

<b>Module code</b>	SM-4328		
<b>Module Title</b>	Introduction to Algebra and Number Theory		
<b>Degree/Diploma</b>	Bachelor of Science (Mathematics)		
<b>Type of Module</b>	Major Option		
<b>Modular Credits</b>	4	<b>Total student Workload</b>	10 hours/week
		<b>Contact hours</b>	4 hours/week
<b>Prerequisite</b>	SM-2203 Linear Algebra and its Applications		
<b>Anti-requisite</b>	None		
<b>Aims</b>			
This module aims to familiarise the student with basic properties of natural numbers and various algebraic structures.			
<b>Learning Outcomes</b>			
<i>On successful completion of this module, a student will be expected to be able to:</i>			
Lower order :	40%	- use the Euclidian and division algorithms and solve linear congruences	
Middle order :	40%	- apply certain results of number theory in cryptography	
Higher order:	20%	- understand main algebraic structures and use their properties	
<b>Module Contents</b>			
Method of mathematical induction. Division and Euclidian algorithm.			
- Greatest common divisor and least common multiple. Primes and Fundamental Theorem of arithmetics. Congruences and modular arithmetics. Structure of $Z_n$ . Solving linear congruences. Chinese Remainder Theorem.			
- Fermat Little Theorem. Euler generalization. Public key cryptography.			
- Permutations. Order and sign. Cycle decomposition. Definition and examples of groups. Semi-groups. Rings and fields.			
- Basic properties of groups. Order of an element. Subgroups. Cyclic groups. Generating sets.			
- Cosets. Lagrange Theorem. Fermat and Euler Theorems. Homomorphisms. Normal subgroups.			
<b>Assessment</b>	Formative assessment	Tutorial and feedback.	
	Summative assessment	Examination: 60%	
		Coursework: 40%	
		- 1 class test (20%)	
		- 1 assignment (20%)	