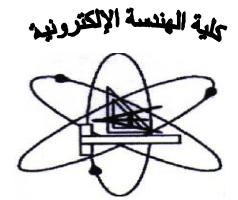


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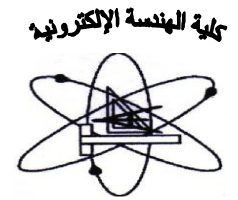


Department offering the program: Electronics and Electrical Communications
Department offering the course: Physics and Engineering Mathematics

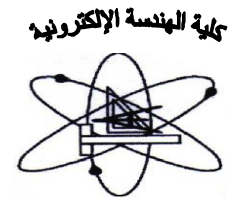
Course Specification

1- Course basic information :			
Course Code: PME 011 Department requirement	Course Title: Mathematics (1)	Academic years: 2015-2016 Level (0) – Semester : 1 st	
Field: Mathematics and Basic Science	Teaching hours: Lecture	3	Tutorial 2 lab 0

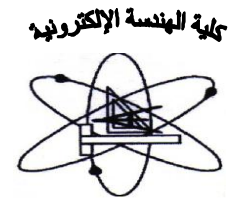
2- Course Objectives	<ol style="list-style-type: none">1. To introduce students to Calculus of differentiation and Classifications of functions.2. To provide students with concepts of Functions, Limits, and Continuity.2. To teach students First and Higher partial derivatives.3. To provide students with engineering applications on partial differentiation.4. To enhance students ability to demonstrate Analytical geometry, Conical sections and Quadratic surfaces.5. To enhance students ability to understand Convergent and divergent of Infinite and Power series.
3- Intended Learning Outcomes: ARS	Course ILOs



A- Knowledge and Understanding	<p>A1. Explain concepts and theories of mathematics and sciences, appropriate to mathematics (1).</p> <p>A5. Demonstrate methodologies of solving engineering problems, data collection and interpretation</p>	<p>A1.1 Explain concepts and Theorems of limits, Cauchy theorem and L'Hopital rule.</p> <p>A1.2 Explain concepts of functions and Continuity.</p> <p>A1.3 Explain concepts and theories of differentiation Roll's theorem – Mean value theorem and Taylor theorem.</p> <p>A1.4 Explain concepts of Analytical geometry, and Series.</p> <p>A5.1 Demonstrate methodologies of solving engineering problems using concepts of limits.</p> <p>A5.2 Demonstrate methodologies of solving engineering problems using differential calculus and higher derivatives.</p> <p>A5.3 Demonstrate methodologies of solving multiple variable functions problems using First and Higher partial derivatives.</p> <p>A5.4 Demonstrate methodologies of solving Conical sections, Parabola, Ellipse, Hyperbolic and Quadratic surfaces problems using Analytical geometry.</p> <p>A5.5 Demonstrate methodologies of solving engineering problems with Infinite and power series.</p>
B- Intellectual Skills	<p>B.2 Select appropriate solutions for engineering problems based on analytical thinking.</p>	<p>B2.1 Select appropriate solutions for Limits, and continuity engineering problems based on analytical thinking.</p> <p>B2.2 Select appropriate solutions for differential engineering problems based on analytical thinking.</p> <p>B2.3 Select appropriate solutions for multiple variable functions problems based using First and Higher partial derivatives.</p> <p>B2.4 Select appropriate solutions for Conical sections, Parabola, Ellipse, Hyperbolic and Quadratic surfaces problems using Analytical geometry.</p> <p>B2.5 Select appropriate solutions for engineering problems based on analytical thinking using Infinite and power series.</p>
C- Professional Skills	<p>C.1 Apply knowledge of mathematics to solve engineering problems.</p> <p>C.12 Prepare and present technical reports.</p>	<p>C1.1 Apply knowledge of mathematics to solve limits, and Continuity problems</p> <p>C1.2 Apply knowledge of mathematics to solve differential problems.</p> <p>C1.3 Apply knowledge of First and Higher partial derivatives to solve multiple variable functions problems</p> <p>C1.4 Apply knowledge of Analytical geometry to solve Conical sections, Parabola, Ellipse, Hyperbolic and Quadratic surfaces problems.</p> <p>C12.1 Prepare and present technical reports on methodologies of solving engineering problems using complete and partial derivatives techniques.</p>



