Intitulé du cours

Course title – Intitulé du cours	Math Camp – Algebra Refresher
Level / Semester – Niveau /semestre	
School – Composante	Ecole d'Economie de Toulouse
Teacher – Enseignant responsable	ADRIEN BLANCHET
Other teacher(s) – Autre(s) enseignant(s)	
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Other teacher(s) – Autre(s) enseignant(s)	
Lecture Hours – Volume Horaire CM	
TA Hours – Volume horaire TD	
TP Hours – Volume horaire TP	
Course Language – Langue du cours	
TA and/or TP Language – Langue des TD et/ou TP	

Teaching staff contacts – Coordonnées de l'équipe pédagogique :

Please do not hesitate to contact A. Blanchet at Adrien.Blanchet@tse-fr.eu

The teacher meets with students after class and by appointment (throughout the year). They can discuss the content of the course, any difficulties encountered in learning (lecture or exrcises : further study, courses adapted to your profile) or any doubts about schooling and career prospects. You should also feel free to discuss with the teacher any social or personal problems that might prevent you from succeeding in your studies.

Course Objectives – Objectifs du cours :

The aim of this course is to remind incoming students of what they are expected to know about linear and bilinear algebra. The focus will be on practical problem-solving techniques that students will encounter during their time at TSE, but also on providing a theoretical foundation for these concepts.

Prerequisites – Pré requis :

None.

Practical information about the sessions – Modalités pratiques de gestion du cours :

The student is not required to attend the course. For students who choose to follow this course, punctuality is required. The use of laptops and tablets is permitted, but all electronic devices must remain in silent mode.

Grading system – Modalités d'évaluation :

None

Bibliography/references – Bibliographie/références :

Linear and bilinear algebra is an extremely classical course and many references can be found in the library and/or on Interne t. Here are a few references

Strang, Gilbert. *Introduction to linear algebra*. Wellesley-Cambridge Press, 2022.

Greub, Werner H. *Linear algebra*. Vol. 23. Springer Science & Business Media, 2012.

Lay, David C. *Linear algebra and its applications*. Pearson Education India, 2003.

Lancaster, Kelvin. *Mathematical economics*. Courier Corporation, 2012.

Session planning – Planification des séances

Below is a list of all the concepts that must be mastered by students entering a Masters course. The audience for this course is generally extraordinarily heterogeneous and it is very difficult to make a course that is useful to many. The idea is to quickly go over all the concepts seen by undergraduates at TSE. This allows those who have forgotten these concepts to get them back in their heads and those who haven't seen them to identify them so that they can work on them on their own. This refresher course is by no means a complete course for learning these concepts.

As far as possible, the teacher will endeavour to provide lists of exercises for each concept. Students will be invited to group by level and to work on the exercises together. The strongest groups will be able to complete the exercise sheets (even if they do not do some of the redundant exercises that they have already mastered).

Section 1

- vector spaces, vector sub-spaces

- linear independence, spanning family, basis

Section 2

- linear map

- Matrix (operations)

Section 3

- rank nullity theorem

- diagonalisation

Section 4

- bilinear forms, quadratic forms

- scalar product

Section 5

- orthonormal basis

- orthogonal projection

Distance learning – *Enseignement à distance :*

Distance learning can be provided when necessary by implementing:

- *Interactive virtual classrooms*
- *Recorded lectures (videos)*
- *MCQ tests and other online exercises / assignments*
- *Remote (online) tutorials (classes)*
- *Chatrooms*

En cas de nécessité, un enseignement à distance sera assuré en mobilisant:

- *Classe en ligne interactive*
- *Vidéo enregistrée de la présentation du matériel pédagogique*
- *QCM et exercices en ligne*
- *TP/TD à distance*
- *Forum...*