Course Specifications

Course Title:	**Foundations of Mathematics**
Course Code:	**111 math-3**
Program:	**Bachelor in Mathematics**
Department:	**Mathematics**
College:	**College of Arts and sciences**
Institution:	**Najran University**

Table of Contents

A. Course Identification

1. Credit hours:	
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐	
3. Level/year at which this course is offered: 1 / 1	
4. Pre-requisites for this course (if any)**: None**	
5. Co-requisites for this course :None	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	Blended	---	---
3	E-learning	---	---
4	Correspondence	---	---
5	Other	---	---

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	45
2	Laboratory/Studio	---
3	Tutorial	---
4	Exams	3
	Total	48
Other Learning Hours*		
1	Study	30
2	Assignments	10
3	Library	---
4	Projects/Research Essays/Theses	---
5	Office hours	15
	Total	103

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course will provide an introduction to mathematical logic, sets, methods of proof, relations, mappings, algebraic structures, and we shall study some of their properties.

2. Course Main Objective:

The main objective is to provide students basic concepts: mathematical induction, principles of mathematical logic, the sets, relations, mappings and algebraic structures.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Define the basic concepts of the statement, connectives, set , relation and types of the relations, partitions on a set and mappings.	
1.2	Describe the basic concepts and the fundamental properties of the statements, connectives, mapping.	
2	**Skills :**	
2.1	Apply appropriate mathematical techniques for solving various problems in foundations of mathematics.	
2.2		
3	**Competence:**	
3.1	Work effectively within groups and independently	
3.2		

C. Course Content

No	List of Topics	Contact Hours
1	**Element of Mathematical Logic** Statements, Negative statement, Connectives, De Morgens laws properties of statement.	9
2	**Sets** Definition of the Set, types of numerical sets , the methods of defining a set, The membership and inclusion , The power set , complement of a set, Venn diagrams, properties of the sets. **Methods of proof** Direct proof and indirect proof, proof with contradiction , contra positive , proof by counter examples , mathematical induction.	6
3	**Relations** The order pairs , the direct product of two sets, some properties of the direct product of two sets , Cartesian product of sets , binary relations, binary relations on a set ,	9
4	Equivalence relations , partition of a set, Equivalence Classes the set of integers mod n, some properties.	6
5	**Mappings** : Mappings, type of mappings , the inverse image , the equivalence of sets Composition of mappings, properties of mappings.	9

6	**Binary Operations** : Binary operations, some Algebraic structures (Groups, Rings , Fields)	6
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	Define the basic concepts of the statement, connectives, set , relation and types of the relations, partitions on a set and mappings	• lectures • discussions	• Written exam
1.2	Describe the basic concepts and the fundamental properties of the statements , connectives, mapping and how to prove the function is one to one correspondence	• lectures • discussions	• Quizzes. • Assignments • Written exam
2.0	**Skills**		
2.1	Apply appropriate mathematical techniques for solving various problems in foundations of mathematics.	• Lectures • discussions	• Quizzes. • Assignments • Exams
2.2		• Lectures • discussions	• Exercises • Homework • Quiz • Written Exam
3.0	**Competence**		
3.1	Work effectively within groups and independently	• Lecture • Discussions.	• Design project. • Written Exam • Oral Exam
3.2			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Exercises, Homework& Assignments	Open	10%
2	Oral Exam and Rubrics	14th Week	5%
3	Quizzes	Open	5%
4	Written Test(1)	7th Week	15%
5	Written Test(2)	13th Week	15%
6	Final Exam	End of Semester	50%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- Introducing the course syllabus, grading scale and the distribution of marks for the course in the first lecture of the course.
- Arrangements for availability of teaching staff for individual student consultations and academic advice (include amount of time teaching staff are expected to be available each week).
- Office hours for a teaching staff for one hour weekly.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	د. سلمان بن عبد الرحمن السلمان " المدخل الي البني الجبرية" دار الخريجي للنشر ١٤٣١هـ
Essential References Materials	• **Kenneth H. Rosen** Discrete Mathematics and Its Applications seven edition McGraw-Hill Companies, Inc 2012. • **Seymour Lipschutz** "Theory and problems of discrete mathematics" Third edition All rights reserved. Manufactured in the United States of America.2007
Electronic Materials	• https://www.pdfdrive.com/discrete-mathematics-and-its-applications-7th-edition-e157829540.html • https://www.pdfdrive.com/discrete-mathematics-with-applications-e16611413.html • **https://www.pdfdrive.com/discrete-mathematics-applications-e26668346.html**
Other Learning Materials	• ----------

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture halls, containing white boards, and electronic monitors, and 25 seat approximately.
Technology Resources (AV, data show, Smart Board, software, etc.)	• Laptop • smart board • Projector. • Wi Fi

Item	Resources
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	**None**

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Peer reviewer	Rubrics (indirect)
Student course evaluation survey at the end of semester.	Students	Questionnaire (Indirect)
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Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Mathematics
Reference No.	**********
Date	**********