



# UNIVERSITÀ DEGLI STUDI DI PALERMO

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| DEPARTMENT              | Architettura                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                  |
| ACADEMIC YEAR           | 2018/2019                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                  |
| MASTER'S DEGREE (MSC)   | ARCHITECTURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                  |
| INTEGRATED COURSE       | MATHEMATICS 1 AND 2 - INTEGRATED COURSE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                  |
| CODE                    | 18528                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |                  |
| MODULES                 | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                  |
| NUMBER OF MODULES       | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                  |
| SCIENTIFIC SECTOR(S)    | MAT/05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |                  |
| HEAD PROFESSOR(S)       | DI PIAZZA LUISA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Professore Ordinario | Univ. di PALERMO |
| OTHER PROFESSOR(S)      | CAPONETTI DIANA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Professore Associato | Univ. di PALERMO |
|                         | DI PIAZZA LUISA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Professore Ordinario | Univ. di PALERMO |
| CREDITS                 | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                  |
| PROPAEDEUTICAL SUBJECTS |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                  |
| MUTUALIZATION           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                  |
| YEAR                    | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                  |
| TERM (SEMESTER)         | Annual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |                  |
| ATTENDANCE              | Not mandatory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                  |
| EVALUATION              | Out of 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                  |
| TEACHER OFFICE HOURS    | <p><b>CAPONETTI DIANA</b><br/> Friday 9:30 11:30 DMI-Via Archirafi 34-II piano-Studio 221. PROSSIMO RICEVIMENTO VENERDI' 24 MAGGIO. Necessaria la prenotazione via portale. Tramite e-mail, si puo' richiedere un appuntamento in giorni ed orari differenti da quelli previsti. Students can book an appointment by the web page, and by e-mail they can agree for an appointment in a different day or time.</p> <p><b>DI PIAZZA LUISA</b><br/> Monday 12:00 13:00 Dipartimento di Matematica e Informatica, via Archirafi 34<br/> Wednesday 12:00 13:00 Dipartimento di Matematica e Informatica, via Archirafi 34<br/> Thursday 12:00 13:00 Dipartimento di Matematica e Informatica, via Archirafi 34</p> |                      |                  |

**DOCENTE:** Prof.ssa LUISA DI PIAZZA

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| <b>PREREQUISITES</b>      | Knowledge of numerical sets. Powers and their properties, logarithms and their properties. Fundamentals of algebra. Solving equations and inequalities of the first and second degree. Elements of analytic geometry in the plane. Fundamentals of trigonometry.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>LEARNING OUTCOMES</b>  | <p>Knowledge and Understanding:<br/>The student must know the basic concepts of linear algebra, geometry and mathematical analysis.</p> <p>Applying Knowledge and Understanding:<br/>The student must acquire the ability to use the mathematical methods and tools presented in the course for mathematical formalization of problems and mathematical models.</p> <p>Making Judgement:<br/>The student must be able to analyze the data of a problem and identify the mathematical tools to solve it.</p> <p>Communication Skill:<br/>The student must be able to express mathematical concepts in a correct and complete way.</p> <p>Learning Skills:<br/>The student must be able to acquire and develop independently information contained in written texts with formalized and scientific language.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>ASSESSMENT METHODS</b> | <p><b>FINAL EXAM:</b><br/>Final exam consists of a written and oral test. The written test regards the resolution of exercises (3/4 exercises and two open choice questions for each modulo) concerning the main topics covered in the course. The written test will evaluate the acquired computing capacity, the degree of knowledge of the definitions and concepts presented in the course and the ability of the students to apply them independently. The oral test consists of the discussion of the topics of the written test and of an interview concerning the main results presented in the course. The oral test will also allow to evaluate the achievement of properties of language and reasoning skills.</p> <p><b>INTERMEDIATE WRITTEN TESTS:</b><br/>During each module there will be a midterm and a final test, not compulsory but recommended, reserved to students attending the module, whose positive outcome can replace, in whole or in part, the written test of the final exam. Each midterm and final test consists in two exercises and a multiple choice question.</p> <p><b>FINAL ASSESSMENT:</b><br/>The final assessment, properly graded, will be made on the basis of following criteria:<br/>Rating: Excellent: 30-30 cum laude. Outcome: in-depth knowledge of the topics, excellent properties of language and analytical skill, the student is able to apply independently the knowledge to solve the proposed problems.<br/>Rating: Very good: 26-29. Outcome: in-depth knowledge of the topics, good mathematical language; the student is able to apply the knowledge to solve the proposed problems.<br/>Rating: Good. Rating: 24-25. Outcome: good knowledge of the main topics and properties of language, the student has a fairly good capacity to apply the knowledge to solve the proposed exercises.<br/>Rating: Satisfactory. Rating: 21-23. Outcome: basic knowledge of the main topics and sufficient command of the language, the student has a limited capacity of apply the knowledge independently, is able to solve basic exercises.<br/>Rating: Sufficient. Rating: 18-20. Outcome: acceptable knowledge of the proposed topics and acceptable command of the language, the student has a limited capacity of apply the knowledge independently, is able to solve standard exercises.<br/>Rating: Unsufficient: &lt;18. Outcome: inadequate knowledge of the contents of the course topics; the student is not able to solve the proposed exercises.</p> |
| <b>TEACHING METHODS</b>   | The course consists of two modules, Mathematics module 1 (6 credits) and Mathematics module 2 (6 credits), which take place, respectively, in the first and in the second semester of the first year of the degree course. Didactic activity is based on lectures and exercises delivered in classroom                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**MODULE  
MATHEMATICS - MODULE 1**

