

Teaching Portfolio

[Staff to be reviewed are required to provide a teaching portfolio to assist in peer review and teaching assessment for academic promotion]

The following are the possible areas to include in the teaching portfolio. This is meant as a guide and staff are free to include new areas. The key principle in the teaching portfolio is to make a case for the quality of teaching you provide, supported with documentary evidence.

1. Teaching Philosophy

A statement of teaching philosophy, including goals and innovative teaching methods.

As an educator in AI and Robotics, my teaching philosophy is driven by active, experiential, and research-based learning, ensuring that students develop both theoretical depth and practical proficiency. In today's rapidly evolving technological landscape—where AI and robotics continuously reshape industries—it is crucial to equip students with not only foundational knowledge but also the critical problem-solving skills, adaptability, and creativity required to thrive in real-world environments.

My teaching approach is centred on developing industry-ready skills. I guide students to apply cutting-edge AI and robotics concepts—such as OpenAI's AI models, Tesla/Unitree's robotics innovations, and Google's reinforcement learning research—to solve genuine technological challenges. For instance, in my Robotic Systems course, students move beyond theoretical kinematics to engage with simulation tools like Webots and toolkits like ikpy, experiencing firsthand how abstract principles transform into tangible robotic behaviours.

I firmly believe in nurturing lifelong learners. Technologies evolve at a breakneck pace, and I instil in my students the importance of self-directed learning by engaging them with contemporary research ideas, emerging tools, and continuous skill enhancement. In the Algorithms & Data Structures course, students not only master data structures but also explore real-world applications through weekly coding tasks and class projects that push them to independently explore the latest algorithmic breakthroughs to solve these challenges.

Enhancing critical thinking and innovation is another cornerstone of my philosophy. By incorporating project-based learning (PBL) —as pioneered by institutions such as MIT and Stanford—and a flipped classroom model I create an environment where students become active participants. They review lecture videos and interactive tutorials before class, so that in-person sessions can focus on deep problem solving, group discussions, and hands-on applications. In the Intelligent Systems Lab and Advanced AI courses, students collaborate on projects that involve designing reinforcement learning agents and developing innovative AI solutions. This experiential approach encourages out-of-the-box thinking and interdisciplinary applications, where principles from mathematics, physics, and software engineering converge.

I also harness AI-powered learning tools to foster an interactive classroom environment. Utilizing platforms like Jupyter Notebooks, MSTEams Classwork's code, simulation softwares like Webots, and AI-based coding assistants like Co-Pilot, my students are exposed to the same state-of-the-art tools used by tech leaders at Microsoft and Nvidia. Collaborative learning is promoted through group projects, peer-reviewed code (paired-programming), and interdisciplinary challenges that not only build technical competence but also vital communication and teamwork skills.

Ultimately, my goal is to bridge the gap between academia and industry. By engaging students in research-driven projects and exposing them to real-world problem solving—from robotics simulations in lab sessions to the analytical challenges of final year projects, I prepare them for impactful careers in AI research, autonomous agents, intelligent robotics, and cutting-edge software development. My philosophy is to empower students to be creators of innovative solutions and critical thinkers, ready to adapt and lead in a technological era defined by rapid change and relentless innovation.

2. Strategies, Objective, Methodology

a) Learning outcome (identify the learning outcomes you expect your students to achieve).

By the end of my courses, students are expected to achieve a robust set of competencies that blend theoretical mastery with practical industry readiness. These learning outcomes are designed to ensure that graduates not only understand core principles but also can apply them innovatively in complex, real-world scenarios.

1. Theoretical Mastery & Analytical Thinking: Students will develop a deep understanding of essential AI and robotics principles. In courses like Essential Mathematics for Digital Science and Robotic Systems, they learn about kinematics, control theory, and differential equations. They also gain proficiency in analysing algorithm complexity using Big-O notation in the Algorithms & Data Structures course. This rigorous theoretical foundation empowers students to critically assess and innovate upon existing models.

2. Practical Application & Industry Readiness: A core objective is for students to translate theory into practice. They implement cutting-edge AI models and robotics frameworks (using tools such as PyTorch, Open-AI Gynasium, Webots, and ROS) to build functional systems. In Advanced Artificial Intelligence, students design and train reinforcement learning agents, mirroring industry practices seen in Tesla's robotics and Google's AI research. This hands-on approach ensures that graduates are primed for real-world challenges and technological innovation.

