ISO 29990:2010

NATIONAL INFOCOMM COMPETENCY FRAMEWORK

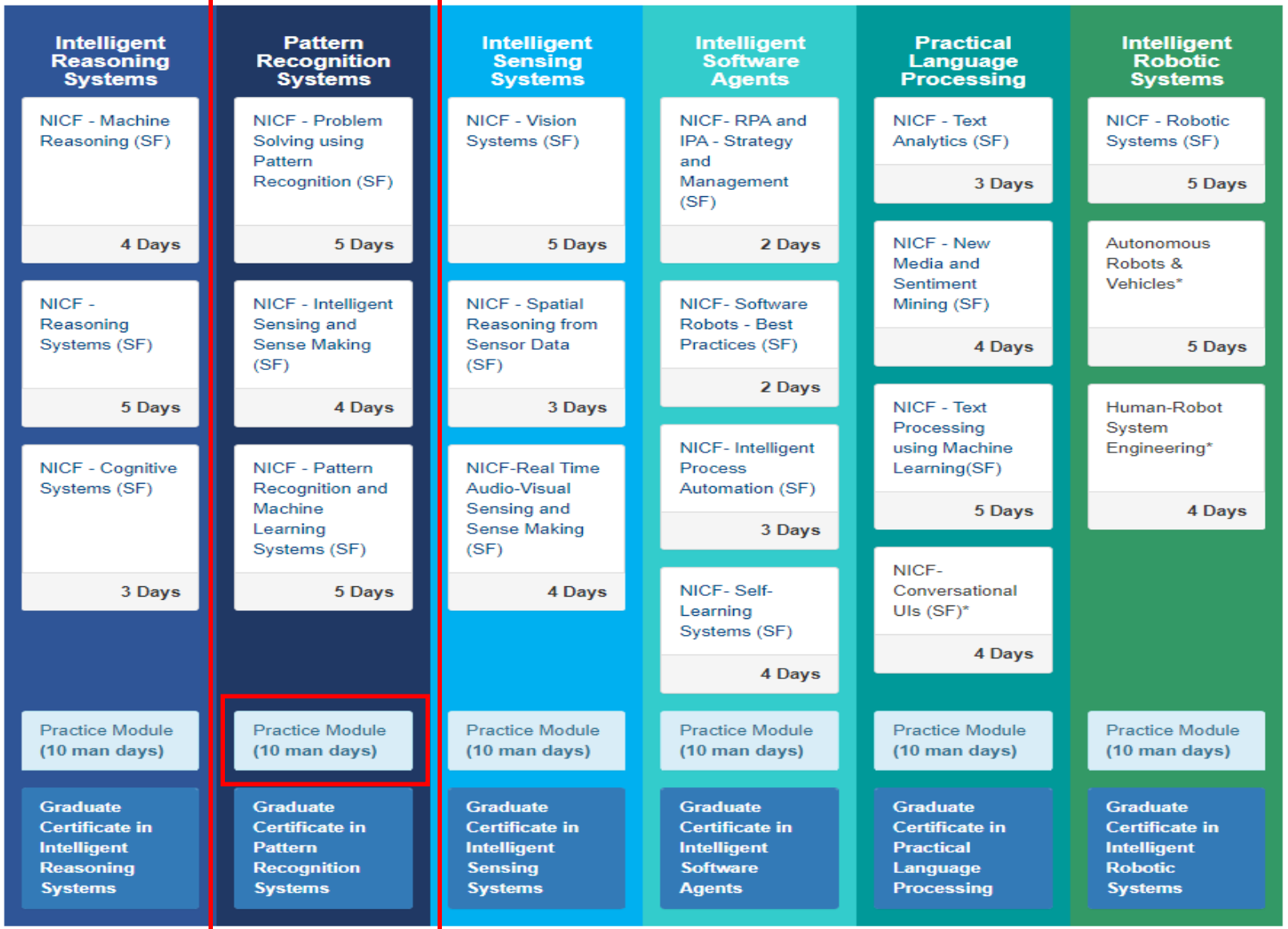
NUS National University of Singapore

ISS INSTITUTE OF SYSTEMS SCIENCE

GRADUATE CERTIFICATE IN PATTERN RECOGNITION SYSTEMS

PRACTICE MODULE

Stackable Graduate Certificate Programme in Artificial Intelligence



Graduate Certificate in Pattern Recognition systems

This graduate certificate teaches how to design and build systems that make decisions by recognising complex patterns in data. Examples are robotic systems and smart city applications that take as input diverse sensor data streams. These systems will utilise the latest pattern recognition, machine learning and sensor signal processing techniques.

