

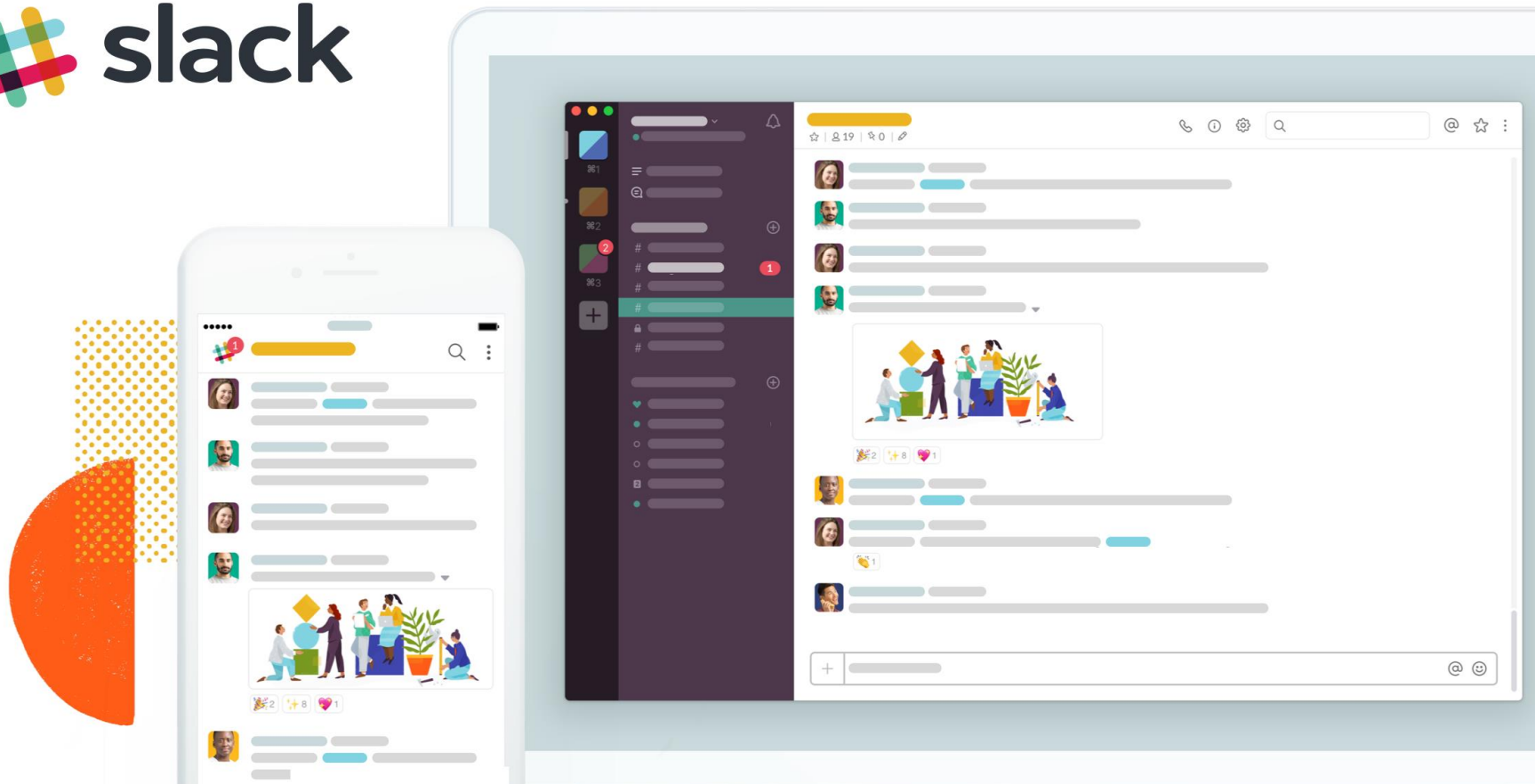
MACHINE REASONING

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

| | | | | | |
|----------------------|--------------------|-----------------------------|--|---------------------------------|------------------------------------|
| OVER 5,500 | GRADUATE ALUMNI | OFFERING OVER 120 | ENTERPRISE IT, INNOVATION & LEADERSHIP PROGRAMMES | TRAINING OVER 120,000 | DIGITAL LEADERS & PROFESSIONALS |
|----------------------|--------------------|-----------------------------|--|---------------------------------|------------------------------------|

ACTION: JOIN MTECH SLACK GROUP **PART-TIMER**

<http://bit.ly/mtech2019pt>



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. **Create** 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 Rule/Process Reasoning System **Workshop**

Day 2

- 2.1 Knowledge Representation
- 2.2 Knowledge Acquisition (Business Rules)
- 2.3 Knowledge Models (Acquired → Represented)
- 2.4 Knowledge Modelling **Workshop**

Day 3

- 3.1 Technical Machine Inference
- 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** (Graded individual exam)
- 4.4 Creating Reasoning System **Workshop**
(Graded workshop & project deliverables)

Agenda : Course Assessment & Grading

EEP & MTech Stackable

- **Paper Assessment** **on last lecture day**
 - [**Individual** 50 marks] 1 hour open book exam (course level)
- **Workshop Project Deliverables** **due last lecture day**
 - [**Individual** 10 marks] An example reasoning system enhanced by knowledge discovery technique, e.g. home loan approval
 - [**Individual** 20 marks] A runnable standalone bespoke business reasoning system
 - [**Individual** 20 marks] A project report with relevant attachments, including
 - System Design / Knowledge Models
 - Use/Test cases

Agenda : Course Assessment & Grading

MTech Thru-Train

- **Paper Assessment** **on last lecture day**
 - [**Individual** 50 marks] 1 hour open book exam (course level)
- **Workshop Project Deliverables** **due last lecture day + 14**
 - [**Individual** 10 marks] An example reasoning system enhanced by knowledge discovery technique, e.g. home loan approval
 - [**Group** 15 marks] A runnable standalone bespoke business reasoning system
 - [**Group** 15 marks] A project report with relevant attachments, including
 - System Design / Knowledge Models
 - System Development & Implementation in tools, e.g. KIE suite
 - System User Guide
 - [**Group** 10 marks] A 5 minute video presentation, covering
 - System Design & Use Case Demo

Agenda : Course Assessment & Grading

Paper Assessment

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



- 1 hour open book individual exam
- Extra 15 minutes reading time before exam starts
- Pencil can be used for drawing.
- Internet (re)search is allowed but no online discussion, e.g. WhatsApp, Internet Messaging, Email, etc.
- Bring your IC identification card.