3. Research & Innovation: I emphasize engagement with contemporary research. Students are encouraged to review, critique, and implement state-of-the-art research papers in courses like Emerging Technologies in Artificial Intelligence and Intelligent Systems Lab. They develop novel solutions that integrate optimization techniques, machine learning algorithms, and embedded systems—cultivating a mindset that is both innovative and research-oriented.

4. Software & Hardware Proficiency: Students are trained to write efficient, scalable, and optimized code, as demonstrated in the Algorithms & Data Structures and Advanced AI courses. They also gain hands-on experience with hardware applications—applying concepts such as inverse kinematics, force control, and motion planning in robotic systems. This dual proficiency prepares them for the interdisciplinary demands of modern AI and robotics projects.

5. Interdisciplinary Integration: Modern challenges in technology require an interdisciplinary approach. Through projects in Emerging Technologies in Artificial Intelligence, students explore topics like explainable AI and multimodal systems, integrating knowledge across computer science, statistics, and engineering. This cross-disciplinary competence is a key learning outcome, ensuring that graduates are versatile problem solvers who can innovate at the intersections of technology.

6. Teamwork & Communication: Collaboration is a key learning outcome. Through group coding projects, peer-reviewed technical writing, and final year project presentations, students hone their ability to communicate complex ideas clearly and work effectively in teams. These experiences are crucial for their future roles in research and industry, where clear articulation of ideas and collaboration are essential for success.

Each of these outcomes is reinforced through a blend of formative and summative assessments—from coding assignments and lab reports to project defences and working software products. This comprehensive framework ensures that students leave the program not only with strong technical skills but also with the critical, creative, and collaborative mindset needed to drive future innovations in AI and robotics.

b) Instructional methodology (including the use of e-learning or experiential learning projects).

My instructional methodology employs a diverse mix of pedagogical strategies to create an immersive, interactive, and student-centred learning environment that is aligned with the practices of top institutions and industry leaders.

1. Flipped Classroom & Blended Learning: I use the flipped classroom model to maximize active learning. Students engage with lecture videos, coding tutorials, and online simulations before class. This approach is especially effective in the Algorithms & Data Structures course, where foundational concepts are introduced online, leaving in-class time for hands-on coding sessions, live debugging, and collaborative problem solving.

2. Project-Based Learning (PBL): Project-based learning is integral to courses like Intelligent Systems Lab and the Final Year Project. Here, students work on real-world problems that mirror challenges faced in industry—developing solutions inspired by Google’s AI challenges and Tesla’s robotics advancements. These projects are structured in phases, with regular milestones, peer reviews, and iterative feedback, ensuring continuous improvement and real-time problem solving.

3. AI-Powered Learning Tools: To create an interactive learning environment, I integrate AI-powered tools such as Jupyter Notebooks, Webots for robotics simulations, and AI-based coding assistants. These tools facilitate dynamic learning experiences and help students to visualize abstract concepts, experiment with algorithms, and refine their coding skills in real time.

4. Interdisciplinary & Research-Driven Learning: Drawing from Stanford and MIT’s AI curriculum, I emphasize the importance of research-driven learning. Students are encouraged to engage with cutting-edge research papers and implement advanced algorithms. In courses like FYP and Emerging Technologies in Artificial Intelligence, they read research papers and explore interdisciplinary challenges that combine AI and software engineering—preparing them to develop innovative, cross-disciplinary solutions.

5. Collaborative & Peer Learning: Collaborative learning is embedded throughout my courses. Students work in teams on coding projects, lab assignments, and group discussions, fostering a culture of peer instruction and shared problem solving. Digital collaboration tools—such as Kanban boards, cloud docs and GitHub repositories—are used to maintain continuous communication and cooperative learning, reinforcing the skills needed in modern tech workplaces.

6. Experiential Learning & Industry Readiness: Hands-on labs and real-world projects are key elements of my methodology. In the Robotic Systems and Intelligent Systems Lab courses, students engage with real datasets, robotics hardware, and simulation software to design and test robotic control systems. Industry research and case studies of company products provide practical insights and reinforce the connection between academic concepts and professional applications.

