

**ZCA 110 B Lecture Plan (Linear algebra part)**  
(week 1 – 3)

**SELF-READING INITIATIVE**

Text book (for linear algebra): Matrices by Frank Ayres, Schaum's Outline series

The table below lists the detailed topics from Ayres and the corresponding dates these topics will be covered.

In this self-reading initiative, students have to prepare and study the topics selected from chapters 1,2,3,4,5,6,8,9,10 themselves before coming to the class. Under this assumption, the lecturer will only conduct very brief introduction to these topics (say 10-15 minutes). After the brief introduction, students will begin attempting problems (which are made known to the students on or before the class) DURING the rest of the lecture hour. The lecturer will be walking around the class to assist students attempting the problems assigned. In the following session (i.e. the next class to come), the lecturer will discuss the problem sets attempted by students in the previous session in a more detailed manner. Randomly selected students will be asked to pass up the solutions for grading.

This initiative is a bold attempt to provoke self-study pro-activeness in our fellow first year students who are used to the chronic habit of spoon-feeding. Ideally, if this initiative works out, all students will make preparation for the pre-scheduled topics before coming to the classes, in which they will be forced to attempt questions without going through any formal lecture on these topics. Hence, students will have to understand the contents of these topics by doing the reading and studying for themselves before going to classes, failing which will result in their failure to submit the solutions when asked to do so. Such initiative hopes to promote an active form of learning, (although somewhat forcefully) in which student themselves shoulder a major portion of responsibility in the process of acquiring knowledge. In comparison, learning through lectures (which is the most conventional way teaching is done) is a relatively passive mode of learning.

**Schedule for the first three weeks, covering all topics in linear algebra.\*\***

Week	Date	Activity
1. Isnin, 07/07/08 -Sabtu, 12/07/08	7/7/08, Monday, 11 am -11.50 am	Briefing. No lecture.
	8/7/08, Tuesday, 10 am-10.50 am.	Brief lecture on <b>Chapter 1</b> (Matrices): Equal matrices. Sum of matrices. Product of matrices. <b>Chapter 2</b> (Some types of matrices): Triangular matrices. Scalar matrices. Diagonal matrices. The Identity Matrix. Transpose of a matrix. Symmetric matrices. Skew-symmetric matrices. Conjugate of a matrix. Hermitian matrices. Skew-Hermitian matrices. Direct sums.  Problem sets covering Chapter 1, 2 will be uploaded to the webpage before the next class. Print hardcopy.  Problem set for Chapter 3 and Chapter 4 will be uploaded to the webpage before the next class. Print hardcopy.

		Students are reminded to prepare for Chapter 3 and Chapter 4 for the next class.
	10/7/08, Thursday, 1 pm-1.50pm.	<p>Very brief lecture (10-15 minutes).</p> <p>The problem set hard-copy of Chapter 3, 4, will be distributed during the class.</p> <p>Students will attempt the problem set covering: <b>Chapter 3</b> (Determinant of a square matrix): Determinants of orders 2 and 3. Properties of determinants. First minors and cofactors. <b>Chapter 4</b> (Evaluation of determinants): Procedure for evaluating determinants.</p>
	10/7/08, Thursday, 2 pm-2.50pm.	<p>Discussion of solutions to the problems from the previous session (Chapter 1, 2, 3, 4).</p> <p>Problem set for Chapter 5 and Chapter 6 will be uploaded to the webpage before the next session. Print hardcopy.</p>
	11/7/08, Friday, 10 am-11.50am.	<p>Discussion of solutions to the problems from the previous session (Chapter 1, 2, 3, 4).</p> <p>The problem set hard-copy of Chapter 5, 6 will be distributed during the class.</p> <p>Students are reminded to prepare for Chapter 5 and Chapter 6 for the next class.</p>
2. Isnin, 14/07/08 -Sabtu, 19/07/08	14/7/08, Monday, 11.00 am-11.50 am	<p>Randomly selected students will be asked to submit the solutions of previous session (i.e. Chapter 1, 2, 3, 4).</p> <p>Very brief lecture (10 – 15 minutes).</p> <p>Students will attempt the problem set covering: <b>Chapter 5</b> (Equivalence): Rank of a matrix. Non-singular and singular matrices. Elementary transformations. Inverse of an elementary transformation. Equivalent matrices. Row equivalence. Elementary matrices. Inverse of a product of elementary matrices. <b>Chapter 6</b> (The adjoint of a square matrix): The adjoint.</p>
	15/7/08, Tuesday, 10.00 am-11.50 am	<p>Randomly selected students will be asked to submit the solutions of previous session (i.e. Chapter 5, 6).</p> <p>Discussion of solutions to the problems from the previous session.</p> <p>Problem set for Chapter 8 and Chapter 9 will be uploaded to the webpage before the next class. Print hardcopy.</p>

