Subject Description Form

Subject Code	COMP206
Subject Title	Mathematics
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	• To provide students with fundamental concepts and working techniques of calculus and linear algebra. • To help students attain the techniques for proper formulation and analysis of problems that are important for success in upper-level computing subjects.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: *Professional/academic knowledge and skills* (a) understand the fundamentals of important mathematical skills, namely, calculus and linear algebra; (b) apply the mathematical skills in process of system design and analysis; (c) possess the capability to read research papers in which concepts are expressed mathematically; *Attributes for all-roundedness* (d) solve problems in a systematic manner. **Alignment of Programme Outcomes:** Programme Outcome 1: This subject contributes to having students practice their writing skills through assignments. Programme Outcome 4: This subject contributes to developing student critical thinking through tutorial and lab exercises on solving problems. They will also practice more in written assignments, programming exercises, and project. Programme Outcome 5: this subject contributes to motivate student using learnt technology to solving problems in industrial through tutorial and assignments. Programme Outcome 8: This subject contributes to developing student solving problems by using different technologies in different application areas through assignments.

Subject Synopsis/ Indicative Syllabus

Topic	Duration of Lectures
1. Calculus Continuous functions and slope; derivatives; chain rule; implicit differentiation; curve sketching; optimization; approximation; definite and indefinite integrals; change of variables; integration by parts and other tricks; double integrals.	16
2. Linear algebra Linear equations; vectors and matrices; vector spaces and subspaces; linear independence; rank and basis; linear transformations and its algebra; linear operators; linear functionals and dual space; transpose; determinants; characteristic values and spaces.	12
Total	**28**

Teaching/Learning Methodology

The course includes 14 lectures and 14 tutorials. The lectures give the basic knowledge of the course and some examples. The tutorials allow students to do exercises. Some extra materials such as using Matlab to solve integration or linear systems are optional.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1. Assignments	22%	✓		✓	✓		
2. Lab exercises							
3. Project							
4. Mid-term	33%		✓	✓	✓		
5. Examination	45%		✓	✓	✓		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The most important of the course is to solve mathematical problems such as optimization problem. So more practice is necessary. Two assignments which include all the aspects of the course are designed. One mid-term exam is given to test how good the students understand the materials. The final exam is comprehensive.

Student Study Effort Required

Class contact:	
▪ Lecture	28 Hrs.
▪ Tutorial	14 Hrs.

	Other student study effort:	
	▪ Assignment and exercise	20 Hrs.
	▪ Review	20 Hrs.
	Total student study effort	82 Hrs.
Reading List and References	**Textbooks:** 1. Goldstein, Lay and Schneider, Calculus and Its Applications, 9th Edition, Prentice-Hall, 2001. 2. David C. Lay. Linear Algebra and Its Applications, 2nd Edition, Addison-Wesley, 2000. **Reference Books:** 1. Brown, Porta and Uhl, Calculus and Mathematical, Part 1, Addison-Wesley, 1994. 2. Brian H. Denton. Learning Linear Algebra Through DERIVE, Ellis Horword, 1994.	