UNIVERSITY OF AUCKLAND
Waipapa Taumata Rau
NEW ZEALAND

ENGINEERING

FINAL YEAR PROJECT

Display Day 2023

Thursday, 19 October
University of Auckland City Campus
Building 401 & 405, Entry via 20 Symonds Street

Featured Departments:
Mechanical and Mechatronics Engineering
Civil and Environmental Engineering
Engineering Science and Biomedical Engineering
Chemical and Materials Engineering
Electrical, Computer, and Software Engineering

KIA ORA KOUTOU.

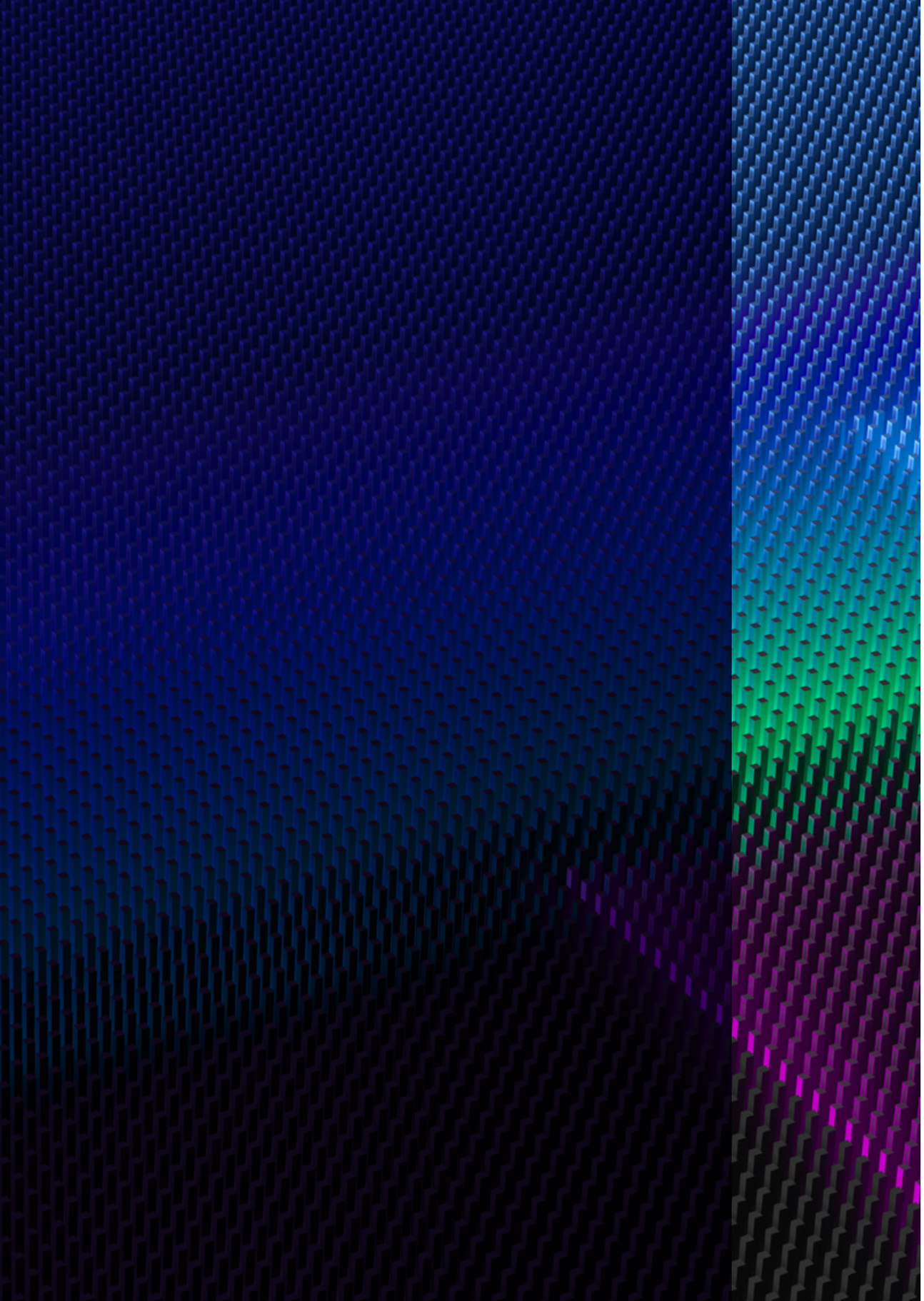
As Dean of Engineering, it is my pleasure and privilege to welcome you to our 2023 Final Year Research Project Display Day.

The Part IV Research Project represents a significant point in an undergraduate Engineering student's degree. These year-long research undertakings are the culmination of the knowledge they've attained so far, applied to relevant situations that they have to test and prototype, many of which you will be able to witness today. The Research Project Display Day is always an exciting time to see engineering theory come to life.

These projects provide an opportunity not just for students to realise their capacity and build confidence in their skills, but also for employers to experience what an up-and-coming engineer can bring to the table. We put a strong emphasis on getting our students career-ready once they graduate, so it's great to see the range of industry sponsors who continue to get involved with the final year research projects each year.

I hope you'll join us in proudly celebrating everything that our students have achieved this year.

PROFESSOR GERARD ROWE
Manukura Pūkaha | Dean of Engineering
Waipapa Taumata Rau | University of Auckland



ABOUT

the Final Year Project

The Final Year Project, formally recognised as the Part IV Research Project, is a compulsory unit of our Bachelor of Engineering (Honours) degree. This involves final year Engineering students spending the bulk of the year — usually in pairs — on a research project supervised by engineering academics. This degree component requires the submission of a research portfolio that includes a final report, a conference presentation, and technical demonstrations. In essence, it assesses a student's ability to utilise their knowledge of both theory and practice.

A variety of topics will be showcased by each department, and in some cases, a student's project may entail solving a real problem proposed by an engineering company. Because these projects are considered as learning experiences to encourage students to tackle problems the same way engineers do in their professional career, we encourage as much industry participation as possible.

We ensure that this is the case by inviting industry professionals each year, not just as sponsors and co-supervisors, but also to review and judge the projects. Prizes are also awarded to outstanding projects of each department.

The practical demo and display/exhibition component of the Final Year Project is what you will be seeing today.

Engineering departments featured at today's event in the order of floor level:

- Mechanical and Mechatronics Engineering
- Civil and Environmental Engineering
- Engineering Science and Biomedical Engineering
- Chemical and Materials Engineering
- Electrical, Computer, and Software Engineering

MECHANICAL & MECHATRONICS ENGINEERING

Drone Technology

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
2	On the Development of Tethered, Modular, Reconfigurable, Aerial Robotic Vehicles	Minas Liarokapis	Karl Stol	Geoffrey Huang, Masahiro Kobayashi
29	Variable Pitch Propellers for Highly-Agile Drones	Nicholas Kay	Luke Hallum	Lex Hostler, Raymond Hu
36	Improving Control Allocation for Over-actuated Multirotor UAVs	Karl Stol	Jaspreet Dhupia	Sam Gilbert, Jos Spaans
37	Drone Flight Control for Contact Testing of Power Lines	Karl Stol	Luke Hallum	Katrina Chan, Jonty Kirk
46	Drone Airframe Optimisation	Peter Xu	Jaspreet Dhupia	Cameron Dallas, Benjamin Holt

Design/Systems Engineering

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
14	Investigating effective CAD teaching: fun and foundations	Stephen Kavermann	Hazim Namik	Angelito Castro, Megan Noronha
78	An integrated energy harvester for powering wireless vibration sensors	Lihua Tang	Vladislav Sorokin	Lachlan Pearce, Rory Reade
82	299 Motor Optimization and Development	Mark Jeunnette	Hazim Namik	Nason Hameed, Akitha Medagoda
116	Developing design labs for Part II students	David Wynn	Hazim Namik	Camelle Maree Cal
117	Automatically generating solution proposals for the Warman Design Project	David Wynn	Peter Xu	Alex Lasenby, Stefan Zdravkovic
118	Design guidance system for machine design projects	David Wynn	Arcot Somashekar	Hayden Banks, Leroux Van Zyl
119	Assessment and improvement of a method to create new designs by combining existing variants	David Wynn	Maran MM	Kevin Isidro, Jerome Wijesurendere

Smart Materials and Microtechnologies

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
32	Manufacture of laser induced graphene electronic sensors from seaweed	Jonathan Stringer	Johan Verbeek	Elizabeth Chan, Aaron Lew
34	Extrusion 3D Printing with Aqueous Two Phase Systems	Jonathan Stringer	Johan Verbeek	Evan Hoflich, Josh Leake
35	Adapting a desktop Inkjet printer for Braille printing	Jonathan Stringer	Johan Verbeek	Dom Alexander, Jacob Church
44	Electrical power generation using triboelectric generator	Kean Aw	Vladislav Sorokin	Bhumik Mahesh Patel, William Pickett

