



## Course Specifications

<b>Program(s) on which this course is given:</b>	Electronics & Electrical Communications Engineering
<b>Major or Minor element of programs:</b>	Major
<b>Department offering the program:</b>	Electronics & Electrical Communications Engineering
<b>Department offering the course:</b>	Mathematics and Engineering Physics
<b>Academic year / Level:</b>	First
<b>Date of original/modified specification approval:</b>	2003/
<b>Semester of course offering:</b>	Second

### A- Basic Information

<b>1.a. Title:</b>	Mathematics (2)			<b>1.b. Code:</b>	MTH 117B			
<b>2. Units/Credit hours per week:</b>	2.a. Lectures	2	2.b. Tutorial	2	2.c. Practical	0	2.d. Total	4

### B- Professional Information

<b>1. Overall Aims of the Course:</b>	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> <li>1. Solve ODEs using power series solutions and classify its type.</li> <li>2. Apply Laplace transform and the inverse Laplace for a given function.</li> <li>3. Use Laplace transforms to obtain the transient response of linear systems.</li> <li>4. Transform any periodic function to its trigonometric or complex Fourier series expansion.</li> </ol>
<b>2. Intended Learning Outcomes of Course (ILOs):</b>	<p><b>a) Knowledge and Understanding</b></p> <ol style="list-style-type: none"> <li>1. Define and describe the basic properties of power series solution of ODEs. (1.1)</li> <li>2. Classify the different types of Frobenius method for solving ODEs.(1.1)</li> <li>3. Transform any linear time dependent function into its equivalent Laplace form. (1.1)</li> <li>4. Explain the main properties of trigonometric series expansion showing the expansion for different kinds of symmetry. (1.1)</li> <li>5. Explain the main properties complex Fourier series expansion. (1.1)</li> </ol> <p><b>b) Intellectual Skills</b></p> <ol style="list-style-type: none"> <li>1. Model any linear electrical system into its equivalent differential equation form. Then, solve this system using Laplace transform. (3.1, 3.9)</li> <li>2. Expand any periodic function into its Fourier series presentation (3.1)</li> </ol> <p><b>c) Professional and Practical Skills</b></p> <ol style="list-style-type: none"> <li>1. Evaluate the transient response for any linear circuit (RLC circuit) (2.1).</li> <li>2. Estimate the poles of any linear control system using Laplace transform and study the stability of such system (2.1).</li> <li>3. Apply Laplace transform to synthesize the response of different systems including different kinds of filters, control systems, electrical systems ...etc (2.1).</li> <li>4. Apply Fourier series to synthesis the response of different systems (2.1).</li> </ol> <p><b>d) General and Transferable Skills</b></p> <ol style="list-style-type: none"> <li>1. Acquire computational skills. (4.2)</li> <li>2. Get acquainted with working in a group.(4.7)</li> <li>3. Acquire communication skills.(4.7)</li> </ol>

### 3. Contents

Topic	Total hours	Lectures	Tutorial/ Practical
Power series solutions of ODEs.	18	10	8
Laplace Transform.	18	10	8

Fourier Series.		14	6	8
Applications		10	4	6
4. Teaching and Learning Methods	Lectures (Y)	Practical Training/ Laboratory (N)		Seminar/Workshop (N)
	Class Activity (Y)	Case Study (N)		Projects (N)
	E-learning (N)	Assignments /Homework (Y)		Other:
5. Student Assessment Methods				
5.a. Method			To assess (with reference to the ILOs)	
• Discussions and reports			c1, c2, c3, c4, d1, d2, d3.	
• Assignments			a1, a2, a3, a4, a5	
• Quizzes			b1, b2	
• Midterm			a1, a2, a3, a4, a5, b1, b2, c1, c2, c3, c4	
• Final			a1, a2, a3, a4, a5, b1, b2, c1, c2, c3, c4	
5.b. Assessment Schedule			Week	
Assessment 1 : Discussion			In every lecture.	
Assessment 2 : Assignments and Quizzes			one per week.	
Assessment 3 : Midterm			8	
Assessment 5 : Final			15	
5.c. Weighting of Assessments				
Assignments and reports			5%	
Quizzes and discussion			10%	
Midterm			15%	
Final			70%	
Total			100 %	
6. List of References				
6.a. Course Notes: Lecturer notes (in English).				
6.b. Essential Books (Text Books)				
• “Mathematics, First Year for Engineering Students”, Department of Engineering Physics & Math.- Faculty of Engineering – Cairo university, 2006.				
6.c. Recommended Books: N/A				
6.d. Periodicals, Web Sites, ... etc: N/A.				
7. Facilities Required for Teaching and Learning				
White board, data show, screen, projector.				
Course Coordinator:	Prof. Dr. Said Rezk Grace			
Head of Department:	Prof. Dr. Ahmad Alaa Aboulsoud			
Date:				