ISY5004
INTELLIGENT SENSING SYSTEMS

where physical and virtual worlds become prompts

PRACTICE PROJECT (JAN-MAY 2026)

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Intelligent Sensing Systems (ITSS)

Graduate Certificate in Intelligent Reasoning Systems	Graduate Certificate in Pattern Recognition Systems	Graduate Certificate in Intelligent Robotic Systems	Graduate Certificate in Intelligent Sensing Systems	Graduate Certificate in Architecting AI Systems	Graduate Certificate in Practical Language Processing	Graduate Certificate in Intelligent Financial Risk Management
Machine Reasoning 4 days	Problem Solving using Pattern Recognition 5 days	Robotic Systems 5 days	Vision Systems 5 days	Explainable and Responsible AI 3 days	Text Analytics 3 days	Advanced Machine Learning for Financial Services 4 days
Cognitive Systems 3 days	Pattern Recognition and Machine Learning Systems 5 days	Autonomous Robots & Vehicles 5 days	Spatial Reasoning from Sensor Data 3 days	AI and Cybersecurity 3 days	New Media and Sentiment Mining 3 days	Explainable and Responsible AI for Finance 3 days
Reasoning Systems 5 days	Intelligent Sensing and Sense Making 4 days	Human-Robot System Engineering 4 days	Real Time Audio-Visual Sensing and Sense Making 4 days	Architecting Agentic AI Solutions 4 days	Text Processing Using Machine Learning 4 days	Credit Risk Modelling and Analytics 4 days
				Integrating and Deploying AI Solutions 3 days	Conversational UIs 4 days	Alternative Data for FinTech Innovation 3 days

Intelligent Sensing Systems (ITSS)

This GC only has 10 credit units.

$$GPA = \frac{\sum(\text{grade point of course} \times \text{units assigned to course})}{\sum(\text{units assigned to all enrolled courses})}$$

Graduate Certificate	Number of Courses	Units
Fundamental (Compulsory)		
ISY5001: Intelligent Reasoning Systems	3	11
ISY5002: Pattern Recognition Systems	3	13
Specialist (Choose ONE)		
ISY5004: Intelligent Sensing Systems	3	10
ISY5003: Intelligent Robotic Systems	3	13
Specialist (Choose ONE)		
EBA5004: Practical Language Processing	4	12
EBA5008: Intelligent Financial Risk Management	4	12
SWE5008: Architecting AI Systems	4	12
Capstone Project (Compulsory)		
ISY5007: Capstone Project in Intelligent Systems	-	6
TOTAL	-	52 – 55

2.11.4. A grade point will be awarded for each examination/project taken using the scheme presented in Figure 4 below.

Figure 4: Grading Scheme for Examinations

Standard Grading Scheme		Grade Point
A+	85 – 100	5.0
A	80 – 84.9	5.0
A-	75 – 79.9	4.5
B+	70 – 74.9	4.0
B	65 – 69.9	3.5
B-	60 – 64.9	3.0
C+	55 – 59.9	2.5
C	50 – 54.9	2.0
D+	45 – 49.9	1.5
D	40 – 44.9	1.0
F	0 – 39.9	0.0

2.11.5. The grade point average (known as GPA) will be calculated for the courses taken, weighted by the grade point value of each course. The final GPA of each student will include the grade point for the Capstone Project result. The formula for the GPA calculation is as below:

$$GPA = \frac{\Sigma(\text{grade point of course} * \text{units assigned to course})}{\Sigma(\text{units assigned to all enrolled courses})}$$

Project scope and team size

- Team size: ≤5 members. Please form your teams in “Practice Project Groups” in Canvas.
- Participants are to source suitable projects, either from sponsor companies (if any) or their own ideas.
- Project scope: The team may propose any practical application that demonstrates the advantage of intelligent sensing techniques using the skills taught in this certificate. We will evaluate the project scope on a case-by-case basis, such as
  - Image/video analytics, such as object detection, action, surveillance;
  - Audio and speech analytics;
  - Sensory data analytics, such as RGB-D, point cloud;
  - Sensing for generation, such as image/video/audio/speech/point generation;
  - Not suitable: NLP, APP development, etc.