Dynamics and Control

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
48	Tidal energy for powering marine farms	Vladislav Sorokin	Lihua Tang	Salustiano Rodriguez-Ferrere, Jean-Daniel Rosset
49	Underwater energy harvesting from ocean waves	Vladislav Sorokin	Lihua Tang	Samuel Grant, Jamie O'Dochartaigh
79	Vibration-based rail structure condition monitoring	Lihua Tang	Vladislav Sorokin	Luis Viel Corrales, Peter Thompson
81	Wearable energy harvesting	Lihua Tang	Vladislav Sorokin	Amrit Singh, Sanjeev kumar Somnath

Mechatronics

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
15	Sequentialization of Nodal designs for 3D printing to increase assembly efficiency	Olaf Diegel	Stephen Kavermann	Akhil George, Gareth Spencer
24	IOT based optimal variable control for maximisation of hydroponic plant harvest	Jaspreet Dhupia	Yuqian Lu	Ruby Osborne, Tristan Pilditch
25	Remote Anomaly Detection for IoT-based Health Condition Monitoring of Industrial Robots	Jaspreet Dhupia	Jan Polzer	Joshua Lin, Samuel North
43	Design and Development of a Smart Sensor for Detecting Sewer Flow Conditions	Kean Aw	Karl Stol	Sabina Aquino, Brianna Breeze

Auckland Space Institute

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
38	Enhancing classical control laws with reinforcement learning	Roberto Armellin	Guglielmo Aglietti	K'vaan Valabh, Sumukha Viswakarma
55	Multi debris removal tour design	Roberto Armellin	Guglielmo Aglietti	Alastair Crasto, Filip Kus
65	Gravity off-loading system for a multi-element deployable spacecraft structures	Guglielmo Aglietti	Roberto Armellin	Hazen Mahon, Matthew Oates
68	Damping mechanism for passive deployable spacecraft structures	Guglielmo Aglietti	Roberto Armellin	Toby Ryder, Daniel Shi
98	Ultra-Low profile Reaction Wheel Assembly	Benjamin Taylor	Roberto Armellin	Taylan Boyle, Vivek Panchal

Mechanics of Materials and Manufacturing Processes

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
11	3D Printing for wearable technology	Olaf Diegel	Luke Hallum	Yerin A Liam Tompkins
12	Food 3D printing for customized nutrition	Hamed Abdoli	Simon Bickerton	Reylet Clarisse Esguerra, Jessica Fang
10	Recycling Thermoset Composite Waste through Binder Jet 3D Printing	Simon Chan	Jonathan Stringer	Cindy Chang, Emma Sim-Smith
30	Manufacture of Small Structural Components using Waste Stream CFRP as a Sheet Moulding Compound	Tom Allen	Arcot Somashekar	Joshua Cates, Matthew Yang
33	Design and build of powder characterisation apparatus for powder bed 3D printing	Jonathan Stringer	Olaf Diegel	Ashna Prasad, Kanako Tanaka
57	Development of a Secondary Vacuum-Bag Curing Process for 3D Printed Continuous Fibre Epoxy Components	Simon Bickerton	Krishnan Jayaraman	Justin Reiter, Jerry Sun
58	Lightweight protection for vehicle-side inductive charging pads	Tom Allen	Arcot Somashekar	Ahimsha Saravanapavan, Erika Joy Yson
62	Are conventional heat exchanger design heuristics applicable to ultra-high surface area (gyroid) heat exchangers?	Johan Verbeek	Simon Chan	Matthew Inglis, Felicia Nasrun
69	Thermal Performance of a Small-scale Fast-charging IPT System for Electric Vehicles	Simon Bickerton	Krishnan Jayaraman	Reagan Kelly, Keaton Mackenzie
72	Designing polymer blends for high impact strength	Johan Verbeek	Simon Bickerton	Jinda Dong, Vidushan Jayaratnam
73	Producing high performance polyester tapes	Johan Verbeek	Jonathan Stringer	Matthew Hall, Liam Maguire
76	Enhancing Bond Strength using Additive Manufacturing; Design Optimisation of Selective Laser Melting 3D Printed Surface Topologies	Simon Bickerton	Jonathan Stringer	Benjamin France, Toby Smeets
77	Manufacture of Carbon Fibre Thermoplastic Composites, Utilising Waste Plastic Blends	Simon Bickerton	Krishnan Jayaraman	Zehuan Gao, Janusha Gunasekara

97	Using high voltage DC plasmas to modify polymer blends suitable for high impact strength	Johan Verbeek	Simon Bickerton	Elias Fritzen, Nick Goodall
106	Wet spinning of highly conductive carbon fibres	Arcot Somashekar	Krishnan Jayaraman	Ollie Lennox, Callum Richards
107	Stretchable and flexible biocarbon-based strain sensor for human motion monitoring or robotic applications	Arcot Somashekar	Justine Hui	Fraser Eade, Allen Liu
108	3D printing of waste plastic-based polymer composites	Arcot Somashekar	Johan Verbeek	Bradley Hall, Neil Mario
109	3D printing of a polymer blend for robotic applications	Arcot Somashekar	Olaf Diegel	Zachary Fletcher, Rafael Yang

Robotics

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
1	A Humanoid Platform and Human Robot Interaction Framework for Deaf and Deaf-Blind Communication with the American Sign Language	Minas Liarokapis	Maran MM	Sennah Lee, Matthew Shepherd
3	[CDP-ECSE] Reinforcement Learning Based Control for Dexterous Robotic Manipulation	Minas Liarokapis	Peter Xu	Ben Hart, Koen Van Rijnsoever
4	On Ultra-Flexible Robotic Manipulation Systems for Industrial Assembly	Minas Liarokapis	Peter Xu	Harry Bond, Rhys Holland
9	ABB Robotic Arm 3D printing for Repair	Olaf Diegel	Jan Polzer	Jean van Zyl, Joe Wickens
26	Development of a treadmill based test rig for analysis and validation of legged robots	Jaspreet Dhupia	Justine Hui	Willem Scott, Stephen Xie
27	Remote Gantry Controller for Tele-Medicine Applications	Jaspreet Dhupia	Luke Hallum	Toby Osborne, Yijie Ren
47	Robotic Motorway Barriers - An Autonomous, Reconfigurable and Self-docking Solution	Peter Xu	Karl Stol	Dylan Meleisea, Christopher Simonds
99	Localisation and Position Control for a Mobile Robot Remote Lab	Hazim Namik	Stephen Kavermann	Jee Soo Kim, George Reddish
103	Intuitive and Dexterous Teleoperation of Mobile Robotic Manipulation Platform	Minas Liarokapis	Jan Polzer	Caleb Parker-Lee, Jesse Weston
105	Safe human-robot collaboration via active collision avoidance	Yuqian Lu	Peter Xu	Jarrod Chan, Matthew Horning

Biomechatronics

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
6	A convolutional neural network for detecting visual texture	Luke Hallum	Yusuke Hioka	Imogen Chang, Leo Mooney
7	A convolutional neural network that extracts depth from images	Luke Hallum	Yusuke Hioka	Samuel Reedy, Nic Zwager
13	Investigating mechanical design of medical devices to be used in developing countries	Stephen Kavermann	David Wynn	Lily Cheetham, Isabella Vesty
45	Automatic Saliva Injection and Temperature System for a Mastication Robot	Peter Xu	Maran MM	Joshua Kennard, Jun Park
52	Development of a low-cost tabletop system for hearing aid users	Justine Hui	Yusuke Hioka	Nikitta Jam, Alice Oh
74	The visibility of cyclists	Luke Hallum	Stephen Kavermann	Sherry Cheng, Bhakti Patel
75	Are two fingers better than one? Using 3D printing to understand the neural mechanisms of touch	Luke Hallum	Justine Hui	Vu Bach, Yuzhang Tan
110	Detecting sleep apnea in clinical EEG recordings	Luke Hallum	Maran MM	Haochen Zhang, Jeffrey Zhou