7. Gamification & Adaptive Learning: To further enhance engagement, I employ gamification strategies and adaptive learning platforms. Hackathons, coding competitions such as on HackerEarth, Kaggle.com, and real-world robotics challenges offer students competitive yet supportive environments to apply their learning under pressure, thereby fostering creativity and resilience.

c) Other means to enhance learning.

Beyond core instructional strategies, I employ several supplementary methods to further enrich the learning experience and foster continuous innovation.

1. *Mentorship & Peer Coaching*: I establish structured mentorship programs where senior students and alumni guide current learners through complex projects and technical documentation. Peer coaching sessions are embedded into the curriculum, especially in the Final Year Project and Intelligent Systems Lab courses, to facilitate knowledge sharing and collective problem solving.

2. *Continuous Assessment & Feedback*: A balanced mix of formative and summative assessments is critical to my approach. Regular quizzes and in-class coding challenges help monitor progress and provide timely feedback. Detailed review sessions after major assignments and projects ensure that students understand their strengths and areas for improvement, promoting self-reflection and continuous growth.

3. *Technology-Enhanced Learning Environments*: To create an engaging and adaptive learning experience, I integrate a variety of digital tools. Simulation software, online coding platforms such as jupyterlab & codingrooms.com, and interactive visualization tools transform abstract concepts into tangible learning moments. This approach not only supports remote learning but also familiarizes students with the industry-standard tools they will encounter in their careers.

4. *Extracurricular Initiatives, Clubs & Hackathons*: I actively promote participation in hackathons, workshops, student clubs UBD AI Robotics Club and coding competitions such as PhyRC challenge this year. These extracurricular activities complement the curriculum by providing high-energy, real-world problem-solving experiences.

5. *Collaborative Learning Communities*: Finally, I foster a vibrant learning community through online forums, discussion boards, and collaborative projects. This network not only supports academic growth but also builds professional connections among students, faculty, and industry experts. By nurturing a culture of mutual support and shared learning, I ensure that students develop the collaborative skills essential for thriving in the rapidly evolving fields of AI and robotics.

Together, these enhanceive methods create a robust and flexible educational ecosystem. By combining rigorous academics with practical, research-based, and industry-informed approaches, my students are empowered to become innovators, critical thinkers, and effective collaborators—ready to lead and adapt in the dynamic world of technology.

3. Teaching History**Undergraduate and Graduate (Module and Supervision)**

A summary of modules taught, research students supervised, and participation in theses and oral examination committee (including teaching load, no of modules and students taught

a) Modules taught (please include role and class size) in the last 4 semesters.

Sample format:

2024/2025 Semester 2	Module #1	Module #2	Module #3	Module #4	Module #5
<i>Module code</i>	ZA-2203	ZI-4201	Zx-4290		

<i>Module title</i>	Robotic Systems	Advanced AI Applications	Final Year Project (FYP)		
<i>Modular credits (MC)</i>	4	4	8		
<i>>No of lectures/hours/weeks taught</i>	8 lectures (2 hrs)	14 lectures (2 hrs)	-		
<i>>No of tutorials/hours/weeks taught</i>	4 tutorials (2 hrs)	7 tutorials (2 hrs)	-		
<i>>Lab/Field work hours (if any)</i>	4 coding labs (2 hrs)	7 coding lab (2 hrs)	14 coding discussions (1 hr)		
<i>>No of students</i>	8	8	4		
<i>Overall mark/ grade for Peer Review</i>					
<i>Overall mark/ grade for Student Feedback</i>					

2024/2025 Semester 1	Module #1	Module #2	Module #3	Module #4	Module #5
<i>Module code</i>	ZZ-1104	ZC-2205	ZA-3201	ZA-4309	Zx-4290
<i>Module title</i>	Essential Mathematics for Digital Scientists	Data Structures and Algorithms	Intelligent Systems Lab	Emerging Technologies in Intelligent Systems	Final Year Project (FYP)
<i>Modular credits (MC)</i>	4	4	4	4	8
<i>>No of lectures/hours/weeks taught</i>	14 lectures (2 hrs)	7 lectures (2 hrs)	4 lectures (2 hrs)	10 lectures (2 hrs)	-
<i>>No of tutorials/hours/weeks taught</i>	14 tutorials (2 hrs)	7 tutorials (2 hrs)	-	10 tutorials (2 hrs)	-
<i>>Lab/Field work hours (if any)</i>	-	14 coding lab (2 hrs)	10 coding labs (2 hrs)	4 coding labs (2 hrs)	14 coding discussions (1 hr)
<i>>No of students</i>	92	58	14	7	4
<i>Overall mark/ grade for Peer Review</i>					
<i>Overall mark/ grade for Student Feedback</i>					

