

SUBJECT PROGRAM

I. SUBJECT IDENTIFICATION.

Subject: Mathematics III		Acronym: MAT 023	Approval date 03/12/2013		
UTFSM Credits: 4	Prerequisites: MAT 022	Exam: Does not have	Faculty.		
SCT Credits: 7			Mathematics Department		
Weekly Lecture Hours: 4.5	Weekly Assistantship Hours: 1.5	Weekly Laboratory Hours: 0	Semester in which it is taught		
			Odd	Even	Both X
Formative axis: Basic Engineering Sciences					
Total time dedicated to the subject:					

Subject Description

Practical theoretical subject of an intermediate nature that, based on an introduction to linear transformations, provides the fundamental concepts of differential calculus in several variables, ordinary differential equations, series, and Fourier transforms.

Entry requirements

- Handle the basic concepts of differential and integral calculus of real functions of a real variable.
- Handle operations with matrices.
- Manage operations with sequences and series.

Contribution to the graduation profile

<b>SPECIFIC COMPETENCES</b> Apply mathematical knowledge of differential calculus in several variables and differential equations, in the modeling of scientific and technological problems and in the search for their respective alternative solutions. <b>GENERAL/TRANSVERSAL//DISTINCTIVE COMPETENCES</b> Collaborate in the search for solutions to real problems in interdisciplinary work contexts.
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Learning Results that are expected to be achieved in this subject.

1. Relate the main concepts and properties of the algebra of linear transformations with matrix algebra and differential calculus in several variables.
2. Use the fundamental concepts and results of differential calculus in several variables.
3. Solve equations and systems of ordinary differential equations.
4. Qualitatively analyze the solutions of equations and systems of ordinary differential equations.
5. Translate certain types of real interdisciplinary problems in terms of ordinary differential equations.
6. Analyze the feasibility of applying differential calculus theorems in several variables to real problems from different disciplinary areas.
7. Analyze the feasibility of applying theorems of the differential calculus of real functions in a real variable to real problems coming from different disciplinary areas.

Thematic contents

1. Linear transformations. 2. Functions of several variables. 3. First order differential equations. 4. High order differential equations. 5. Laplace transform. 6. Fourier integral and series.
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Teaching and learning methodology.

<ul style="list-style-type: none"> <li>Expository classes combined with cooperative learning techniques.</li> <li>Experimentation with short teaching-learning cycles.</li> <li>Exercise guides with notes from the Mathematics Department and use of appropriate software.</li> </ul>
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Evaluation and grading of the subject. (Adjusted to Institutional Regulations-Regulation No. 1)

Approval requirements and qualification	<p>Exams (3), Controls (6)</p> <p>Notation: Presentation Note (NP), Contest Note 1 (C1), Contest Note 2 (C2), Contest Note 3 (C3), Global Contest Note (E), Average Controls Note (the five with the best grades)(PC) , Final Note of the course (NF).</p> <p>Presentation note (NP)</p> <div> <math display="block">NP=0.80* [(C1+C2+C3)/3] + 0.20*PC</math> </div> <ul style="list-style-type: none"> <li>If <math>NP \geq 55</math> or if <math>NP &lt; 45</math>, then <math>NF=NP</math>.</li> <li>If <math>45 \leq NP &lt; 55</math>, then the student must take the Global Competition and it is calculated:</li> </ul> <div> <math display="block">NF=0.7*NP+0.3*E</math> </div>
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Resources for learning. Bibliography:

Guide Texts	<ul style="list-style-type: none"> <li>KREYSZIG E. “Advanced mathematics for engineering. Volume I and II”, Editorial Limusa, 1994.</li> <li>STEIN S. and BARCELLOS A. “Calculus and Analytical Geometry” Volume I and II McGraw Hill Publishing, 1995.</li> </ul>
Complementary or Optional	<ul style="list-style-type: none"> <li>KREIDER D., KULLER R., OSTBERG D., “Differential Equations”, Inter-American Development Fund Editorial, 1973.</li> <li>STEWART J. “Calculus.” Ibero-American Editorial Group 1994.</li> <li>MARDSDEN J., TROMBA A.. “Vector calculus.” Adisson Wesley Publishing 1986.</li> <li>EDWARDS C., PENNEY D., “Calculus with Analytical Geometry.” Prentice Hall Publishing House 1994. Fourth Edition.</li> <li>THOMAS G., FINNEY R. “Calculus with Analytical Geometry”, Adisson-Wesley Publishing House 1987. Sixth Edition.</li> </ul>

CALCULATION OF NUMBER OF HOURS OF DEDICATION - (SCT-Chile) - SUBJECT SUMMARY TABLE.

ACTIVITY	Number of hours of dedication		
	Number of hours by	Number of Total	number of weeks hours
PRESENCE			
Lecture or theoretical classes	4.5	17	76.5
Assistantship/Exercises	1.5	17	25.5
Industrial visits (Field)			
Laboratories / Workshop			
Evaluations (exams, others)	1.5	3	4.5
Other (Specify) Controls	0.75	6	4.5
NO PRESENCE			
Assistantship			
Mandatory tasks			
Personal Study (Individual or group)	6	17	102
Others (specify)			
TOTAL (HOURS)			213
Total number of TRANSFERABLE CREDITS			7