Aero-Fluid-Hydrodynamics, Thermal Dynamics and Heat Transfer

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
16	Aerodynamic effects of masts upon yacht sails	Stuart Norris	Peter Richards	Sami Naseem, George Pinker
17	Development of a VPP for an AC90 Yacht	Stuart Norris	Peter Richards	Alex Barbarich-Bacher, Arshia Mathur
18	Natural Convection Heat Transfer Through Enclosed Cavities	Stuart Norris	Rajnish Sharma	Dexter Brick, Toby Main
19	A re-evaluation of methods used to predict the performance of transpired solar collectors	Stuart Norris	Priyanka Dhopade	Jedidiah Kueh, Campbell Lin
28	Free Flight Testing of a Fixed-Wing UAV in a Wind Tunnel	Nicholas Kay	Michael Kingan	Isabelle Burr, Jannik Wittgen
31	Flying Met Station	Nicholas Kay	Stuart Norris	Hannah Brighouse, Kathy Hastie
66	Design and Build of a Hydrodynamic Test Rig	Michael Kingan	Rajnish Sharma	Sam Howarth, James Walmsley
67	Reliable artificial rain generation	Michael Kingan	Jonathan Stringer	Josh Posadas, Penisuiti Tata
84	Thermal measurements for reusable space launch systems	Priyanka Dhopade	Rajnish Sharma	Michael Gatland, Jamie Spencer
85	Space and Sustainable Development	Priyanka Dhopade	Guglielmo Aglietti	Cameron Edwards, Sarthak Tripathi
89	[CDP-CEE] Decoding attributes of a successful engineer	Priyanka Dhopade	Rajnish Sharma	Tina McIntosh, Canaan Setefano
91	Yacht aerodynamics using CFD modelling and wind-tunnel experiments	Michael MacDonald	Nicholas Kay	Sam Creevey, Balin Mitchell
93	The fluid mechanics of bottle emptying	Michael MacDonald	Stuart Norris	Taylan Onan, Christos Sanft
94	Turbulent fluid flow over flexible vegetation	Michael MacDonald	Stuart Norris	Ryan Buist, Joe Chan
102	Wind Flow Modelling for Urban Air Mobility	Rajnish Sharma	Nicholas Kay	Ronan Lee, David Tribhuvan
113	Roll behavior of Small Fixed Wing UAVs in Gust Conditions	Rajnish Sharma	Nicholas Kay	Lewis Brown, Peter Vodanovich
115	Wake steering of a small wind turbine under turbulent flow conditions	Rajnish Sharma	Priyanka Dhopade	Cy Mills, Madhav Pandalai
120	Smart CO2 Reduction through Heat Recovery in the Cooling System	Rajnish Sharma	Priyanka Dhopade	Robert Duncan, Leo Lu

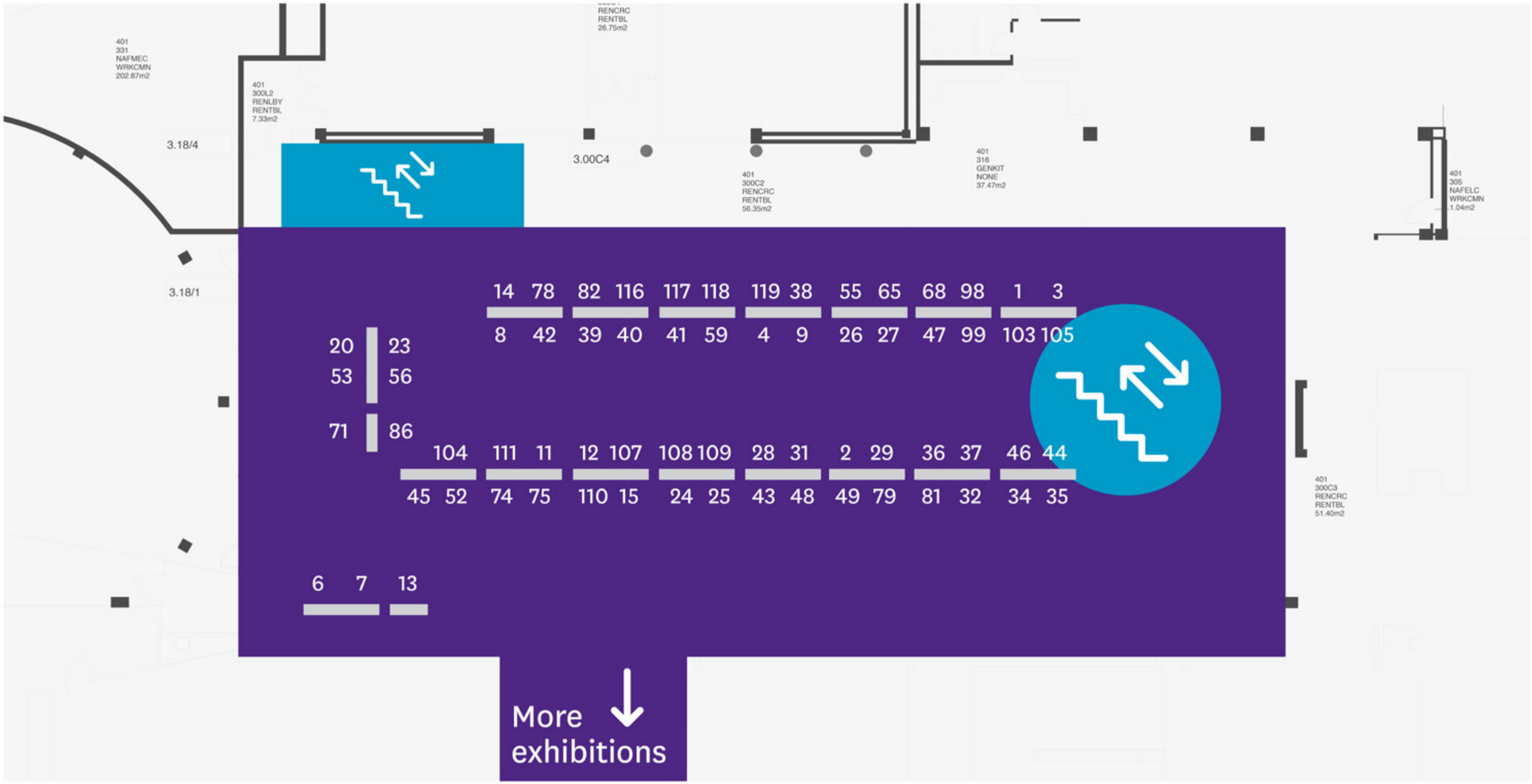
Industry 4.0 Smart Manufacturing Systems

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
8	Stem assembly (O-ring fitting) automation system	Yuqian Lu	Jaspreet Dhupia	Travis Augenstein, Andreas Hamschmidt
39	IoT device for automatic farm gate detection	Jan Polzer	Xun Xu	Matthew Welcome, Youjia Xu
40	Flexible, low-cost real-time monitoring system	Jan Polzer	Xun Xu	Krysban D'Souza
41	Smart control and data analytics for a quality inspection system at ABB	Jan Polzer	Yuqian Lu	Botao Dong, Hang Sun
42	Low Cost Automated Quality Inspection of Welded Pipes	Jan Polzer	Xun Xu	Thomas An, Bobby Sun
59	Development of a portable, cost-effective and automated quality inspection system at ABB	Xun Xu	Jaspreet Dhupia	Kenji Komori, Wei Ting Teo
104	Fully-automated hydraulic hose-making solution	Yuqian Lu	Xun Xu	Indu Narahenpitage, Brian Yu
111	Smart Tension Indicator	Xun Xu	David Wynn	Michelle Mahoney

Acoustics Research

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
20	Measuring the acoustic properties of wall absorbers after they have been installed in a room	Yusuke Hioka	Michael Kingan	Jack Budge, Oscar Lin
23	Real-time acoustic environment simulation to improve vocalist performance	Yusuke Hioka	Justine Hui	Jessica Robinson
53	Language learning tool based on speech acoustics	Justine Hui	Yusuke Hioka	Jenice Kuzhikombil, Anahera Roestenburg
56	Acoustic resonance based metasurfaces for low frequency sound attenuation	Andrew Hall	Michael Kingan	Joel Griffin, Tim Peck
71	Making an impact: next-generation metamaterials for robots and intelligent structures.	Andrew Hall	Michael Kingan	Luna Luo, Joel Riddell
86	Investigation of Trees as sound scatterers - is there potential to design tree planting patterns as meta-material, band-gap noise barriers?	George Dodd	Lihua Tang	Oliver Marchl, Haydn Nicholson

MECH: B401. LEVEL 3 Atrium



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CIVIL & ENVIRONMENTAL ENGINEERING

Construction

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
75	Automated Façade Deterioration Assessment Using Building Information Modelling (BIM) and Image Processing Algorithm	Yang Zou	Nona Taute	Yuvraj Behal, Mohammed Samdani

Geo

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
63	Geotechnical characterisation of South Auckland peat deposits	Rolando Orense	Romain Meite	Phoebe Qiu, Yucy Wang

