QF01/0408-4.0E	Course Plan for Bachelor program - Study Plan Development and Updating Procedures/ Mathematics Department

Study plan No.	**2021/2022**		**University Specialization**	**Master of Math.**	
Course No.	**0101722**		**Course name**	Abstract Algebra (2)	
Credit Hours	**3**		**Prerequisite/ Co-requisite**	0101721	
Course type	☐ MANDATORY UNIVERSITY REQUIREMENT	☐ UNIVERSITY ELECTIVE REQUIREMENTS	☐ FACULTY MANDATORY REQUIREMENT	☐ Support course family requirements	✓ **Mandatory requirements** ☐ Elective requirements
Teaching style	☐ Full online learning		☐ Blended learning		✓ **Traditional learning**
Teaching model	☐ 1 Synchronous: 1 asynchronous		☐ 1 face to face : 1 asynchronous		✓ **2 Traditional**

Faculty member and study divisions' information (to be filled in each semester by the subject instructor)

Name	Academic rank	Office No.	Phone No.	E-mail	
Division number	**Time**	**Place**	**Number of students**	**Teaching style**	**Approved model**

Brief description

Rings and ideals, nilpotents and idempotents in rings, R-modules, products and sums of R-modules, exact sequences and split exact sequences, simple and semisimple R-modules, essential and small submodules, the ring of endomorphisms of an R-modules, projective and injective modules, regular rings, the radical and the socle of an R-module, Noetherian and Artinian R-modules.

Learning resources

Course book information (Title, author, date of issue, publisher ... etc)	Abstract Algebra An Introductory Course, by : Gregory T. Lee			
Supportive learning resources (Books, databases, periodicals, software, applications, others)	• Abstract Algebra. By: I. N. Herstiein • Abstract Algebra. By: A. P. Hillman and G. W. Alexanderson • Abstract Algebra. By: Abraham P. Hilman and Gerald L. Alexan • Groups, rings and field. By: T. S Blyth and E. F. Robertson.			
Supporting websites	• Abstract Algebra Notes- Free Harvard Courses. • Abstract Algebra Notes-You Tube. • http://www.ugrad.math.ubc.ca/coursedoc/math100/index.html • Online tutorials and quizzes			
The physical environment for teaching	✓ Class room	☐ labs	☐ Virtual educational platform	☐ Others
Necessary equipment and software				
Supporting people with				

special needs	
For technical support	

Course learning outcomes (S= *Skills, C= Competences K= Knowledge,)*

No.	Course learning outcomes	The associated program learning output code
	Knowledge	
K1	Recognize advanced concepts in abstract algebra.	**MK1**
K2	Develop reading and writing proofs in abstract algebra.	**MK1**
K3	Discus a variety of examples and counterexamples in abstract algebra.	**MK1**
	Skills	
S1	Exercise abstract algebra research and scientific writing.	**MS2**
S2	Testing the scientific methodology as a way of thinking and a tool in facing algebra problems.	**MS3**
	Competences	
C1	Develop logical thinking and scientific algebraic research methods.	**MC2**

Mechanisms for direct evaluation of learning outcomes

Type of assessment / learning style	Fully electronic learning	Blended learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
First/Second exam	30%	30%	**30%**	30%
Participation / practical applications	0	0	**20%**	30%
Asynchronous interactive activities	30%	30%	**0**	0
Final exam	40%	40%	**50%**	40%

Schedule of simultaneous / face-to-face encounters and their topics

Week	Subject	learning style*	Reference **
1	Rings, Basic Properties of Rings and Subrings....	Lecture	135-142
2	Integral Domains and and The Characteristic of a Ring .	Lecture	142-149
3	Ideals and Factor Rings.	Lecture	149-152
4	Ring, Isomorphisms and Automorphisms and Isomorphism Theorems for Rings .	Lecture	155-167
5	Prime and Maximal Ideals.	Lecture	167-171
6	Polynomial Rings and Euclidean Domains .	Lecture	171-182
7	Principal Ideal Domains and Unique Factorization Domains.	Lecture	182-188
8	Irreducibility and Roots and Irreducibility over the Rationals .	Lecture	191-200
9	Irreducibility over the Real and Complex Numbers and Irreducibility over Finite Fields		200-205
10	Mid Exam 30%		

11	Vector Spaces	Lecture	207-210
13	Basis and Dimension	Lecture	210-215
14	Field Extensions	Lecture	215-221
15	Splitting Fields andApplications to Finite Fields	Lecture	221-229
16	**Final Exam 50%**		