

## 390231 - MAT - Mathematics

Coordinating unit:	390 - ESAB - Barcelona School of Agricultural Engineering		
Teaching unit:	749 - MAT - Department of Mathematics		
Academic year:	2019		
Degree:	BACHELOR'S DEGREE IN LANDSCAPE ARCHITECTURE (Syllabus 2019). (Teaching unit Compulsory)		
ECTS credits:	6	Teaching languages:	Catalan

### Teaching staff

Coordinator:	Blanco Abellan, Monica
Others:	Montoro Lopez, Maria Eulalia

### Degree competences to which the subject contributes

#### Specific:

CE-PS-19. (ENG) Resolver problemas matemáticos que puedan plantearse en la ingeniería. Aplicar los conocimientos sobre: álgebra lineal; geometría; ecuaciones lineales.

### Learning objectives of the subject

The course Mathematics addresses general formative purposes. It aims to generate learning skills and to promote the assessment of the power and usefulness of mathematical models and procedures, in order to understand and to make decisions in the techno-scientific area. Mathematics plays a fundamental role in helping to understand the techno-scientific environment and to deal with it in an autonomous and creative way. As in all the areas of mathematics, systematic and constant work, accurate reasoning and interpretation, and abstraction will be enhanced throughout the teaching-learning process. By the end of the course the student will be able to carry out logical reasoning, to develop analytical and critical thinking, to evaluate arguments rigorously and to communicate them effectively. Students will achieve fundamental concepts connected with linear algebra and geometry, and their applications to drawing, graphical expression and projects. Regarding the area of programming and applications students will use worksheets and specific programs to solve complex mathematical problems.

### Study load

Total learning time: 150h	Hours large group:	40h	26.67%
	Hours small group:	20h	13.33%
	Self study:	90h	60.00%

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### Content

<p>Linear Algebra</p>	<p>Learning time: 36h Theory classes: 10h Laboratory classes: 6h Self study : 20h</p>
<p>Description:</p> <ol style="list-style-type: none"> <li>1. Matrix algebra.</li> <li>2. Determinants.</li> <li>3. Systems of linear equations.</li> <li>4. Inequalities.</li> </ol> <p>Related activities:</p> <p>Activity 1: Lectures. Activity 2: Individual written test. Activity 3: Problem and exercise solving. Activity 4: Computer Lab Sessions. Activity 5: Questionnaires.</p>	
<p>Real functions of real variable</p>	<p>Learning time: 46h Theory classes: 10h Laboratory classes: 6h Self study : 30h</p>
<p>Description:</p> <ol style="list-style-type: none"> <li>1. Functions: types and graphs.</li> <li>2. Limits and continuity.</li> <li>3. Derivatives.</li> <li>4. Optimization.</li> <li>5. Antiderivatives.</li> <li>6. Areas and volumes.</li> </ol> <p>Related activities:</p> <p>Activity 1: Lectures. Activity 2: Individual written test. Activity 3: Problem and exercise solving. Activity 4: Computer Lab Sessions. Activity 5: Questionnaires.</p>	

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<p>Analytic Geometry</p>	<p>Learning time: 40h Theory classes: 14h Laboratory classes: 6h Self study : 20h</p>
<p>Description:</p> <ol style="list-style-type: none"> <li>1. Plane Geometry. Lines in plane.</li> <li>2. Lines and planes in space.</li> <li>3. Incidence relations in space.</li> <li>4. Euclidean space. Vector product and scalar product.</li> <li>5. Distance.</li> <li>6. Conic Sections.</li> <li>7. Quadric surfaces.</li> </ol> <p>Related activities:</p> <p>Activity 1: Lectures. Activity 2: Individual written test. Activity 3: Problem and exercise solving. Activity 4: Computer Lab Sessions. Activity 5: Questionnaires.</p>	
<p>Trigonometry. Trigonometric functions</p>	<p>Learning time: 28h Theory classes: 6h Laboratory classes: 2h Self study : 20h</p>
<p>Description:</p> <ol style="list-style-type: none"> <li>1. Trigonometry.</li> <li>2. Trigonometric functions.</li> <li>3. Inverse trigonometric functions.</li> <li>4. Trigonometric identities.</li> </ol> <p>Related activities:</p> <p>Activity 1: Lectures. Activity 2: Individual written test. Activity 3: Problem and exercise solving. Activity 4: Computer Lab Sessions. Activity 5: Questionnaires.</p>	

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### Planning of activities

ACTIVITY 1. LECTURES	Hours: 97h Theory classes: 38h Self study: 59h
ACTIVITY 2. INDIVIDUAL WRITTEN TEST	Hours: 2h Theory classes: 2h
<p>Description: Midterm written exam. Final written exam.</p> <p>Support materials: Calculator. One formulae sheet.</p>	
ACTIVITY 3. EXERCISES AND PROBLEM SOLVING	Hours: 20h Laboratory classes: 10h Self study: 10h
<p>Support materials: Course material available in Atenea.</p>	
ACTIVITY 4. COMPUTER LAB SESSIONS	Hours: 15h Self study: 5h Laboratory classes: 10h
<p>Support materials: Course material available in Atenea.</p>	
ACTIVITY 5: QUIZZES	Hours: 16h Self study: 16h
<p>Support materials: Quizzes - virtual campus Atenea.</p>	

### Qualification system

- N1: The continuous assessment will be developed mainly in the context of small groups and computer lab sessions.  
 N2: There will be several questionnaires throughout the course.  
 N3: There will be a mid-semester written exam.  
 N4: There will be a final (global) written exam at the end of the semester.

$$\text{Final Mark} = 0.20 N1 + 0.05 N2 + 0.30 N3 + 0.45 N4$$

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### Bibliography

#### Basic:

Agnew, Michael L. Mathematics for the green industry : essential calculations for horticulture and landscape professionals. New Jersey: John Wiley & Sons, cop. 2008. ISBN 9780470136720.

Alsina, Claudi; García Roig, Jaume Lluís; Jacas Moral, Joan. Temes clau de geometria. Barcelona: Universitat Politècnica de Catalunya, DL 1992. ISBN 8476531974.

Burgos Román, Juan de. Álgebra lineal y geometría cartesiana. 2a ed. Madrid: McGraw-Hill, 2000. ISBN 8448124375.

Estela Carbonell, M. Rosa. Fonaments de càlcul [on line]. Barcelona: Edicions UPC, 2003 Available on: <<http://hdl.handle.net/2099.3/36637>>. ISBN 848301713X.

Pelayo Melero, Ignacio M.. Álgebra lineal básica para ingeniería civil. Barcelona: Edicions UPC, 2008. ISBN 9788483019610.

#### Complementary:

Alsina, Claudi; Trillas, Enric. Lecciones de álgebra y geometría : curso para estudiantes de arquitectura. Barcelona: Gustavo Gili, 1984. ISBN 8425211875.

Estela Carbonell, M. Rosa; Saà Seoane, Joel. Cálculo con soporte interactivo en Moodle. Madrid: Pearson Educación, 2008. ISBN 9788483224809.

Larson, Ron; Hostetler, Robert P; Edwards, Bruce H; Heyd, David E; Abellanas, Lorenzo. Cálculo y geometría analítica. 6a ed. Madrid [etc.]: McGraw-Hill, cop. 1999. ISBN 8448123549.