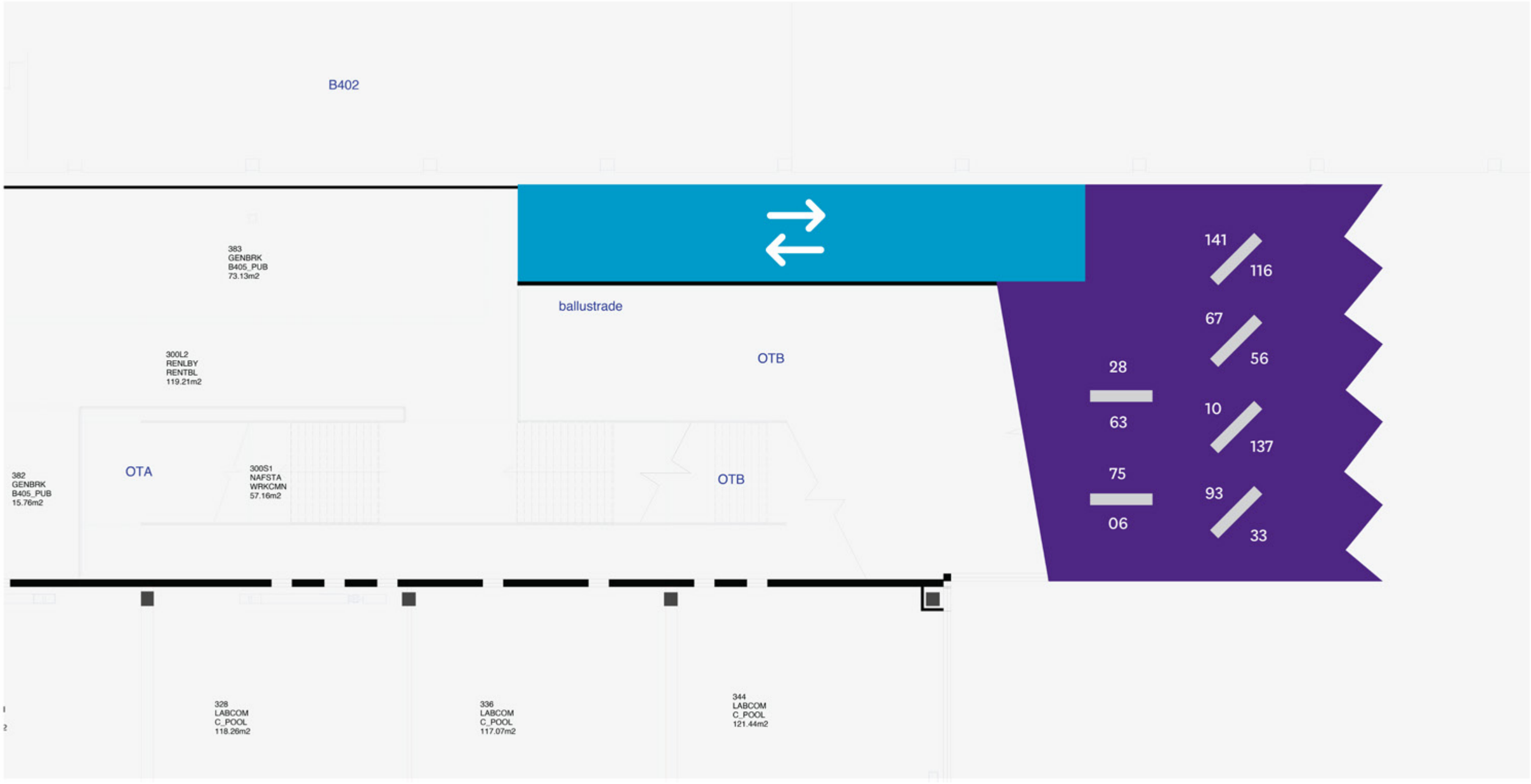
Structural

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
6	How much carbon can concrete really absorb from the environment? - Cross-departmental project with C&M	Enrique del Rey Cas	Charlotte Toma	Patrick Boyle, James Ross
28	Manufacturing kaimoana lime binder concrete	Jason Ingham	Max Stevens	Katerina Carter, David Greis
33	Practice-oriented techniques for modelling floor diaphragms strengthened using fibre reinforced composites	Max Stevens	Jason Ingham	Sofie Mulligan, Natalie Robinson
93	Impacts of design decisions on Embodied Carbon in large infrastructure projects with McConnell Dowell	Charlotte Toma	Enrique del Rey Castillo	Canyu Chen, Xiaolong Wang
137	Developments in Sustainable Materials	Gary Raftery	Ashkan Hashemi	Leo Li, Iris Wang

Water

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
10	Debris dam effects on hydrodynamic loads of New Zealand bridges - Experimental insights under flood-induced flow conditions	Colin Whittaker	Conrad Zorn	Rebecca Liao, Monica Ping
56	The worst place to live in New Zealand	Conrad Zorn	Colin Whittaker	Logan Bradley, Olivia Jury
67	Characteristics of leaks in water distribution pipes	Kobus van Zyl	Kilisimasi Latu	Fangzheng Cui, Matthew Huang
116	Atmospheric rivers under climate change	Asaad Shamseldin	Bruce Melville	Andy Oliver, Finn Palmer
141	Vehicle generated waves in flood waters	Tom Shand	Colin Whittaker	Jithari Bamunusinghe, Dihara Wijeratne

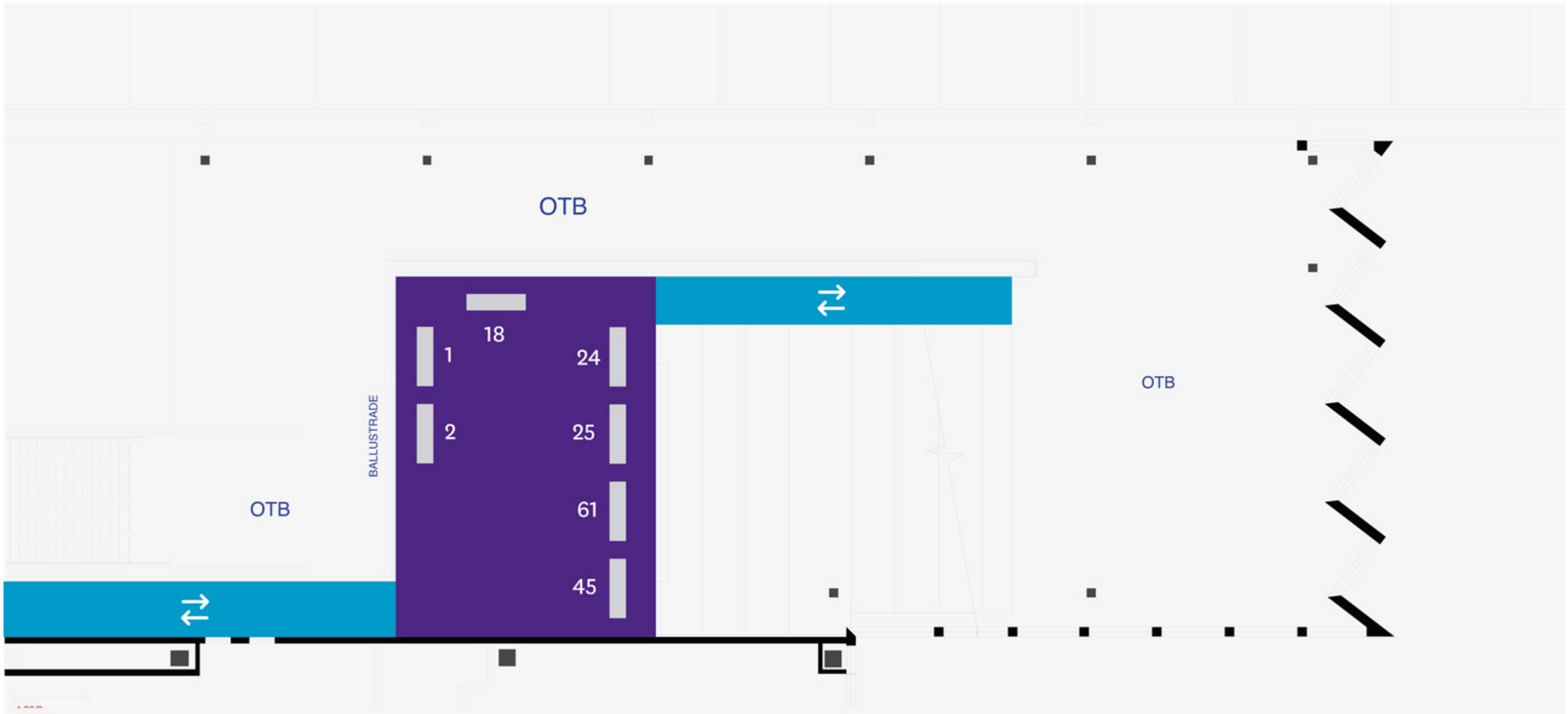
CIVIL:
B405. LEVEL 3 LOWER TERRACE



ENGINEERING SCIENCE & BIOMEDICAL ENGINEERING

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
24	Capturing a football game for virtual reality			Jared Clarke, Nicholas Lee
25	Using a 360-degree camera to help estimate bird populations			Ryo Kamata, Nicholas Patel
61	Measuring Stress in Everyday Life			Manasija Nandagiri, Manas Sonar
2	Evaluating tibia fractures in athletes using wearables and population data			Sarah Donohoe, Joe Walker
1	Evaluating MRI biomarkers of ADHD: Towards a diagnostic tool			Ben Hall, Serena Yu
18	Developing an educational resource tool that models ventilation and the movement of aerosol-based infectious particles within a room			Michelle Delves, Maya Speers
45	How does skin cancer spread? Advanced analysis of melanoma imaging data			Morgan Hatch, Matthew Wright