	17/7/08, Thursday, 1.00 pm-1.50 pm	<p>Very brief lecture (10-15 minutes).</p> <p>Students will attempt the problem set covering: <b>Chapter 8</b> (The inverse of a matrix): The inverse. Inverse from the adjoint. Inverse from elementary matrices. <b>Chapter 9</b> (Linear dependence of vectors and forms): Vectors. Linear dependence of vectors. Basic theorems. A linear Form.</p> <p>The problem set hard-copy of Chapter 8, 9 will be distributed during the class.</p>
	17/7/08, Thursday, 2.00 pm-2.50 pm	<p>Discussion of solutions to the problems from the previous session.</p> <p>Problem set for Chapter 10 will be uploaded to the webpage before the next class. Print hardcopy.</p> <p>Students are reminded to prepare for Chapter 10 for the next class.</p>
	18/7/08, Friday, 10.00 am-10.50 am	<p>Randomly selected students will be asked to submit the solutions of previous session (i.e. Chapter 8, 9).</p> <p>The problem set hard-copy of Chapter 10 will be distributed during the class.</p> <p>Students will attempt the problem set covering: <b>Chapter 10</b> (Linear equations): Definitions. Solution using a matrix. Fundamental theorems. Non-homogeneous equations. Homogeneous equations.</p>
3. Isnin, 21/07/08 -Sabtu, 26/07/08	21/7/08, Monday, 11am-11.50 am.	<p>Randomly selected students will be asked to submit the solutions of previous session (i.e. Chapter 10).</p> <p>Discussion of solutions to the problems from the previous session.</p> <p>Problem set for Chapter 11, 12 will be uploaded to the webpage before the next class. Print hardcopy.</p>
	22/7/08, Tuesday, 10am-10.50 am	<p>The problem set hard-copy of Chapter 10 will be distributed during the class.</p> <p>Full-length lecture on the following topic: <b>Chapter 11</b> (Vector spaces): Vector spaces. Subspaces. Basis and dimension. Bases and coordinates.</p>
	24/7/08, Thursday, 1 pm-1.50 am	<p>Full-length lecture on the following topic: <b>Chapter 12</b> (Linear transformations): Definition. Basic theorems. Change of basis.</p>
	24/7/08, Thursday, 2 pm-2.50 am	<p>Tutorial session.</p>

	25/7/08, Friday, 10 am-10.50 am	Tutorial session.
--	---------------------------------	-------------------

\*\*NOTE: The schedule is tentative and subjected to change.

**ZCA 110 B Lecture Plan (Calculus part)\*\***  
(week 4 – end of semester)

Text book (for Calculus): Thomas' Calculus, by George B Thomas, revised by M.D. Wier, J. Hass and F. R. Giodano. 11<sup>th</sup> edition.

Week	Date	Topic to cover (full-length lecture)
4	Isnin, 28/07/08 -Sabtu, 02/08/08	1.3 Functions and Their Graphs
		1.4 Identifying Functions; Mathematical Models
		1.5 Combining Functions; Shifting and Scaling Graphs
		1.6 Trigonometric Functions
		2.1 Rates of Change and Limits
5	Isnin, 04/08/08 - Sabtu, 09/08/08	2.2 Calculating Limits Using the Limits Laws
		2.3 The Precise Definition of a Limit
		2.4 One-Sided Limits and Limits at Infinity
		2.5 Infinite Limits and Vertical Asymptotes
		2.6 Continuity
		2.7 Tangents and Derivatives
		3.1 The Derivative as a Function
6	Isnin, 11/08/08 - Sabtu, 16/08/08	3.2 Differentiation Rules
		3.3 The Derivative as a Rate of Change
		3.4 Derivatives of Trigonometric Functions
		3.5 The Chain Rule and Parametric Equations
		3.6 Implicit Differentiation
7	Ahad, 17/08/08 - Ahad, 24/08/08	4.1 Extreme Values of Functions
		Cuti Pertengahan Semester