3.1, D6.1, D7.1
Iterative methods for solving algebraic systems of square equations	14-15	A1.5, A5.7	B2.4	C1.3,C12.3	D3.1, D6.1, D7.2

Teaching and Learning Methods - ILOs Matrix

Teaching and Learning Methods	A- Knowledge & Understanding	B- Intellectual skills	C- Professional and practical skills	D- General and transferable skills
Lectures	A.1, A.5	B.2	C.1	D.3
Tutorials	A.1, A.5	B.2	C.1	D.3,D.6,D.7
Exercises	A.1, A.5	B.2	C.1	D.6,D.7
Reports and assignments	A.1, A.5	B.2	C.1,C.12	D.6,D.7



Assessment Methods - ILOs Matrix

Assessment Methods	A- Knowledge & Understanding	B- Intellectual skills	C- Professional and practical skills	D- General and transferable skills
Weekly sheet exercises	A.1, A.5	B.2	C.1	D.3,D.6,D.7
Reports	A.1, A.5	B.2	C.1	D.6,D.7
Quizzes	A.1, A.5	B.2	C.1	D.6
Midterm, and Final Written exams	A.1, A.5	B.2	C.1	D.6

Authorized from department board at 15/05/2016

Authorized from college board at 05/06/2016

Course coordinator:

Dr. H.M. Abdelhafez

Head of Department:

Prof. Fathi El-Sayed Abd El-Samie