

## STUDY GUIDE FOR EXAM 2 – MATH 3010 FALL 2024

The exam covers Sections 4.1 – 4.4; Sections 5.2 – 5.3, 5.5; Sections 7.2 – 7.5.

**Definitions.** You may be asked to state the following definitions:

- Cartesian Product (Definition 4.1)
- Subrings (Definition 4.5, or you may use Proposition 4.14 as the definition)
- (Ring) homomorphism (Definition 4.15)
- (Ring) isomorphism (Definition 4.29)
- isomorphic rings (Definition 4.32)
- subfield (Definition found in Exercise 4.9)
- kernel of a homomorphism (Definition 5.3)
- ideal (Definition 5.8, or you may use Proposition 5.9 as the definition)
- principal ideal (Definition 5.17)
- cosets and quotient rings (Definition 5.22)

**Theorems.** You may be asked to state the following theorems:

- First Isomorphism Theorem (Theorem 5.38)
- Long Division (or “Division with Remainder”, or “Division Algorithm”) for  $F[x]$  (Theorem 7.3)
- Fundamental Theorem of Algebra (Theorem 7.17)
- Eisenstein’s Criterion