2023/2024 Semester 2	Module #1	Module #2	Module #3	Module #4	Module #5
<i>Module code</i>	ZA-2203	ZI-4201	Zx-4290		
<i>Module title</i>	Robotic Systems	Advanced AI Applications	Final Year Project (FYP)		
<i>Modular credits (MC)</i>	4	4	8		
<i>>No of lectures/hours/weeks taught</i>	8 lectures (2 hrs)	14 lectures (2 hrs)	-		

>No of tutorials/hours/weeks taught	4 tutorials (2 hrs)	7 tutorials (2 hrs)	-		
>Lab/Field work hours (if any)	4 coding labs (2 hrs)	7 coding lab (2 hrs)	14 coding discussions (1 hr)		
>No of students	8	7	1		
Overall mark/ grade for Peer Review					
Overall mark/ grade for Student Feedback	4.11	4.00			

2023/2024 Semester 1	Module #1	Module #2	Module #3	Module #4	Module #5
Module code	ZZ-1104	ZC-2205	SS-2202	ZA-3201	Zx-4290
Module title	Essential Mathematics for Digital Scientists	Data Structures and Algorithms	Algorithms and Data Structures	Intelligent Systems Lab	Final Year Project (FYP)
Modular credits (MC)	4	4	4	4	8
>No of lectures/hours/weeks taught	14 lectures (2 hrs)	7 lectures (2 hrs)	7 lectures (2 hrs)	4 lectures (2 hrs)	-
>No of tutorials/hours/weeks taught	14 tutorials (2 hrs)	7 tutorials (2 hrs)	7 tutorials (2 hrs)	-	-
>Lab/Field work hours (if any)	None	14 coding lab (2 hrs)	14 coding lab (2 hrs)	10 coding labs (2 hrs)	14 coding discussions (1 hr)
>No of students	96	46	1	3	2
Overall mark/ grade for Peer Review					
Overall mark/ grade for Student Feedback	3.6	3.66			5

2022/2023 Semester 2	Module #1	Module #2	Module #3	Module #4	Module #5
Module code	ZA-2203	ZC-2204	SS-4301	Zx-4290	
Module title	Robotic Systems	Software Engineering	Software Engineering	Final Year Project (FYP)	
Modular credits (MC)	4	4	4	8	
>No of lectures/hours/weeks taught	8 lectures (2 hrs)	14 lectures (2 hrs)	14 lectures (2 hrs)	-	
>No of tutorials/hours/weeks taught	4 tutorials (2 hrs)	-	-	-	
>Lab/Field work hours (if any)	4 coding labs (2 hrs)	14 coding lab (2 hrs)	14 coding lab (2 hrs)	14 coding discussions (1 hr)	

>No of students	1	10	4	3	
Overall mark/grade for Peer Review					
Overall mark/grade for Student Feedback					

b) Research students supervised

Number of students	Main Supervision		Co-Supervision	
	On-going	Successful	On-going	Successful
1. Undergraduate [including thesis]	4	6	-	-
2. Masters by coursework	-	-	-	-
3. Masters by research	1	-	1	-
4. Ph.D	1	-	1	-
5. Others (internships)	3	1		

c) Other teaching (e.g. Lifelong Learning, in-service, EDPMMO, EDPSGO, etc). Please provide details.

I served as an internal examiner for 11 theses—comprising 2 PhD dissertations, 3 Master's theses, and 6 qualifying assessments—ensuring that each candidate met the highest standards of academic rigor and excellence. (The names of the students are provided below.)