Assessment

	Assessment	Percentage
Practice module project	Progress presentation (15-min)	5%
	Final deliverables: Final report	15%
	Final deliverables: Final recorded 15-min presentation	
	Final deliverables: Final developed system (technology/experiment)	25%
	Peer assessment (refer to the link sent by ISS admin)	5%
Final written exam for the whole Graduate Certificate		50%

Schedule and deadline

	Full-time	Part-time	Stackable
Practice module briefing	12 Jan. 2026, Monday	10 Jan. 2026, Saturday	9 Jan. 2026, Friday
Form project groups on Canvas	10 Feb. 2026, Tuesday, 11:59 pm	22 Mar. 2026, Sunday, 11:59 pm	
[lecturers] Announce (randomly-generated) presentation schedule	To be sent on 11 Feb. 2026, Wednesday	To be sent on 23 Mar. 2026, Monday	
Submit presentation slides	12 Feb. 2026, 11:59 pm	29 Mar. 2026, 11:59 pm	
Progress presentation (15 minutes presentation + 5 minutes Q&A)	(tentative date, Zoom), 13 Feb. 2026, Friday	(tentative date, Zoom) 30/31 Mar. 2026, Monday/Tuesday evening	
Written exam	Mid May (to be confirmed)		
Final project deliverables submission	By 11:59 pm on Sunday, which is the last day of the exam week.		

Project deliverables

Submission	Your submitted files	Remarks
Progress presentation submission	• Use the template “ISY5004 GC project progress presentation template.PPTX”. • You need to upload before the actual presentation day.	One PPTX file per team
Final submission (everything)	• Source code and dataset (a GitHub link or a cloud storage link). • Report (8-10 pages, Latex source files, use the template “ISY5004 GC project report template (latex).zip”). See the suggested outline in the report template. • Recommended free collaborative writing tool: Overleaf, https://www.overleaf.com. • Zip everything into a single zip file. • Two report examples are provided in Canvas.	One Zip file per team
Final submission (report pdf)	• A single final report PDF file, the same as that in the above zipped file.	One pdf file per team
Final submission (recorded presentation)	• There is no final in-person presentation, we will mark your recorded presentation video (15 minutes).	One mp4 file per team

Past ITSS practice project examples

Surveillance	Healthcare
• A vision system that recognize, count and correct physical exercises • Emotion recognition using voice, facial and body posture • Facial attendance with anti-spoofing protection • Crowd surveillance	• Hand washing steps recognition system • Air drawing with hand posture recognition and tracking • Lip reading • Audio-visual intelligent infant activities tracking
Consumer electronics	**Manufacture**
• Tennis sports video analytics • Automatic werewolf referee system using computer vision • SNAP-IT-FIND-IT image retrieval application • Paper plane folding guidance	• Real-time computer interface control with human pose estimation • Vision-based operator activity recognition for personnel efficiency analysis

FAQ

Q0: Have any students failed this Graduate Certificate in the past semesters?

A0: Yes.

Q1	Can we use Microsoft Word to write the project report?
A1	No, you must use LaTeX to write your project report.
Q2	Can AI-generated speech (e.g., text-to-speech) be used in the final recorded video presentation?
A2	No.
Q3	Is it necessary to implement the project in a mobile phone APP or a UI, or cloud services?
A3	No need. Note recommended, because they go beyond the scope of this GC.
Q4	Are we allowed to use public datasets?
A4	Yes, you may use public datasets. However, you must demonstrate your understanding of the dataset, including data cleaning and augmentation, etc.
Q5	Is the effort of creating a new or customized dataset rewarded?
A5	Yes, any effort related to dataset creation is rewarded. This includes collecting your own dataset or performing tasks like cleaning a public dataset.
Q6	What are the requirements for the final recorded video presentation?
A6	The recorded video should be similar to an in-person presentation.
Q7	What should the literature review in the final report include?
A7	It should include research publications and commercial solutions related to your project. Be careful about the fake information if you use GenAI tools for this part.
Q8	What should we include in the experimental results section of the report?
A8	Compare your system's performance with either existing systems (e.g., reference implementations) or explore different configurations within your system (e.g., varying backbones or ablation studies).

Be responsible for the content and quality of your submitted work

Screenshot from Canvas

Please comply with the **NUS Plagiarism Policy** and the **NUS Code of Student Conduct** (Section A: Academic Integrity). You may find the **Academic Integrity Essentials** resource helpful.

Use of AI tools is generally permitted for take-home assignments, provided that you clearly acknowledge their use in your submission. Failure to declare AI use may be considered plagiarism, which is a serious academic offence. There is no penalty for declaring AI use; your work will be assessed solely on its quality. We encourage responsible and transparent use of AI.

