



جامعة بنها  
كلية الهندسة بشبرا  
قسم الطاقة و الطاقة المستدامة



## COURSE SPECIFICATION

### 1- Course Data

<b>Course Title</b>	Engineering Mathematics (1)	Code: EMP 101
<b>Academic year / Semester</b>	2014 / 2015, First semester	
<b>Program on which the course is given</b>	Energy and Sustainable Energy	
<b>Major or Minor element of program</b>	Major	
<b>Prerequisites</b>	None	
<b>Credit hours</b>	3	
<b>Contact hours per week</b>	Lecture: 2 Hours	Tutorials: 2 Hours

### 2- Course Aims

- To provide the students essential information and fundamentals of Differential and Integral Calculus and their applications in engineering.
- To teach the students essential information of algebra, matrices, linear systems and their applications in engineering.
- To apply mathematical techniques for modeling, solving and analyzing real problems.

### 3- Intended Learning Outcome (ILOs)

<b>a- Knowledge and understanding</b>	a1- Identify theories and fundamentals of mathematics. a2- Define mathematical methods for solving problems. a3- Outline mathematical techniques for modeling real problems.
<b>b- Intellectual Skills</b>	b1- Analyze mathematical problems and categorize them. b2- Solve practical problems using mathematical methods. b3- Make mathematical models to real problems in the light of available data and information.
<b>c- Professional and Practical Skills</b>	c1- Apply mathematical logic and techniques for solving real life problems c2- Diagnose solutions to real life problems. c3- Prepare professional reports via mathematical logic.
<b>d- General and Transferable Skills</b>	d1- Communicate effectively using different means. d2- Use information technology for obtaining information. d3- Work in a group and lead a team. d4- Manage time effectively and conduct self learning .

### 4- Contents

Topic	No. of Hours
<b>Differential and integral calculus:</b> Introduction, Elementary functions: polynomial, exponential, logarithmic, trigonometric.	2
Limits and continuity	2
Derivative of elementary functions, higher derivatives	4
Applications: Extreme values, Taylor's expansion, L'Hopital rule.	2
Indefinite integrals, Integrals of elementary functions.	4
<b>Algebra:</b> Introduction, matrices, algebra of matrices, linear independence.	6



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Eigenvalues and eigenvectors.	2
Linear systems	2
Binomial expansion, Partial fractions	2
Complex numbers	2

#### 5- Teaching and Learning Methods for Students with Special Needs

White board, Prepared notes, Data Show.

#### 6- Learning and Teaching Activities

Tools	Intended Learning Outcomes Achieved
Interactive Lectures	ILOs: a1, a2, a3, b1, b2, b3, c1, c2, c3.
Tutorials	ILOs: b1, b2, b3, c1, c2, c3.
Assignments and Homework	ILOs: d1, d2, d3, d4.

#### 7- Student Assessment

##### Assessment Strategy

Tools	Intended Learning Outcomes Achieved
Quizzes	ILOs: a1, a2, b1, b2, c1, c2.
Written Exams	ILOs: a1, a2, a3, b1, b2, b3, c1, c2, c3.
Assignments and Homework	ILOs: d1, d2, d3, d4.

##### Assessment Details

Methods of Assessment	Grading Mode	Weighting %	Minimum Pass Mark	Outline Details
Quizzes	5	5 %		Weeks: 4, 10
Assignments	5	5 %		Weeks: 3, 5, 11, 13
Mid-Term Exam	50	50 %		Weeks: 7, 8: 1 hour
Final Exam	40	40 %		Week 15: 2 hours

#### 8- List of References

a- Course Notes	<ul style="list-style-type: none"> <li>Lectures In Mathematic, Differential Calculus, Mohamed H. Eid, Benha Univeristy, 2013.</li> <li>Calculus, Fathi Abdsallam, 2013</li> </ul>
b- Required Books (text books)	<ul style="list-style-type: none"> <li>Calculus, 6<sup>th</sup> Edition, James Stewart, Thomson Brooks / Cole, U.S.A, 2008.</li> <li>The Theory of Matrices, 2<sup>nd</sup> Edition, P.Lancaster and M.Tismenetsky, Academic Press, London, New York, 1985.</li> </ul>
c- Recommended Books	<ul style="list-style-type: none"> <li>Advanced Calculus With Applications In Statistics, 2<sup>nd</sup> Edition, A.I. Khuri, John Wiley &amp; Sons, Inc., New Jersey, 2003.</li> </ul>
d- Periodicals, web sites,...	<p>www.intmath.com www.thomsonrights.com</p>

Course Instructor: Dr. Mohamed Husien Eid

Date: 20 / 9 / 2014

Head of Department: