ISO 29990:2010

NATIONAL INFOCOMM COMPETENCY FRAMEWORK

NUS National University of Singapore

ISS INSTITUTE OF SYSTEMS SCIENCE

MACHINE REASONING

A STACKABLE COURSE FOR CERTIFICATE IN: INTELLIGENT REASONING SYSTEMS (IRS)

OVER **6,250** GRADUATE ALUMNI

OFFERING OVER **150** ENTERPRISE IT, INNOVATION & LEADERSHIP PROGRAMMES

TRAINING OVER **135,000** DIGITAL LEADERS & PROFESSIONALS

Course Manager

issgz@nus.edu.sg

- GU Zhan 顾瞻 (Sam) lectures Master of Technology programme in the areas of data science, machine intelligence, and soft computing. Prior to joining ISS, he was in New Zealand running start-up, delivering artificial intelligence training programs. Sam had also spent many years in financial and engineering sector wearing versatile hats: data scientist, project manager, consultant, system manager and software engineer.
- He devotes himself into pedagogy, and is very passionate in inspiring next generation of artificial intelligence lovers and leaders.

Learning Outcomes

1. **Identify** needs of machine reasoning technology in various industrial applications.
2. **Acquire** knowledge of core machine reasoning techniques, including rule-based logical reasoning, domain expert's knowledge representation and acquisition, knowledge discovery, and handling uncertainty during reasoning process
3. **Apply** machine learning technique to extract industrial domain knowledge and express business rules in computer readable format.
4. **Compare** the architectures and main techniques used in versatile reasoning systems.
5. **Design** knowledge based machine reasoning software modules based on expected business outcomes and industrial domain knowledge
6. **Architect** software application by applying learnt machine reasoning techniques and graphical system development.

Become T Shaped Expert

Reasoning Types	System Architectures	Knowledge Representation	Knowledge Acquisition	Uncertainty Management	Knowledge Discovery	Machine Learning
Search & Optimization System	Cognitive Reasoning System	Self Learning System	**Rule/Process Reasoning System**	Natural Language Processing System	Vision Based Reasoning System	Robotic Reasoning System

Agenda

Day 1

1.1 Machine Reasoning Overview

1.2 Reasoning Types

1.3 Reasoning System Architectures

1.4 Knowledge Representation

1.5 Rule/Process Reasoning System **Workshop**

Day 2

2.1 Knowledge Acquisition (Business Rules)

2.2 Knowledge Models (Acquired → Represented)

2.3 Machine Inference (1/2)

2.4 Knowledge Modelling **Workshop**

Day 3

3.1 Machine Inference (2/2)

Course **Assessment 1** (15 minutes)

3.2 Inference under Uncertainty

3.3 Knowledge Discovery by Machine Learning

3.4 Knowledge Discovery **Workshop**

Day 4

4.1 Contemporary Reasoning Systems

4.2 Course Review

4.3 Course **Assessment 2** (60 minutes)

4.4 Creating Reasoning System **Workshop**

(Graded workshop & project deliverables)