For the University's stance and message to students regarding the use of AI in academic work, please refer to the **Policy for Use of AI in Teaching and Learning** (Sections 3 and 4), which outlines recommended practices and expectations.

Sample AI Tool Declaration

I used [AI tool name, e.g., GPT-4.1] to [describe specific uses: e.g., generate ideas, format paragraphs, improve expression, analyse effectiveness, create images and illustrations, produce drafts, refine, and/or finalise my assignment]. I am responsible for the content and quality of the submitted work.

Be responsible for the content and quality of your submitted work

Example 1 (fake content)

7. REFERENCES

[1] Y Zhou, B Zhang, and J Zhang, "Encoding time series as images for visual classification tasks: A survey," *Neurocomputing*, vol. 514, pp. 152–170, 2022. Fake

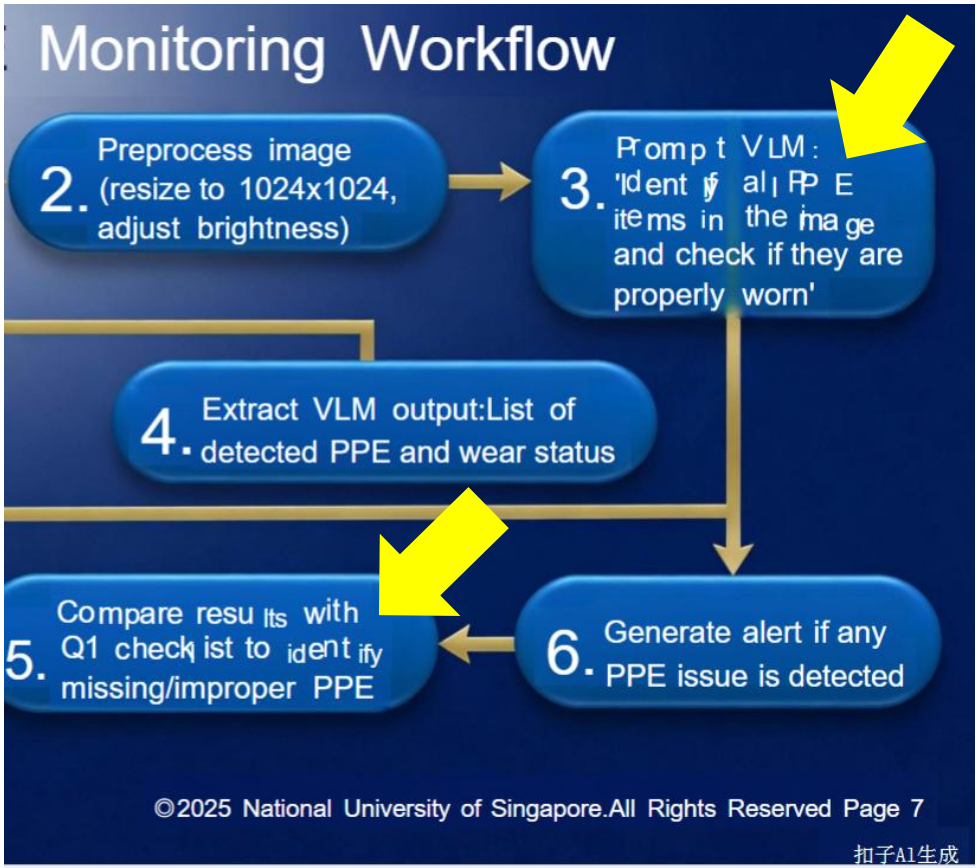
[2] Y Wang, X Xu, and X Zhang, "Time-series classification using images based on recurrence plots and deep learning," *Mathematical Problems in Engineering*, p. 2020, 2020. Fake

[3] L Wang, S Chen, and Q Zhang, "Encoding financial time series as images for algorithmic trading," *IEEE Transactions on Neural Networks and Learning Systems*, vol. 32, no. 5, pp. 2100–2115, 2021. Fake

[4] S Lee and J Ahn, "Candlestick image representation for deep learning in financial markets," *Expert Systems with Applications*, vol. 198, pp. 116789, 2022. Fake

[5] H Zhang, W Li, and X Zhou, "Multiscale image representation of financial data for volatility prediction," *Pattern Recognition*, vol. 135, pp. 109123, 2023. Fake

Example 2 (unacceptable quality)



Thank you!

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