THE NATIONAL UNIVERSITY OF LESOTHO

Department of Mathematics and Computer Science

CS3520 - Computer Organisation and Architecture I

ISA Definition & Documentation Template

17th October 2025

1. Overview & Motivation

Briefly describe:

- The purpose and application context of your ISA.
- The design goals.
- Why this ISA design is suitable for the target workload.

2. Architectural Design Choices

Summarize key architectural decisions and justify them:

- **Instruction Philosophy:** RISC-style, CISC-style, or hybrid? Why?
- **Registers:** Number, size, and roles.
- **Data Types:** Supported word sizes.
- **Addressing:** Addressing modes.
- **Memory Model:** Little/big endian, alignment rules.
- **Instruction Formats:** Fixed or variable length; describe each format briefly.

3. Instruction Set Summary

Provide a clear table grouping all supported instructions:

Category	Mnemonic(s)	Operands	Description

*__NB:__Use your own mnemonics — avoid copying from RISC-V or MIPS.

4. Instruction Encoding Summary

Summarize how your instructions are represented in binary.

- Show bit-field layout(s) for your instruction format(s).
- Specify number of bits for opcode, registers, immediate fields, etc.
- Mention any patterns or regularity.

5. Design Rationale & Trade-offs

Reflect briefly on:

- **Simplicity vs Capability:** Why did you include or exclude certain instructions/features?
- **Code Density vs Performance:** How compact or efficient is your ISA?
- **Hardware Impact:** How does your ISA simplify or complicate datapath/control design?
- **Extensibility:** Could your ISA support future extensions?