



University: *Fayoum University*  
 Faculty: *Computers and Information*  
 Department: *Computer Science*

**Course Specification**

1- Basic Information			
<b>Code:</b> GEN 121	<b>Course Title:</b> Mathematics (2)	<b>Year/Level:</b> First year – Second term	
<b>Programme:</b> B.Sc degree in Computer Science	<b>Number of units:</b>	<b>Lecture:</b>	4 hrs/ week
		<b>Tutorial:</b>	3 hrs/ week
		<b>Practical:</b>	0 hrs/ week

<b>2- Aims of Course:</b>	1. Introduce the basic concepts of integrals infinite series 2. Understand and develop the basic concepts of Maclaurin and Taylor series and Differential equation.
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3- Intended Learning Outcomes	
<b>A- Knowledge and Understanding:</b>	<p><b>A3- Demonstrate the essential mathematics and physics relevant to computer science.</b></p> <p><b>A7. Demonstrate essential facts, concepts, principles and theories relating to computing and information and computer applications as appropriate to the program of study.</b></p> <p><b>A10. Identify and explain the fundamental concepts principles, and techniques needed for the analysis development, validation, verification, deployment, and operations of computer-based and information systems.</b></p> <p><b>A13. Define the mapping of real-world problems to algorithmic solutions</b></p> <p>a1) Integration by parts, trigonometric integrals                      a2) Substitutions and integrals of rational functions                      a3) Quadratic expressions, tables of integrals and improper integrals                      a4) Sequences, convergent or divergent series                      a5) Positive term series (basic comparison test, limit comparison, Test, ratio and root tests.                      a6) Alternating series and absolute convergence, power series, representations of functions.                      a7) Maclaurin and Taylor series, applications of Taylor polynomials                      a8) Definition , classifications and terminology of differential equations                      a9) Techniques of solution of ordinary first order first degree differential equations.</p>

	<p>a10) Separable, reducible to separable, homogeneous reducible to Homogeneous.</p> <p>a11) Linear diff. equation and exact differential eq.</p> <p>a12) Integrating factor and Bernoulli equation.</p>
<b>B- Intellectual Skills:</b>	<p><b>B1. Analyze real problems, and appropriate problem solving methods that satisfy commercial or industrial constraints and analyze results</b></p> <p><b>B7. Determine goals for problem solving and test the result of the solution of the problems.</b></p> <p>b1) Evaluate some problems</p> <p>b2) Compare between methods of test for convergence series</p> <p>b3) Apply methods for solving different differential equations</p>
<b>C- Professional and Practical Skills:</b>	<p><b>C1. Analyze and improve organizational processes from an ICT perspective.</b></p> <p><b>C8. Deploy appropriate tools for the construction and documentation of computer-based systems that are used to solve practical problems</b></p> <p><b>C11. Develop a range of fundamental research skills that enable the graduate to continuously increase his knowledge, advance his career and pursue graduate studies.</b></p> <p>c1) Being able to solve problem sheets related to the material course.</p> <p>c2) Collect and record data and information from libraries and summarize it in suitable forms.</p> <p>c3) The student would be able to prove and solve different Problems relating to the course material</p>
<b>D- General and transferable Skills</b>	<p><b>D2. Use effective information-retrieval skills (including the use of browsers, search engines and catalogues) and general IT facilities.</b></p> <p><b>D4. Demonstrate independent critical thinking and problem solving skills.</b></p> <p>d1) Graduate should be gain access data and information from the internet related to the course subjects.</p> <p>d2) Graduate should develop self-professional, scientific, and personal attitude towards continuous education.</p> <p>d3) Graduate should be able to cooperate in teams.</p>

<b>4-Course Content:</b>	<ol style="list-style-type: none"> <li>1. Techniques of integration: Integration by parts, trigonometric integrals and substitutions</li> <li>2. Integrals of rational functions and quadratic expressions</li> <li>3. Tables of integrals and improper integrals</li> <li>4. Infinite series: Sequences, convergent or divergent series</li> <li>5. Positive-term series (basic comparison test, limit comparison test, ratio and root tests)</li> <li>6. Alternating series and absolute convergence, power series, power series representations of functions</li> </ol>
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	7. Maclaurin and Taylor series, applications of Taylor polynomials. 8. Differential equations: Definition, classifications and terminology 9. Techniques of solution of ordinary first-order first-degree differential equations (separable, reducible to separable, homogeneous, reducible to homogeneous, linear, reducible to linear, exact differential, and non-exact differential-integrating factor) 10. Applications.
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<b>5- Teaching and Learning Methods:</b>	1. Lectures 2. Tutorials 3. Class discussions 4. Internet searches
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<b>6- Teaching and Learning Methods for handicapped students :</b>	-
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<b>7- Student Assessment</b>	
<b>A- Assessment Methods:</b>	1. Assignments and Quizzes 2. Midterm written exam 3. Oral exam 4. Final written exam
<b>B- Assessment schedule:</b>	Midterm Examination: Week 7 Oral Examination: Week 14 Final Examination: Week 15
<b>C- Weighting of assessments:</b>	Assignments and Quizzes: 0% Mid-Term Examination: 16% Oral Examination: 8% Final-term Examination: 76%

<b>8- Books and References</b>	
<b>A- Notes:</b>	-
<b>B- Essential Books (Text Books):</b>	AP calculus AB & BC 2016 by Tamara Lefcourt Ruby; Kaplan Publishing (2015)
<b>C- Recommended Books:</b>	-
<b>D- Periodicals, Web sites, ... etc</b>	-

**Course Professor: Dr. Esha Essawy Department Head: Dr. Amira Edress**

**Course Content Intended Learning Outcomes Matrix**

**Course Title:** Mathematics (2)

**Course Code:** GEN 121

Course Content	Week	Knowledge & Understanding												Intellectual Skills			Professional & Practical Skills			General & Transferable Skills					
		a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	b1	b2	b3	c1	c2	c3	d1	d2	d3			
1. Techniques of integration: Integration by parts, trigonometric integrals and substitutions	1	x	x													x			x	x	x	x	x	x	x
2. Integrals of rational functions and quadratic expressions	2		x	x												x			x	x	x	x	x	x	x
3. Tables of integrals and improper integrals	3			x												x			x	x	x	x	x	x	x
4. Infinite series: Sequences, convergent or divergent series	4				x											x	x		x	x	x	x	x	x	x
5. Positive-term series (basic comparison test, limit comparison test, ratio and root tests)	5					x										x	x		x	x	x	x	x	x	x
6. Alternating series and absolute convergence, power series, power series representations of functions	6						x									x	x		x	x	x	x	x	x	x
7. Maclaurin and Taylor series, applications of Taylor polynomials.	7							x								x	x		x	x	x	x	x	x	x
8. Differential equations: Definition, classifications and terminology	8								x							x		x	x	x	x	x	x	x	x
9. Techniques of solution of ordinary first-order first-degree differential equations (separable, reducible to separable, homogeneous, reducible to homogeneous, linear, reducible to linear, exact differential, and non-exact differential-integrating factor)	9:10												x	x	x	x	x								
10. Applications.	11	x	x	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x

Course coordinator: Dr. Esha Essawy

Head of Department: Dr. Amira Edress