ESB:
B405. LEVEL 4 UPPER TERRACE



CHEMICAL & MATERIALS ENGINEERING

Materials Engineering for Health and Environment

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
17	Characterisation of mechanical properties of composite hydrogels for cardiac tissue engineering	Jenny Malmstrom		Amy Cui, Kathy Pu
18	Electrospinning of chitosan fibres using green deep eutectic solvents (DESs) for piezoelectric applications	Jenny Malmstrom		Maxim Caco, Jack Lawson
10	Identifying requirements for an articular cartilage replacement candidate through computational modelling	Reza Arjmandi		Joshua Eickhoff, Russell Gonzalez
23	Bringing mechanical testing of sheep lumbar spine segments to the next level with a kinematic measurement system	Vonne van Heeswijk		Benjamin Paris, Olivia Upston
5	Correlating Temperature Rise with Greenhouse Gases	Ashton Partridge		Tariq Ghazaly, Joshua Swanepoel

Novel Materials for Energy and Manufacturing

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
25	Fabricating aerogels/ xerogels based on colloidal silica from geothermal plants	Mark Jones (Eng)		Luan De beer, Angelo Yelich O'Connor
26	Development of Roman-inspired, lime-based concrete for the creation of sustainable and durable memorial stones	Mark Jones (Eng)		Claire Han, Wayne Tan
33	Nanocellulose-based membrane for zinc ion batteries	Peng Cao		Matthew Payne, Tien Tan
19	High performance electrode materials for aqueous metal-air batteries	Shanghai Wei		Gina Leclercq, Jacqueline Wong
20	Advanced Alloy Anode for Magnesium Rechargeable Batteries	Shanghai Wei		Ameera Danford, Angela Whyte
1	W addition to carbide composites as a solid solution strengthening agent	Steven Matthews		Qiwen Liu, Dominic Pranjoto
2	WC-17Co + Carbon/(Ni+graphite) addition	Steven Matthews		Miranda Graham, Sophie Hogan
3	SiC addition to carbide composites as a solid solution strengthening agent	Steven Matthews		Shahbaz Ali, William Wei
4	How much carbon can concrete really absorb from the environment?	Steven Matthews		Gianna Bean, Olivia Chin
30	Core-Rim WC composites	Steven Matthews		Katy Ha, Nathtan Sawang
31	WC+Cr_3C_2+Ni + Carbon/(Ni+graphite) addition	Steven Matthews		Hyeonsu Han, Sut Cheng Ieong
32	"Self-Healing" Intelligent Anticorrosion Coatings	Wei Gao		Harry Beal, Ryan Doyle
6	Physical and rheological characteristics of phase change materials over multi-thermal cycles	Amar Auckaili		Steven Osmena, Alex Tomson
36	Innovative metal-oxide carbon electrodes for supercapacitors	Wei Gao		Joshua Salam, Kai Bouleçane

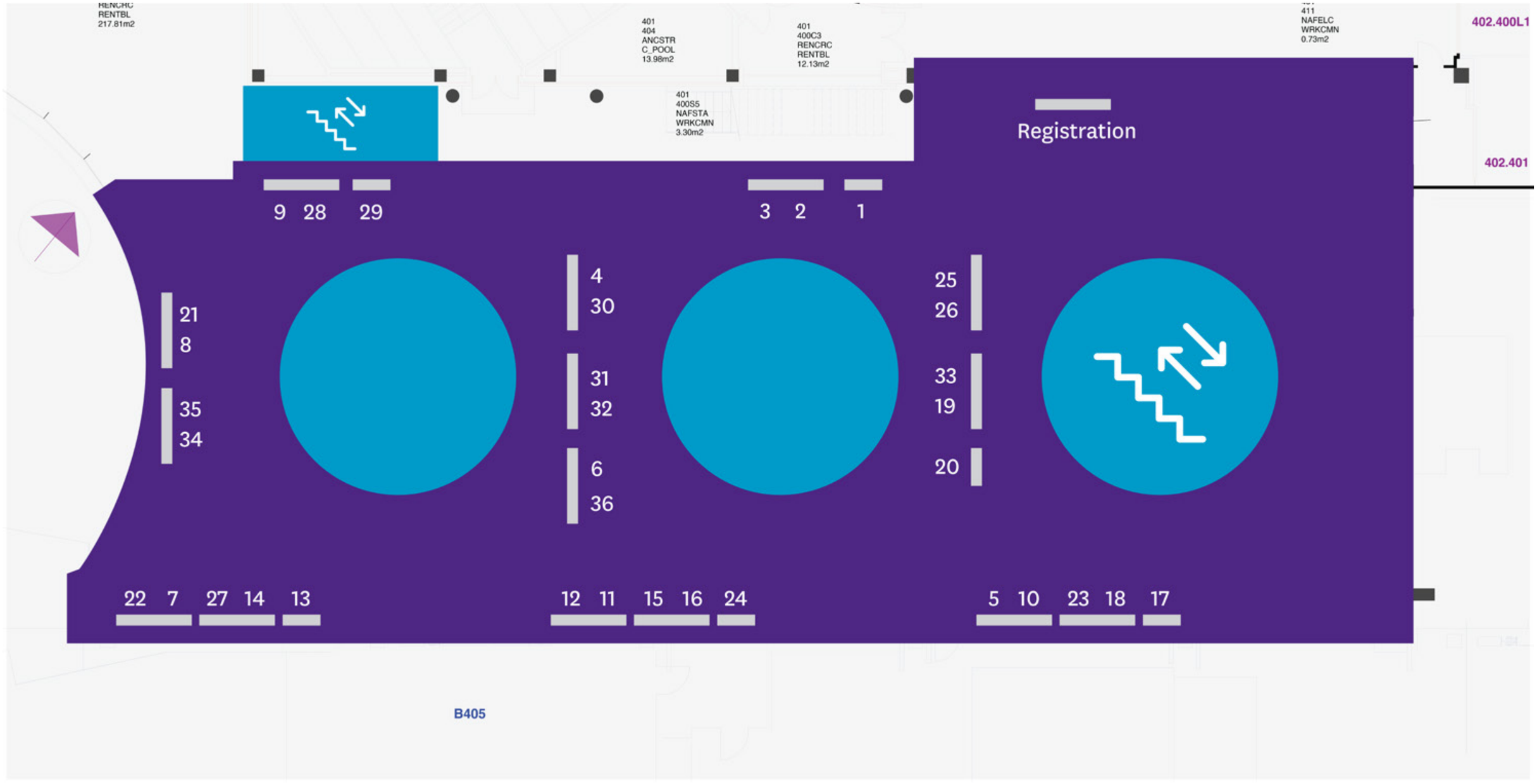
Innovative Processe Engineering

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
16	Application of CAT Scan Technology to Cleaning-In-Place	Brent Young		Daegan De Swardt, Roi Questin
15	Efficiency of a H_2 PEM Fuel Cell Combined Heat and Power System	Brent Young		Jackson Barr, Max Reid
24	Digital modelling of industrial plants for demand flexibility operation	Wei Yu		Nate Amanono, Noam Webber
11	Development of a Power Conditioning System for Green Hydrogen Production	Jingjing Liu		Sam Clarke
12	Understand how O_2 bubbles affect green hydrogen production energy efficiency	Jingjing Liu		Callum Campbell-Ross, Maggie Li
27	Resource recovery from wastewater treatment: Valorisation of biosolid sludge to biochar	Saeid Baroutian		Puru Bakshi, Kirsty Parker
13	Sustainable recovery of lipids from New Zealand green-lipped mussel using green solvents	Kaveh Shahbaz		Iain McMillan, Jeff Tan
14	Extraction of high-added value compounds from Undaria Pinnatifida using green solvents	Kaveh Shahbaz		Melanie Bryant, Keely Pakes
7	Producing Paraffinic Products From Recycled Plastics	Amar Auckaili		Emma Johns, Milica Mihajlovic
9	Cr effect on biomineralization of struvite by bacillus pumilus	Wei Yu		George Sadler, Stephen Stuart
28	Investigating bacterial population dynamics in anaerobic chain-elongation bioprocesses for upcycling winery waste	Shan Yi		Haluka Kirk, Christina Pan
29	Enzymatic and chemical treatments for efficient lignocellulose bioconversion	Shan Yi		Max Bradbury, Himadri Podder

