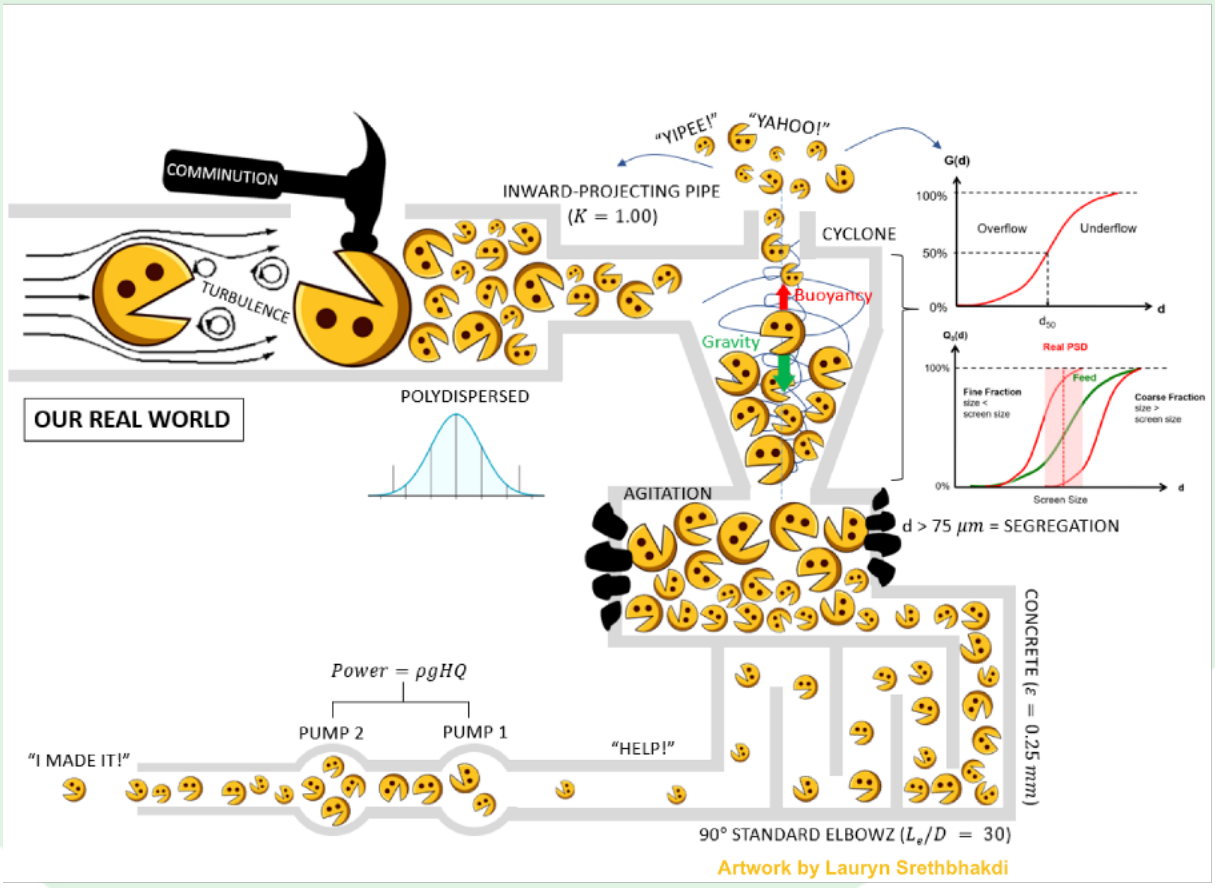
CEIC2001

Fluid and Particle Mechanics

Term 1, 2022



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
May Lim	m.lim@unsw.edu.au	Microsoft Teams	520 Hilmer Building (E10)	

School Contact Information

For assistance with enrolment, class registration, progression checks and other administrative matters, please see the Nucleus: Student Hub. They are located inside the Library – first right as you enter the main library entrance. You can also contact them via http://unsw.to/webforms or reserve a place in the face-to-face queue using the UniVerse app.

If circumstances outside your control impact on submitting assessments, Special Consideration may be granted, usually in the form of an extension or a supplementary assessment. Applications for Special Consideration must be submitted online.

For course administration matters, please contact the Course Coordinator.