Key Takeaways:

- Build intelligent pattern recognition systems
- Understand core and advanced pattern recognition techniques and gain experience applying these techniques in practical systems and applications
- Understand and apply advanced signal processing techniques to sensor data
- Be familiar with current best practices and tools for building pattern recognition systems

Practice Module : Objectives

The objective of this practice module is threefold:

- Firstly, to expose participants in a supervised manner to real world problems so that they may practice the use of the skills they have learned during the individual course modules in a real world setting and obtain expert advice and guidance when needed.

- Secondly, to enable participants to demonstrate their proficiency across all of the skills that they have learned in the course modules and hence be certified as competent at the Certificate level.

- Thirdly, to provide a formal grading mechanism so that the certificate may be used as one component in the NUS-ISS Stackable Master of Technology (MTech) in Intelligent Systems.

Graduate Cert: Assessment Components

- The graduate cert assessment comprises the assessment components below:

Assessment Component	Weight
Practice Module Project work (documentations and MVP* deliverables)	50%
In-class assessment (Quizzes and Workshops)	10%
Examination	40%

* MVP: minimal viable product of pattern recognition system

Standard Grading Scheme		CAP
A+	85 - 100	5.0
A	80 - 84	5.0
A-	75 - 79	4.5
B+	70 - 74	4.0
B	65 - 69	3.5
B-	60 - 64	3.0
C+	55 - 59	2.5
C	50 - 54	2.0
D+	45 - 49	1.5
D	40 - 44	1.0
F (Fail)	0 - 39	0.0

- A participant must attain a minimum overall score of **50%** in order to pass the practice module and hence be awarded the Graduate Certificate in Pattern Recognition Systems.

Project Work: Assessment

Project Work Assessment Component	Weight
Mid-Project Presentation	5%
Final Presentation	10%
Final Report	15%
Final System	15%
Peer Review	5%
Total	**50%**

Practice Module : Timeline

The practice module will take an estimated 10 days of effort by participants. These days are not expected to be continuous and may stretch over many weeks. The overall agenda is shown below.

Day 1: Introduction, project initialization

Day 2 to 9: Mid-Project presentation, project work, supervision and feedback

Day 10: Project final video presentation and report submission

Written examination (3 hours open book)

Practice Module : Timeline : Activities

Day	Activities	Remarks
Day 1	Introduction to the practice module • Participants will be made fully aware of the practice module requirements and assessment process.	Lecture
Days 2 - 9	Project work, supervision and feedback • Participants will work on their projects independently. Participants will be able to meet with ISS course lecturers to obtain advice and guidance. Mid-Project Presentation • Participants will make a presentation in which they outline the goals of their projects along with details of the data resources required/available, techniques/tools used, progress, etc.	Independent work/ Supervision Presentation by participants (Tentative Date: 10 Oct 2020 – Day 2 of the ISSM course)
Day 10	Project final video presentation • Participants will submit a final project video presentation in which they describe fully the project they have undertaken and the methods and metrics they have used to evaluate its success. Project Work Assessment • Participants will submit a final project report including other relevant project deliverables, e.g. runnable software system.	Submission of deliverables
Exam Day	Written Examination • Participants will undertake a formal written examination with a scope covering all of the topics taught in the course modules.	Examination

Practice Module : Project Work

Requirements:

- Form a project team of max 4 members and enrol in LumiNUS project groups.
- The team may work on any practical application that demonstrates the advantage of pattern recognition and machine learning techniques.
- A suitable project uses AI/machine learning techniques to design and build a pattern recognition system to solve a real-world problem using the skills taught in the 3 course modules.
- The project must develop, integrate and demonstrate at least **three** out of following aspects:
  - ❖ Supervised learning / unsupervised learning scenarios
  - ❖ Machine learning/ Deep learning techniques
  - ❖ Hybrid machine learning /Ensemble approach
  - ❖ Intelligent sensing / sense making techniques

Practice Module : Project Work

Project Examples:

- Stock market forecasting
- House price prediction
- Diabetes occurrence prediction
- Object recognition
- Face recognition
- Automatic image caption generation
- Wearable sensors for human activity recognition
- Hand gesture recognition
- ……

Practice Module: Project Work

Project Deliverables:

- A runnable standalone pattern recognition system
- Datasets
- Final report to describe:
  - Tools/techniques you have used
  - System design / Models
  - System performance
  - Findings and discussions
- Python/R/Java/… codes, model files, other supporting documents (if any)
- A video presentation file, .mp4/.mov/.wmv etc., containing a 10 -15 mins presentation

Practice Module: Project Work

Additional Submissions:

- 1-2 pages individual project report per project member, including:
  - Individual reflection of project journey: (1) personal **contribution** to group project (2) what learnt is most **useful for you** (3) how you can apply the knowledge and skills in **other situations or your workplaces**
- Peer evaluation form

Submission deadline: 31/10/2020

Please submit to LumiNUS

Please submit only one ZIP file from each team.

Questions & Answers

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