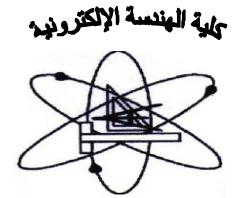
D- General Skills	D.3 Communicate effectively.	D3.1 Communicate effectively in tutorial class room with the demonstrator.
	D.6 Effectively manage tasks, time, and resources.	D6.1 Effectively manages tasks, time, and resources, when solving mathematics problems, and in exams.
	D.7 Search for information and engage in life-long self-learning Mathematics (1).	D7.1 Search for information and engage in life-long self-learning relevant to differential Calculus, and Higher Derivatives. D7.2 Search for information and engage in life-long self-learning relevant to Analytical geometry techniques.
4- Course Contents	<p>Calculus of differentiation: Classifications of functions – Limits of functions – Theorems of limits (Cauchy theorem – L'Hopital rule) – Continuity of functions – Types of discontinuity – Smooth function – Trigonometric functions and its inverse Exponential function – Logarithmic function – Hyperbolic functions and its inverse – Differentiation of functions (First and Higher derivatives) Differentiation study of (Exponential functions – Logarithmic functions Trigonometric functions, Hyperbolic functions and their inverse) Applications of differentiation (Roll's theorem – Mean value theorem) Taylor theorem (Taylor and Maclurin expansion of functions).</p> <p>Partial differentiation: Multiple variable functions – First and Higher partial derivatives of multiple variable functions – Complete differentiation and Chain rule – Extrema and Lagrange multiplier – Engineering application on partial differentiation.</p> <p>Analytical geometry: Conic sections (Parabola – Ellipse – Hyperbolic) – Quadratic surfaces.</p> <p>Infinite series: Infinite series – Convergent and divergent series – Tests of convergence and divergence series – Power series – Radius and interval of convergence of a power series.</p>	
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 tutorials. • Give them specific tasks. • Repeat the explanation of some of the material at lecture and tutorial times. 	
7- Student Assessment		
a- 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	- Quiz 1: 5th week. - Mid-term examination: 8th week. - Quiz 2: 10th week. - Final written examination : 16th -17th weeks
c- Weighting of Assessment	- Mid-term examination: 16% - Final-term examination: 67% - Semester work /reports/quizzes: 17% -Total: 100 %
8- List of text books and references:	
a- Course notes	There are lectures notes prepared in the form of a book authorized by the department
b- Text books	[1] Emil Shoukralla, Real valued functions with differentiation and integration calculus, Publishing for universities – Cairo [Arabic edition], 2010.
c- Recommended books	[1] J. Stewart: Calculus: Concepts & Contexts. Cengage Learning, 4th edition (2009).
d- Periodicals, Web sitesetc	Web Sites related to Mathematics and Mathematical engineering such as: www.math.hmc.edu , www.tutorial.math.lamar.edu , www.web.mit.edu

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 differentiation: Classifications of functions – Limits of functions – Theorems of limits	1-2	A1.1, A5.1	B2.1	C1.1	D3.1, D6.1, D7.1
Continuity of functions – Types of discontinuity – Smooth function	3	A1.2	B2.1	C1.1	D3.1, D6.1
Trigonometric Functions - Exponential and Logarithmic Functions- Hyperbolic Functions	4	A1.2			D3.1, D6.1
Differentiation of functions - Applications of differentiation	5-6	A1.3, A5.2	B2.2	C1.2	D3.1, D6.1, D7.1
Partial differentiation– First and Higher partial derivatives of multiple variable functions	7-9	A5.2, A5.3	B2.3	C1.3, C12.1	D3.1, D6.1, D7.1
Complete differentiation and Chain rule – Extrema	10-11	A5.2	B2.2	C1.2, C12.1	D3.1, D6.1, D7.1



and Lagrange multiplier – Engineering applications on partial differentiation					
Analytical geometry: Conic sections (Parabola – Ellipse – Hyperbolic) – Quadratic surfaces	12-13	A1.4, A5.4	B2.4	C1.4	D3.1, D6.1, D7.2
Infinite series– Convergent and divergent series– Power series – Radius and interval of convergence of a power series	14-15	A1.4, A5.5	B2.5		D3.1, D6.1

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, C.12	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:

Prof. Dr. Saied El-Serafi

Head of Department

Prof. Fathi El-Sayed Abd El-Samie

