Course Name	Course Code	Contact Hours			Year	Level	Prerequisite
		Lectures	Sec/Lab	Credit Hours			
Abstract Algebra (2)	**323MATH**	**3**	**-**	**3**	**3**	**5**	**222 MATH**

Student's workload				
In-class activities	**Contact Hours**		**Self-learning/study**	**Hours**
Lectures	45		HW/Assignments	22
Laboratory			Study for exam	62
Exams and quizzes	5		Working for lab	
			Preparation for classes	30
Total	**50 ~42.**		Total	**114**
Total Learning Hours **= 156.**			Equivalent **ECTS points** = Total LH/28 = **5.57**	

(1) Brief Course Description

Abstract Algebra (2)is an extension of abstract algebra(1), which requires the concept and understanding of group theory while abstract algebra(2) requires the concept and understanding of ring theory(extension of group theory), fields and their extensions, this course focus on some types of rings and knowledge of isomorphism of ring.

(2) Course Objectives

After finishing the course, the student is expected to be familiar with the following:

- Concept of ring which is an extension of the group
- Concept of subring which is an extension of the subgroup, ideal which is an extension of the normal subgroup and factor ring which is an extension of the factor group.
- Concept of homomorphism of rings as an extension of homomorphism of groups
- Types of rings, fields and their extensions

(3) Course Contents

- **Ring:** Definition and theorems, commutative ring, zero divisors, ring and its group of unit, integral domain, field
- **Subrings and Ideals:** Subrings, ideals and relationship between them, factor ring.
- **Homomorphism and Isomorphism of Ring**: Definition, theorem and examples, kernel and image of homomorphism, first, second and third isomorphism theorems and its applications.
- **Euclidean Rings and Ring of Polynomials**: Euclidean rings, unique factorization theorem, construction of ring polynomials, roots of ring of polynomials over a field, polynomial ring on the field of rational numbers.

- **Field Extension**: Simple algebraic extension and simple transcendental extension, finite extension, algebraic closure, splitting fields, finite field.

(4) Assessment Criteria

- First mid-term exam 20%
- Second mid-term exam 20%
- Quizzes and home work 10%
- Final exam 50%

(5) Course Teaching Strategies

- Academic lectures
- Scientific discussions
- Home work
- Mini-model education
- Assignments to prepare scientific projects

(6) Text Book

- Topics in Algebra, I.N. Herstein, New York, John Wiley and Sons, 1977.
- A First course in Abstract Algebra, J. B. Fraleigh, 7th Edition, Addison-Wesley Publishing Co. London, 2003

(7) Reference Books

- A Survey of Modern Algebra, S. Maclane and G. Birkhoff, New York: Macmillan, 1977.
-Algebra, S. Lang, 3rdEdition, Addison-Wesley, 1993.
- Basic Algebra, M. Cohn Paul, Springer-Verlag New York 2002.