Food Engineering

PROJECT NO	PROJECT TITLE	EXAMINER	ASSESSOR	STUDENTS
21	Preparation of bacteria into a non-soluble immobilized matrix	Meng Wai Woo		Vincent Chen, Leo Tattersfield
22	Design and optimization of reactor packing materials	Meng Wai Woo		Carl Legaspi, Therese Julienne Vivero
34	Smart Tension Indicator	Meng Wai Woo		Fraser Longmuir
35	3D Ohmic food printing	Meng Wai Woo		Fraser Kernick, Jarrod Matthews
8	Image analysis for fruit drying process quality control	Wei Yu		Aidan Roycroft, Jaden Zeng

CHEMMAT:
B401. LEVEL 4 ATRIUM



ELECTRICAL, COMPUTER, & SOFTWARE ENGINEERING

PROJECT NO	PROJECT TITLE	STUDENTS	CATEGORY	LAB
127	Computing Education for Machine Learning	Eaton Ma, Aashish Singh	AI & Machine learning - 1	HASEL 405.662
35	On the use of inductive-transductive machine learning to detect Autism Spectrum Disorder	Wiktor Tumilowicz , Skylar Wells	AI & Machine learning - 1	HASEL 405.662
49	Who wrote this code? Human or AI?	Benjamin Goh , Cameron Nathan	AI & Machine learning - 1	HASEL 405.662
99	Designing an Interactive Computing Education Tool for Teaching Machine Learning	Ahmad Barzak, Caleb Brunton	AI & Machine learning - 1	HASEL 405.662
30	Turbulent Water Modelling for Aquaculture Robotic Vision Systems	Benjamin Salmon, Yun-Shan Tsai	AI & Machine learning - 1	Power Systems 405.628
110	AI approach to a question/answering system for a construction project	Dean Phommahaxay , Michael Theron	AI & Machine learning - 1	Power Systems 405.628
22	Improved synthetic data for warehouse based machine learning applications	Jo Bull, Henry Gann	AI & Machine learning - 2	Embedded Systems 405.760
31	Transfer learning for Air Pollution Inference	Aden Ing , Avikash Naidu	AI & Machine learning - 2	Embedded Systems 405.760
32	Turbid Water Enhancement for Aquaculture Robotic Vision Systems	Aidan Folger , Joseph Young	AI & Machine learning - 2	Embedded Systems 405.760
67	Stress Monitoring and Quantification through Digital Biomarkers	Craig Lim , Alfred Pama	AI & Machine learning - 2	Embedded Systems 405.760
116	Accelerating Capsule Networks on Adaptive Platforms	Matthew Liu , Frank Shen	AI & Machine learning - 2	Embedded Systems 405.760
101	Automated Generation of Trustworthiness Oracles for Machine Learning Models	Steven Cho , Seaton Cousins-Baxter	AI & Machine learning - 2	HASEL 405.662
86	Wave Emulation using a Gough-Stewart Platform	Samuel Hu	Control Systems	Control Systems 405.722
48	Smart control of renewable energy sytstems	Mayur Das , Rufaro Manjala	Control Systems	Control Systems 405.722
85	3D Force Sensing	Lexin Lin , Yiqi Zang	Control Systems	Control Systems 405.722
114	Improved Sensors to Monitor Knee Strain	Isaac Sheppard , Kallum Spader	Control Systems	Control Systems 405.722
9	A Charger for Supercapacitor Based Backup Source Used in Uninterruptable Power Supplies	Puja Laxman , Ashley Van Der Merwe	Control Systems	Power Electronics 405.614
34	Pacemakers for Gastrointestinal Diseases	Glacer Barnett , Yogesh Dangwal	Embedded Systems - 1	Embedded Systems 405.760
40	Safe autonomy using synchronous AI and the F1/10 racing car	Bill Wen , Ray Xiang	Embedded Systems - 1	Embedded Systems 405.760
68	An emulation platform of Google bitide for compositional neural network execution	Jared Bawden, Ganeev Sethi	Embedded Systems - 1	Embedded Systems 405.760
74	Auto-complete for Music	Shou Miyamoto , Rachel Nataatmadja	Embedded Systems - 1	Embedded Systems 405.760
90	Anomaly detection for IoT-based time series	Aarni Kupari , Jin Young Oh	Embedded Systems - 1	Embedded Systems 405.760
28	Run-Time Security Threat Detection for Embedded Systems Software	Daiyaan Claver , Neil Mishra	Embedded Systems - 2	Embedded Systems 405.760
73	Deep Learning Transformers for ECGs	Francis Cho , Xuhan Liu	Embedded Systems - 2	Embedded Systems 405.760
117	Energy vs. Accuracy: Investigation of Energy Efficient Solutions for Machine Learning (ML)	Isaac Chandler, Jordan Green	Embedded Systems - 2	Embedded Systems 405.760
29	Investigating Security Vulnerabilities of Network on Chip Interconnections in MPSoC	Asher Butler , Daniel Mar	Embedded Systems - 2	Embedded Systems 405.760
115	Development of Unbreakable Cryptosystem using Dynamic Function Exchange	Anthony Mulder , Akash Pai	Embedded Systems - 2	Embedded Systems 405.760

PROJECT NO	PROJECT TITLE	STUDENTS	CATEGORY	LAB
87	Game-based Spatial Skills Training	Andy Fong , Patrick Oliver	Games & Education Aids 1	MDLS 405.559
102	Automated and Efficient Evaluation of Student Artefacts using Large Language Models	Nigel Lai , Alan Zhang	Games & Education Aids 1	MDLS 405.559
14	Gamifying a Virtual Reality based Vine Pruning training tool	Rick Casey Gonzales, Issei Metoki	Games & Education Aids 1	Radio Systems 405.736
1	How Can Robots Programming Engage Young Girls in STEM?	Jessica Fenwick , Brooke Knowles	Games & Education Aids 1	Radio Systems 405.736
100	VR and psychophysiological monitoring to develop resilience	Alex Liang, Jared Daniel Recomendable	Games & Education Aids 1	MDLS 405.559
51	Understanding how software teams collaborate	Qingyang Li , Harry Qu	Games & Education Aids 1	Radio Systems 405.736
96	Automating the development of worked examples using large language models.	Breanna Jury, Angela Lorusso	Games & Education Aids 2	Control Systems 405.722
98	Efficiently developing question banks for student learning using large language models	Ben Lowthian , Ojas Madaan	Games & Education Aids 2	Control Systems 405.722
104	Support for Automated Evaluation of Programming Style	Anton Lui , Gavin Mackintosh	Games & Education Aids 2	Control Systems 405.722
128	Applying machine learning to education	Alex Kim	Games & Education Aids 2	Control Systems 405.722
123	STEM: Computing and Electronics Education for High School Classrooms	Tianhua He , Ruskin Swedlund	Games & Education Aids 2	Green Electronics 405.712
3	How Can Board Games Teach Robot Ethics?	Julie Kim, Min Sun Kim	Games & Education Aids 2	Radio Systems 405.736
11	Design tool for LED optics	Daniel Black, Adam Fu	Green Energy Technologies	Green Electronics 405.712
19	Investigating and improving efficiency in laser power transfer applications	Tim Cheng , Yalin Yang	Green Energy Technologies	Green Electronics 405.712
59	Tunable white lighting controller simulating natural light	William Chen , Brandon Koh	Green Energy Technologies	Green Electronics 405.712
122	Ambient Environmental Energy Harvesting for Supercapacitor Driven Battery-less IoT Devices	Hugo Hu , Anna Qin	Green Energy Technologies	Green Electronics 405.712
8	Control, Drive, and Protection of GaN Half-Bridges in Cryogenic Environments	Suzanne Lo , Charley Shi	Green Energy Technologies	Power Electronics 405.614
60	Building individual's self-confidence not to be phished: a gamified approach	Matthew Jakeman , Jordan York	Human Computer Interactions - 1	Green Electronics 405.712
106	The university's digital twin for sustainability	Michael McCormack , Jiazhi Zhou	Human Computer Interactions - 1	Green Electronics 405.712
107	Development Of Novice User Technologies: An AI-Assisted Tool for Learning Code Comprehension and Debugging	Ou-An Chuang , Zimo Zou	Human Computer Interactions - 1	Green Electronics 405.712
95	Virtual reality installation to study embodiment	Howard Jiang , Meixuan Li	Human Computer Interactions - 1	Power Systems 405.628
126	Studying the effects of shared haptic senses on mixed reality finger drumming training	Victor Gan , Yuewei Zhang	Human Computer Interactions - 1	Power Systems 405.628
79	How Can Developers Collaboratively Work on Program Code?	Amy Rimmer , Yuewen Zheng	Human Computer Interactions - 1	Radio Systems 405.736
82	Tangible AR for Data Structure Teaching	Danika Chhour , Wynn Mo	Human Computer Interactions - 2	MDLS 405.569
89	Construction Training in a virtual environment for Health and Safety	Katherine Chong , Michael Truong	Human Computer Interactions - 2	MDLS 405.569
92	RythmWalker – A Mobile AR Rhythm Game for Promoting Physical Activity	Drason Guo , Dean Shu	Human Computer Interactions - 2	MDLS 405.569
80	AR/VR Perceptual Training	David Huckle, Blair Mclean	Human Computer Interactions - 2	MDLS 405.569
94	Multitasking Intervention Experiment	Emily Liu , Jessica Lorelei Villegas	Human Computer Interactions - 2	MDLS 405.569
25	Tukuna te reo ki te ao rorouira: Put language in the digital world	Bovey Yu , Joshua Zhu	Image & Voice Processing - 1	Control Systems 405.722
56	Speech Analysis: Modelling vs machine learning	Euan Pike , Samarth Sangwar	Image & Voice Processing - 1	Control Systems 405.722