1. Kaliniki Kassim (PhD examiner)
2. Parham Hadikani (PhD examiner)
3. Hafiq Anas (Masters examiner)
4. Hafiq Anas (QA assessment)
5. Hassan Haider (QA assessment)
6. Mohammad Nazrul (QA assessment)
8. Usman Sani (QA assessment)
9. Gusti Ahmad (QA assessment)
10. Wasswa Shafiq (QA assessment)
11. Rufai Yusuf (QA assessment)
12. Nur Iksan (QA assessment)
13. Noorsyamimi binti Ajak (Masters' thesis)

Please include as appendices:

- a) Student feedback exercise reports for past 3 years (6 semesters)
- b) Documents that demonstrate your commitment to and accomplishments in educational activities, etc
- c) For 2 – 3 modules:
 - i. Module outlines for at least 2 – 3 modules
 - ii. Samples of teaching-learning materials
 - iii. Assessment tasks
 - iv. Handouts
 - v. Additional reading list
 - vi. Project titles and term paper questions
 - vii. If applicable, lab projects
 - viii. Examination questions
- d) **Other pieces of evidence that lend additional support to the claims of your quality and reputation as an educator**

Within my department, I have earned the trust of my peers by serving as an internal examiner for two PhD theses, three Master's theses, and conducting six qualifying assessments. These roles

require rigorous evaluation of research quality and academic rigor, reflecting my deep expertise and the high standards I uphold in our academic community.

Globally, I have made significant contributions as a mentor through my role with the Cognitive Science Society. I have personally guided emerging scholars such as Chris Stolle, a PhD candidate at Hong Kong University, and Sahiti Chebolu, a PhD student from the Max Planck Institute in Germany. In addition to these mentorship roles, I extend my supervision to external candidates from renowned institutions like Bryn Mawr College in Philadelphia and IISER India, thereby reinforcing my international reputation as an educator.

My commitment to nurturing local talent is unwavering. This year, I guided students in the Intelligent Systems Lab to develop an AI-system for our NAO robot, enabling it to understand speech and communicate intelligently using generative AI Ollama models. We proudly showcased this innovation to ***His Majesty at the Teacher's Day*** event, and its national TV coverage underscored my collective dedication to excellence in training and elevating UBD's standing.

Furthermore, I have actively supported Bruneian students with a keen interest in AI, mentoring promising individuals such as Lieutenant Commander Amiel Azim Afflon from the Royal Brunei Navy, Dk Faten Khairiyah from UBD, and Nabila Amna from SOASIS UBD.

Beyond formal academic roles, I am passionate about community engagement and promoting higher education. I have delivered public talks at local schools and community events, effectively championing the UBD and SDS degrees. One notable example includes managing large school visits, such as those organized for Anggerek Desa Primary School, where I shared insights into the exciting world of AI and robotics, inspiring younger generations and fostering early interest in STEM disciplines.

TEACHING PERFORMANCE INDICATORS

4. Teaching Achievement and Academic Leadership

a) Leadership roles and academic leaderships in the development of programmes, modules, and/or curriculum; including pedagogical innovations and other contributions to education (please specify type of role and contribution)

1. I lead the collaboration with the Coursera for UBD to design UBD's first ever 3-year degree programme in BDSc Applied Artificial Intelligence. I helped envision the curriculum design, selection of courses and the design of learning programs within. I also help administer UBD's other curricula on Coursera. This collaboration enabled UBD ***achieve Coursera 2024 AI Innovation Award***. I have delivered workshops and helped other UBD faculties in benefitting from Coursera and adapting their curriculum for hybrid mode offerings.
2. As Program Leader for the BDSc Data Science, Applied AI and Artificial Intelligence and Robotics, I have revised the existing curriculum to equip our students with relevant skills for the current job market in Brunei and for fostering local entrepreneurship.
3. As a Program Leader for Applied AI and Robotics majors, I am redrafting the new proposals for GenB programs on how to most efficiently redesign and realign our degree curricula with latest tech, theory, industrial needs and national goals.
4. I have consistently led SDS's student evaluation of different degrees and choice of majors to help SDS plan courses and teaching assignments for upcoming years.

b) Contribution to development of teaching materials (including published cases, textbooks, production of teaching materials, software, pedagogical articles, teaching methodologies, etc)

Over the last 2 years, I have devised several new module course outlines some of which include Robotic Systems, Software Engineering, Algorithms & Data Structures, Intelligent

Systems Lab, Essential Mathematics for Digital Science, Advanced Artificial Intelligence and Emerging Technologies in Artificial Intelligence.