*Prof.ssa DIANA CAPONETTI*

**SUGGESTED BIBLIOGRAPHY**

P. Marcellini, C. Sbordone, Calcolo, Liguori Editore, Napoli.  
M. Bramanti, C. Pagani, S. Salsa, Matematica, Ed. Zanichelli, Bologna.  
P. Marcellini, C. Sbordone, Esercitazioni di Matematica, 1° volume, parte prima e parte seconda, Liguori Editore, Napoli.

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|-------------------------------|-------------------------------------------------|
| <b>AMBIT</b>                  | 50661-Discipline matematiche per l'architettura |
| <b>INDIVIDUAL STUDY (Hrs)</b> | 84                                              |
| <b>COURSE ACTIVITY (Hrs)</b>  | 66                                              |

**EDUCATIONAL OBJECTIVES OF THE MODULE**

This module aims to enable the student to acquire the fundamental concepts of linear algebra, geometry in the Euclidean spaces  $R^n$  and single-variable calculus. The module tends to let the student acquire computational facilities and geometric intuition with regard to vectors and matrices and computational techniques of differentiation and integration. This module encourages the student to develop the key skills and confidence in the use of mathematical approaches in solving problems.

**SYLLABUS**

| <b>Hrs</b> | <b>Frontal teaching</b>                                           |
|------------|-------------------------------------------------------------------|
| 4          | Numerical sets and real functions. Basic trigonometry.            |
| 9          | Fundamentals of linear algebra.                                   |
| 9          | Fundamentals of geometry in the plane and in the space.           |
| 18         | Differential and integral calculus for functions of one variable. |
| <b>Hrs</b> | <b>Practice</b>                                                   |
| 26         | Exercises and complements on the topics of lectures.              |

**MODULE  
MATHEMATICS - MODULE 2**

*Prof.ssa LUISA DI PIAZZA*

**SUGGESTED BIBLIOGRAPHY**

- P. Marcellini, C. Sbordone, Calcolo, Liguori Editore.  
- M. Bramanti, C. Pagani, S. Salsa, Matematica, Ed. Zanichelli.  
- P. Marcellini, C. Sbordone, Esercitazioni di Matematica, 2° volume, parte prima e parte seconda, Liguori Editore.  
- Dispense della docente

|                               |                                                 |
|-------------------------------|-------------------------------------------------|
| <b>AMBIT</b>                  | 50661-Discipline matematiche per l'architettura |
| <b>INDIVIDUAL STUDY (Hrs)</b> | 84                                              |
| <b>COURSE ACTIVITY (Hrs)</b>  | 66                                              |

**EDUCATIONAL OBJECTIVES OF THE MODULE**

This module aims to enable the student to acquire mathematical methodologies and tools for the study of the shapes in the plane and in the space, and the study of time evolution of phenomena.

**SYLLABUS**

| <b>Hrs</b> | <b>Frontal teaching</b>                                                                     |
|------------|---------------------------------------------------------------------------------------------|
| 8          | Curves in the plane and in space. Conics.                                                   |
| 6          | Geometry of surfaces in $R^3$ . Quadrics.                                                   |
| 12         | Functions of several variables. Constrained and unconstrained optimization.                 |
| 8          | Double integrals and volumes.                                                               |
| 10         | Ordinary differential equations. Mathematical models by means linear differential equations |
| <b>Hrs</b> | <b>Practice</b>                                                                             |
| 22         | Exercises and complements on the topics of lectures.                                        |