ADVANCED MATHEMATICS

1.1. Identification

University:	Kungliga Tekniska Högskolan (Stockholm)													
School:	School of Chemical, Science and Technology													
Course:	Advanced Mathematics													
ECTS:	6													
Semester:	*Winter*							*Summer*						X
Category	*Fundamental course*					X		*Specialisation course*						
Module	*MFI*	X	*MFII*		*MFIII*			*MSI*		*MSII*		*MSIII*		
Teachers:	Björn Gustafsson													
Language:	*English*			*Italian*			*Swedish*		X		*Spanish*			

1.2. Learning-outcomes

- knowledge about the mathematical fundaments necessary for the design of performing materials and industrial chemical processes more economical and environmentally-friendly.

1.3. Competencies

- **General**
  - to have critical understanding of technical and scientific tools
  - to work and manage teams
  - communication skills (both written and oral)
  - to work in an international context

- **Specific**
  - to acquire an understanding of the physical background of the most common linear partial differential equations
  - to learn mathematical methods to solve linear partial differential equations

1.4. Contents

Algebra and geometry. Elementary functions. Complex numbers. Polynomes and algebraic equations. Linear equation systems. Matrixes and determinants. Vectors and vector geometry. Lab exercises with computer support.

Calculus. Boundary values and continuity. Derivatives. Integrals. Differential equations. Taylor´s formula. Sequences and series. Multidimensional calculus. Applications in chemical engineering.

1.5. Teaching Methodology

- Lecture sessions
- Practical sessions: “cooperative work” for solving problems

1.6. Evaluation

- written exams
- oral evaluation of the problems solved by “cooperative work”

1.7. Bibliography

N. Asmar: Partial Differential Equations and Boundary Value Problems.