

Course title:	Geometry for Engineers	Course code:	CE01_UM3
Credits:	5	Work load (hours):	130
Course level:	Undergraduate <input checked="" type="checkbox"/>	Graduate	<input type="checkbox"/>
Course type:	Mandatory <input checked="" type="checkbox"/>	Selective	<input type="checkbox"/>
Course category:	Basic <input checked="" type="checkbox"/>	Orientation	<input type="checkbox"/>
Semester:	1 st	Hours per week:	4
Course objectives (capabilities pursued and learning results):			
The course content covers Stereometry, and Analytic Geometry in two and three dimensions. Starting with a combination of rigorous proofs and applications of propositions of three-dimensional Euclidean geometry, the student develops the necessary geometrical feeling and insight for three-dimensional space and the geometric objects (such as planes and lines, dihedral and solid angles, and several kinds of polyhedra as well as their measurement) in it. In the second part of the course, the student is familiarized with the geometry of vectors and coordinates as well as the algebraic representation and study of geometric objects in two and three dimensions.			
Prerequisites:			
High-school Euclidean Geometry			

Instructor's data:

Name:	Theophanes Grammenos
Level:	Ass. Professor
Office:	
Tel. - email:	24210-74152, thgramme@civ.uth.gr
Other tutors:	---

Specific course information:

Week No.	Course contents	Hours	
		Course attendance	Preparation
1	Stereometry Axioms of three-dimensional Euclidean geometry, relative positions of planes and lines in space, skew lines	4	3
2	Parallel and perpendicular lines in space, Thales' theorem in space, theorem of the three perpendiculars	4	3
3	Distance of a point to a plane, distance between planes, projection of points and lines onto planes, relative position of three planes	4	3
4	Dihedral angles, trihedral and solid angles, convex and non-convex polyhedra	4	3

5	Prism, parallelepiped, cube, tetrahedron, pyramid, truncated pyramid, measurements	4	3
6	Regular polyhedra, Platonic solids, Euler's theorem, cylinder, cone, truncated cone, measurements	4	3
7	Sphere, relative positions of lines and planes to a sphere, measurements	4	3
8	Analytic geometry <u>Vector calculus</u> : vectors, dot product, cross product, mixed and double cross product, triple product, vectors in the plane	4	3
9	<u>Determination of a point in space</u> : position vector and coordinates, change of coordinate system, metric properties through coordinates	4	3
10	<u>Line in the plane</u> : vector equation, Cartesian equation, parametric equation, relations between lines, bundle of lines, angle between lines, distance of a point to a line, orientation of a plane relative to a line	4	3
11	<u>Line and plane in space</u> : vector equations, Cartesian equations, parametric equations, relative positions of planes, axial and central bundles of lines, distance of a point to a plane, angles between planes and lines, skew lines	4	3
12	<u>Circle and sphere</u> : Cartesian equation of circle, tangent line, poles, parametric equation of circle, Cartesian equation of sphere, tangent plane	4	3
13	<u>Conic sections</u> : general equation of conic sections, tangent to a conic section, ellipse, hyperbola, parabola, parametric equations of conic sections	4	3
14	<u>Polar coordinates</u> : general properties, line, circle, conic sections	4	3

Additional hours for:			
Class project	Examinations	Preparation for examinations	Educational visit
	3	15	

Suggested literature:

<ol style="list-style-type: none"> 1. Andreadakis St., <i>Analytic Geometry</i> 2. Xenos Th., <i>Analytic Geometry</i> 3. Georgiou D., Iliadis St., <i>Analytic Geometry</i> 4. Togas P., <i>Theoretical Geometry</i> 5. Tsintsifas G., Ballis S., <i>Geometry</i>, vol.3 6. Argyropoulos I., Vlamos P., <i>Euclidean Geometry</i>
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Teaching method (<i>select and describe if necessary - weight</i>):		
Teaching	<input checked="" type="checkbox"/> Use of Whiteboard and Projector (for notes in electronic format). Use of University of Thessaly's eclass webpage for uploading teaching material, related web links, briefing, and communication with students	80%
Seminars	<input type="checkbox"/>%
Demonstrations	<input type="checkbox"/>%
Laboratory	<input type="checkbox"/>%
Exercises	<input checked="" type="checkbox"/>	20%
Visits at facilities	<input type="checkbox"/>%
Other (<i>describe</i>):	<input type="checkbox"/>%
Total		100%

Evaluation method (<i>select</i>)- weight :				
	<u>written</u>	<u>%</u>	<u>Oral</u>	<u>%</u>
Homework	<input checked="" type="checkbox"/>	10%	<input type="checkbox"/>	
Class project	<input type="checkbox"/>		<input type="checkbox"/>	
Interim examination	<input checked="" type="checkbox"/>	10%	<input type="checkbox"/>	
Final examinations	<input checked="" type="checkbox"/>	80%	<input type="checkbox"/>	
Other (<i>describe</i>):	<input type="checkbox"/>		<input type="checkbox"/>	