Please include as appendices:

- a) Two peer review reports done within the past 2 years
- b) Awards or prizes certificates or evidence
- c) Evidence on teaching materials

5. Future Plan

a) Teaching goals for the next 3 years

1. *Curriculum Expansion and Excellence:* I will continue to lead courses in Robotic Systems, Software Engineering, Algorithms & Data Structures, Intelligent Systems Lab, Essential Mathematics for Digital Science, and undergraduate mentoring modules. In addition, I plan to introduce advanced courses in Intelligent Multi-Agent Systems and specialized Machine Learning tracks. These new offerings will incorporate emerging trends and research insights—drawing on innovations seen in industry giants like Nvidia, Tesla, and Google—to ensure that our curriculum remains at the cutting edge. By embedding project-based learning, real-time simulations, and cross-disciplinary challenges, I aim to enhance student skillsets, nurture independent and critical thinking, and build confidence in constructive design and real-world problem-solving.
2. *Data-Driven Pedagogical Enhancement:* I plan to leverage advanced data analytics tools, including those available through Coursera's robust learning platforms, to rigorously assess and refine our learning structures at UBD. This strategic approach will involve analyzing student engagement metrics, identifying learning gaps across online and offline modalities, and uncovering insights into student performance and challenges. The goal is to develop targeted instructional strategies and adaptive learning pathways that enable each student to reach their highest potential. By integrating these analytics into our teaching practices, I aim to create a responsive and evidence-based learning environment that continuously evolves in line with both academic research and industry standards.

b) Steps taken to improve teaching

Over the past few years, I have embraced a wide array of innovative online tools and platforms to enhance the delivery of my teaching and mentoring. I have integrated industry-standard tools such as GitHub and GitLab for collaborative coding and version control, allowing students to engage in real-world software development practices. Platforms like [CodingRooms](#) have enabled me to conduct live coding sessions and provide immediate feedback, fostering an interactive and responsive learning environment.

To support computational projects and cloud-based learning experiences, I utilize IBM Cloud, which offers robust resources for deploying scalable applications and simulations. Additionally, the MS Teams Classwork platform has been instrumental in creating a collaborative online classroom where students can access resources, participate in discussions, and work on group assignments seamlessly. In my robotics courses, I rely on Webots for realistic simulation experiences, enabling students to apply theoretical concepts in a virtual yet practical context.

Furthermore, I have incorporated Coursera Private Authoring to design and distribute course content in a structured and engaging format, aligning with modern digital pedagogies. This

platform not only enhances content delivery but also supports adaptive learning, allowing me to tailor lessons to the diverse needs of my students.

Recognizing that continuous professional development is key to effective teaching, I have actively participated in numerous TLC workshops, teaching seminars, and webinars. These sessions have deepened my understanding of evidence-based pedagogical practices and innovative instructional strategies, such as blended and flipped classroom models, which I now implement regularly. A list of the workshops I attended is given below:

- (1) TLC Online seminar, "AI-Powered Higher Education: Transforming Teaching and Learning", co-organized by Sunway University's Centre for Higher Education Research (CHER) and Department of Computing and Information Systems, in collaboration with DRM Learning Consultancy and CIFAL York (Canada) 2024
- (2) IEED UBD EntreMasterclass Program 2024
- (3) TLC workshop on Social media training for researchers 2024
- (4) EdPuzzle, Mentimeter, & Zipgrade. Participant, 15-Sep 2021
- (5) UBD TLC Workshop on Mendeley & MSWord for Academic Writing, Participant, 03-Nov 2021
- (6) American Chemical Society Webinar on UBD-ACS-CAS Resources for Research, Participant, 15-Dec 2021
- (7) UBD TLC Workshop Experiential Learning Approach in Entrepreneurship, Participant, 16-Feb 2022
- (8) UBD TLC Workshop on Turnitin, Participant, 27-Jan, 2021
- (9) UBD TLC Workshop on Online Learning Pedagogies, Participant, 24-Feb 2021
- (10) UBD TLC Workshop on Blended Learning During COVID-19 Outbreaks in Kagawa University Japan, Participant, 31-Mar 2021
- (11) UBD TLC Workshop on How to Design Blended Learning Courses & a Lesson Plan? Participant, 23-Jun 2021