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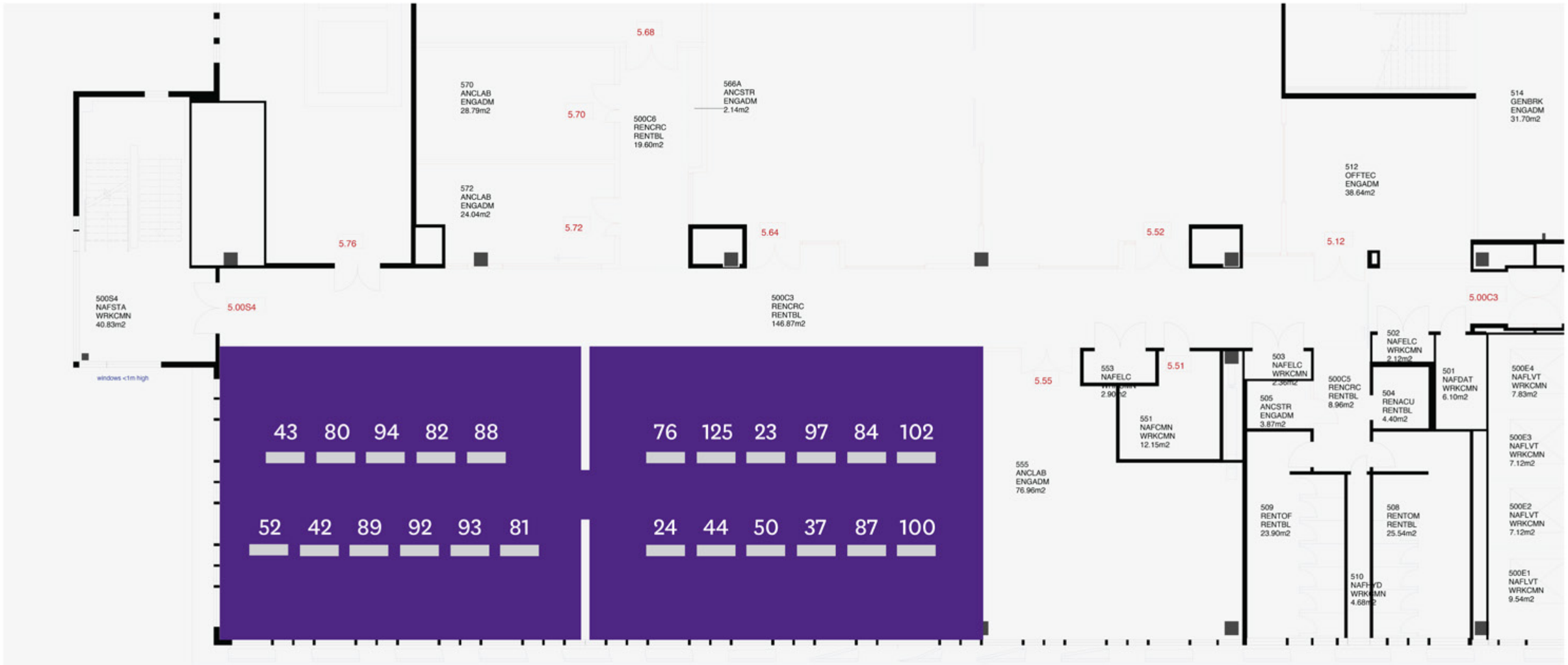
57	CDP–Mechanical - Project Title: Real-time acoustic environment simulation to improve vocalist performance	Nishan Shrestha	Image & Voice Processing - 1	Control Systems 405.722
27	Exploring Real-Time Face Recognition on Edge Devices	James Park , Martin Qiang	Image & Voice Processing - 1	Embedded Systems 405.760
10	Automatic Speech Recognition for the Speech Impaired	Ben Wang, Zihan Zhong	Image & Voice Processing - 1	HASEL 405.662
62	Plant monitoring system with 3D reconstruction	Max Nankivell , Eva Sorensen	Image & Voice Processing - 1	Robotics 405.652
26	Let's see some emotions - Emotional speech visualisation and annotation	Sunny Choi , Enuri Kolugala	Image & Voice Processing - 2	Control Systems 405.722
58	The reconstruction of speech/voice with the use of noise cancelling algorithms and machine learning.	Timothy Aguana Cabrera , Edward Chan	Image & Voice Processing - 2	Control Systems 405.722
112	2D Object Representation via Complex Polygonal Basis Functions	Kili Miyamoto , Anthony White	Image & Voice Processing - 2	Control Systems 405.722
61	Plant monitoring system to estimate harvesting timing	Eric Heo , Daniel Yang	Image & Voice Processing - 2	Radio Systems 405.736
13	Early detection of plant disease using machine learning approaches	Jason Chen , Violet Liu	Image & Voice Processing - 2	Robotics 405.652
64	Talking face generation system using DNN	Yu-gyeong Hong , Gayeon Kim	Image & Voice Processing - 2	Robotics 405.652
111	Low-cost Semi-Convex Volume Estimation	Hope Adams , Jimmy Wong	Intelligent Systems & Industrial Informatics	Control Systems 405.722
77	mmWave based human activity recognition	Beck Busch , Sam Mason	Intelligent Systems & Industrial Informatics	Embedded Systems 405.760
78	Digital twin for intelligent environment	Owen Eng , Wa Ben Wong	Intelligent Systems & Industrial Informatics	Embedded Systems 405.760
15	Fault tolerant scheduling and computing for CubeSat satellites	Mike Ma , Yinuo Xue	Parallel & Cloud Computing	Radio Systems 405.736
16	Power-efficient High Performance Computing (HPC) in small satellites	Jia Tee , Matan Yosef	Parallel & Cloud Computing	Radio Systems 405.736
17	Making GPU accelerators faster, avoid communication	Jack Gong , David Tran	Parallel & Cloud Computing	Radio Systems 405.736
18	Optimisation of HLS for Image Processing on FPGAs	Callum Iddon, Kian Jazayeri	Parallel & Cloud Computing	Radio Systems 405.736
124	Evaluation of new materials in wireless charging pads for high power operation	Cynthia Cao , Linge Wang	Power Electronics & Wireless Power Technologies	Power Electronics 405.614
20	Development of a Power Conditioning System for Green Hydrogen Production	Thea Larsen	Power Electronics & Wireless Power Technologies	Power Electronics 405.614
21	Thermal Analysis of power electronics in Inductive Power Transfer	Alexander Bailey, Johnny Wong	Power Electronics & Wireless Power Technologies	Power Electronics 405.614
41	Total harmonic distortion analysis of closely coupled wireless power transfer coils	Winnie Wen , Aaron Zhou	Power Electronics & Wireless Power Technologies	Power Electronics 405.614
46	Radio Frequency Wireless Energy Harvesting in an Indoor Environment	Muhammad Afandi , Alexander Wiseman	Power Electronics & Wireless Power Technologies	Power Electronics 405.614
47	Design of a contactless power supply for driving UV disinfection lamps	Andrea Guan , Laurence Li	Power Electronics & Wireless Power Technologies	Power Electronics 405.614
36	Identification of power quality using machine learning	Sam Hudson , Liam Kelly	Power Systems	Control Systems 405.722
38	Control of an Islanded Microgrid with Photovoltaic and Hybrid Energy Storage System	Chantelle Haywood , Elizabeth Ngan	Power Systems	Power Systems 405.628
119	Peer-to-Peer Transactive Energy Platform For Participating in NZ Electricity Reserve Market	Zhenyang Wang , Bing Yan	Power Systems	Power Systems 405.628
120	Power system resilience assessment framework for high weather hazard scenarios	Sam Robinson , Hemanth Sonthi	Power Systems	Power Systems 405.628
53	Small Antennas for Body Area Networks	Thomas Cummings , Aleksandar Matic	Radio Systems	Radio Systems 405.736