Agenda : Course Assessment & Grading

MTech Thru-Train

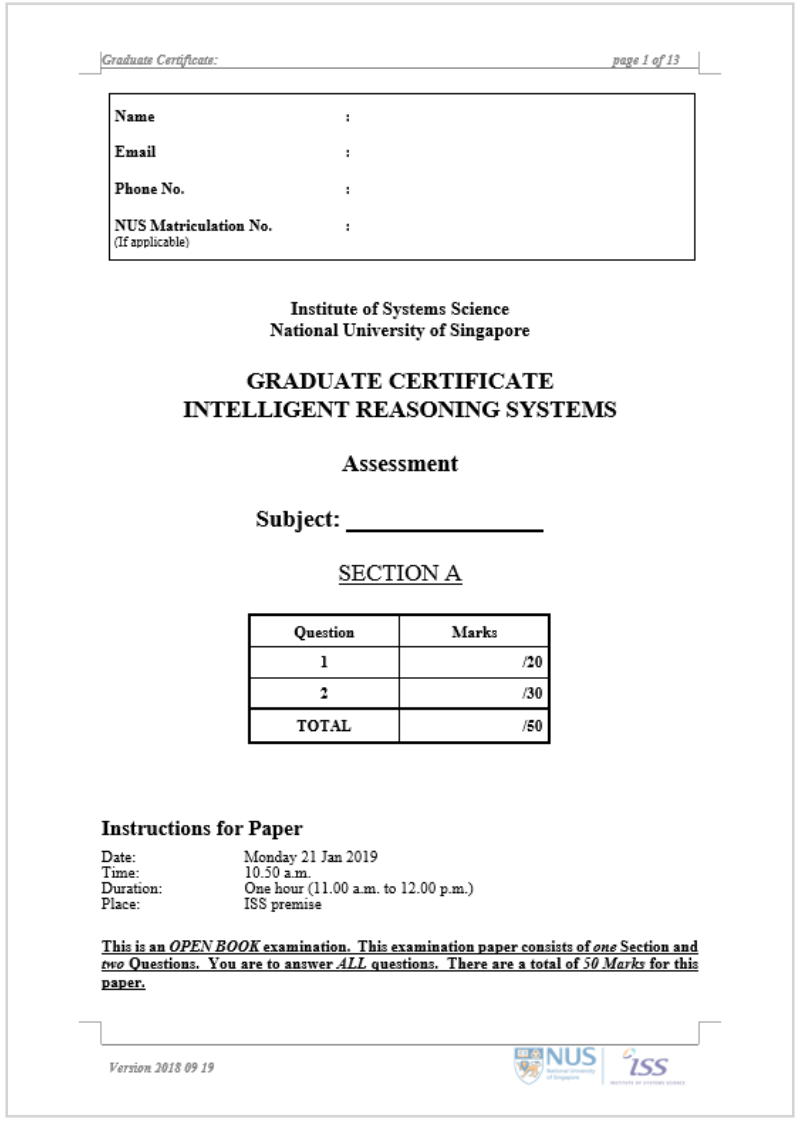
- **In-Class Assessments [Individual]** **on 3rd & 4th lecture day**
  - 15 minutes open book test (course level)
  - 60 minutes open book test (course level)

- **In-Class Workshops [Individual]** **due 16:30 on 4th lecture day**

- **Project Work [Group]** **due 23:59 on 1st Sunday in May/Nov**
  - Refer to Practice Module

Agenda : Course Assessment & Grading

In-Class Assessments



Graduate Certificate: *page 1 of 13*

Name	:	
Email	:	
Phone No.	:	
NUS Matriculation No. (If applicable)	:	

Institute of Systems Science
National University of Singapore

GRADUATE CERTIFICATE
INTELLIGENT REASONING SYSTEMS

Assessment

Subject: _____

SECTION A

Question	Marks
1	/20
2	/30
TOTAL	/50

Instructions for Paper

Date: Monday 21 Jan 2019
Time: 10.50 a.m.
Duration: One hour (11.00 a.m. to 12.00 p.m.)
Place: ISS premise

This is an *OPEN BOOK* examination. This examination paper consists of *one* Section and *two* Questions. You are to answer *ALL* questions. There are a total of *50 Marks* for this paper.

Version 2018 09 19

- Open book individual test
- Digitized assessment paper: Microsoft Word document .docx
- Internet (re)search is allowed but no online discussion, e.g. WhatsApp, Internet Messaging, Email, etc.
- Bring your IC identification card.

Agenda : Course Assessment & Grading

In-Class Workshops

[In-Class Workshops Submission]

- Deliverables in a single zip file for an example reasoning system enhanced by knowledge discovery technique, e.g. mortgage approval
- Naming convention:
    1. A zip file for day 4 (individual) : ***ID_FullName.zip*** e.g. ***A1234567B_Gu Zhan.zip***
- Upload to LumiNUS respective submission folders.

END OF LECTURE NOTES