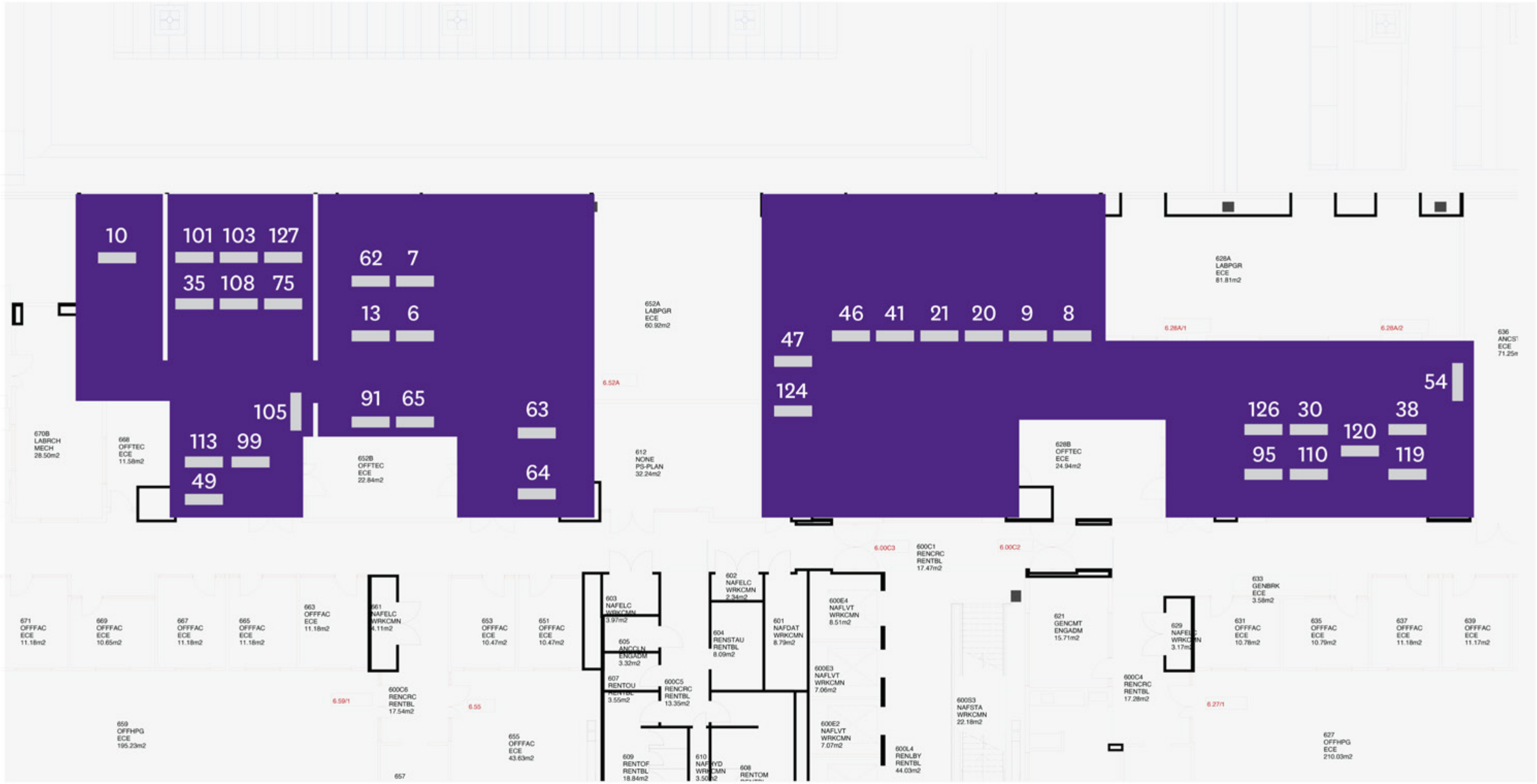
PROJECT NO	PROJECT TITLE	STUDENTS	CATEGORY	LAB
55	Broadbeam Antennas for Millimetre Wave Communications	Kees Albers-Connolly , Kaichao Liang	Radio Systems	Radio Systems 405.736
121	Tracking Seabirds Using Radar	Demian Pillay , Martin Wu	Radio Systems	Radio Systems 405.736
2	How Can Tangible-based Robotics Environment Help Children Learn Programming?	Ryan Mardiono , Karan Thakur	Robotics	Radio Systems 405.736
6	Reinforcement Learning based control of an Autonomous Formula SAE Car	Nick Huang, Bowen Xiang	Robotics	Robotics 405.652
7	CDP-Mech Reinforcement Learning Based Control for Robotic Grasping and Manipulation*	Tony Cui , Brendan Zhou	Robotics	Robotics 405.652
63	Sign-language understanding using Reinforcement learning and DNN	Shameer Prasad, Caleb Simmons	Robotics	Robotics 405.652
65	Guide and logistics robot system: taking elevator with interaction	Finn Tracey , Cale Ying	Robotics	Robotics 405.652
91	Investigating the Integration of Pepper Robot and ChatGPT: A Study on Enhancing User Experience and Engagement	Xiaohui Chen , Katherine Luo	Robotics	Robotics 405.652
81	Mobile based smart indoor tracking for elderly care	Julian Chan , Ethan Yip	Smart Phone & Tablet Applications	MDLS 405.569
88	A Companion Application for Senior Citizen Care	Kiran Chung , Yvonne Wang	Smart Phone & Tablet Applications	MDLS 405.569
93	Analysis of news sources to provide localized disaster information	Ishaan Bhide , Matthew Ouyang	Smart Phone & Tablet Applications	MDLS 405.569
54	Modeling and Validation of Electrical Load Profiling for Energy Efficiency	Danya Barham , Annabell Simpson	Smart Phone & Tablet Applications	Power Systems 405.628
75	Investigating inclusion of software engineering tools and practices	Ananya Ahluwalia , Samantha Mebius	Software Development Tools and Processes 1	HASEL 405.662
103	Predicting Software Testability	Ciaochen Sun , Ellen Zhang	Software Development Tools and Processes 1	HASEL 405.662
42	Evaluating Identifier Meaningfulness	Kyle Hensel , Destiny Li	Software Development Tools and Processes 1	MDLS 405.569
43	Investigating “part-of-speech” based identifier naming guidelines	Joshua Feng , Matthew Lai	Software Development Tools and Processes 1	MDLS 405.569
52	Detecting learning behaviour in computing education via the analysis of versioned repositories	John Chen , Serena Lau	Software Development Tools and Processes 1	MDLS 405.569
4	How Can Large Screens Help Programmers Understand Code?	Minghao Lin, Kevin Wu	Software Development Tools and Processes 1	Radio Systems 405.736
105	Analysis of ripple effects of transitive dependencies in software projects	Saakshi Hegde , May Sribunwongsa	Software Development Tools and Processes 2	HASEL 405.662
108	Links between personality and perceptions of success in software	Yik Chong, Rachel Jeung-McIntyre	Software Development Tools and Processes 2	HASEL 405.662
24	Improving Software Architecture Diagram Usage and Uptake	Raymond Feng , Raymond Zhang	Software Development Tools and Processes 2	MDLS 405.559
44	Automatic Questions about Learner’s Code	Angelo Tangonan, Nicholas Yao	Software Development Tools and Processes 2	MDLS 405.559
76	A dating platform for interpersonal relationship research	Lang Cheng , Hanyong Zhang	Software Development Tools and Processes 2	MDLS 405.559

PROJECT NO	PROJECT TITLE	STUDENTS	CATEGORY	LAB
125	Making Smart-contract development environments more developer friendly	Frank Ji, Xiaoxiao Zhuang	Software Development Tools and Processes 2	MDLS 405.559
113	Improving human interpretability of modern chess engines	Bryan Liu , Nilay Setiya	Web tools and Application	HASEL 405.662
23	Web application tool for technical interview preparation	Ibrahim Anees , Jaskaran Sandhu	Web tools and Application	MDLS 405.559
37	Characterisation and Analysis of Reddit Financial Communities	Kevin Wang , Bill Wong	Web tools and Application	MDLS 405.559
50	AIs helping humans think reflectively	Juwon Jung , Hayoon Seo	Web tools and Application	MDLS 405.559
84	Procedurally Generated Spatial Skills Testing	Tim Li , Owen Xu	Web tools and Application	MDLS 405.559
97	An AI Supported Integrated Development Environment	Harrison Bland, Charlie Kake-White	Web tools and Application	MDLS 405.559

ECSE:
B405. LEVEL 5
MDLS 559 & 569



ECSE:
B405. LEVEL 6
614, 628, 652, & 662



ECSE:
B405. LEVEL 7
712, 722, 736, & 760

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