Course Details

Units of Credit 6

Summary of the Course

One of the roles of an engineer is to design processes where fluid or particulate materials are transported at scale. A Biomedical Engineer may design an artificial heart to pump blood around the human body. A Chemical Engineering treat and deliver water from a reservoir to every household in Sydney. Petroleum engineers design methods for extracting oil and gas from deposits below the earth's surface. A Food Technologist will mix a large amount of flour, sugar and butter to make delicious biscuits. The engineer or technologist will need to know how fluid and particle behave in order to carry out these tasks efficiently and cost-effectively.

This course teaches the science and technology related to the handling and processing of fluids and particulate materials at scale. The course is structured as nine core modules: 1. Fundamental Concepts in Fluid Mechanics (including fluid properties and behaviours, and the rheology of fluids and semi-solid), 2. Fluid Statics, 3. Fluid Dynamics, 4. Fluid Handling (including flow in pipes, pump and pumping), 5. Fluid Modelling (including differential analysis of fluid motion, dimensional analysis and similitude), 6. Particle Size and Size Distribution, 7. Particle Process and Processing (including classification, mixing, segregation and communition), 8. Particle Settling and 9. Packed Bed.

Course Aims

This course aims to teach fluid and particle mechanics to Chemical Engineering, Chemical Product Engineering, Food Science and Technology, Food Science and Nutrition, Biomedical Engineering and Petroleum Engineering students. The purpose is to develop the students' knowledge and conceptual understanding of fluid and particles properties and behaviours. At the end of the course, students will be able to describe the fundamental properties of fluid and particle systems, and the relationships between different fluids and particles properties; formulate and apply scientific models to predict fluid or particle system behaviours in engineering applications; and apply fluid and particle mechanics principles in an engineering context. The knowledge and skills developed in the course are core to what engineers do and are prerequisites for advanced courses in the degree program.

Course Learning Outcomes

After successfully completing this course, you should be able to:

Learning Outcome	EA Stage 1 Competencies
1. Understand the fundamental properties of fluids and particulate materials.	PE1.1, PE3.4
2. Articulate how mathematical and statistical models or methods (including scientific models, integral analysis, differential analysis, dimensional analysis method, probability distributions and population balance modelling) can be used to describe and predict the behaviour of fluid and particle systems, or the relationships between different fluids and particles properties.	PE1.2

Learning Outcome	EA Stage 1 Competencies
3. Apply fluid mechanics principles in an engineering context, including the design piping system, pump selection and pump sizing.	PE2.2
4. Apply particle mechanics principles in an engineering context, including the design and optimisation of particle processes such as mixing, segregation, comminution, granulation, classification, settling, filtration and fluidisation.	PE2.2

This course is part of UNSW Food Science specialisations approved (2021-2026) by the Institute of Food Technologists Higher Education Review Board (IFT HERB).

Teaching Strategies

The course is structured as nine core modules taught in four sequenced blocks of lectures, in-class and online learning activities, and assessment tasks. The course is delivered in eight hours of instruction (lectures and workshops) per week from Week 1 to Week 5, and Week 7 to Week 10 of Term 1. Lectures are either pre-recorded or recorded live. Students can view the lecture recordings on the course's Microsoft Team channel. Hybrid workshop are held from 3:00 to 5:00 PM AEST in UNSW Business School Room 115 (K-E12-115) on Monday and in Quadrangle Room G027 (K-E15-G027) on Thursday. There will be no lecture and lectorials in Week 6 due to Flexibility Week and on Monday of Week 10 due to the Easter Monday Holiday.

Lectures are designed to give students an understanding of core concepts in fluid and particle mechanics. Course learning outcomes, prior learning, new knowledge, as well as the connections and transitions between the modules are made explicit to the students. Examples, schematics, animations and videos in the lectures demonstrate and visualise the key concepts taught. Worked examples familiarise students with the types of problems encountered in engineering practice and how the Wales-Woods model is used to solve these problems. Exercises with step-by-step guides scaffold learning and reduce cognitive load. The guides allow students to focus on understanding the solution heuristic, evaluate the merits of different solution methods, and verify the validity of the solutions and solution pathways.

Students can attempt the exercises individually or with other students in peer learning activities during the lectorial and online. These activities, including group discussions, collaborative problem-solving and peer marking, expose students to diverse others and develop their communication, collaboration and evaluative judgement abilities, in preparation for real-life social and employment situations. Students can also elaborate on knowledge and concepts taught through various online interactions with the instructor, other students and invited speakers. These interactions are multi-media and may include retrieval practice, online discussions, and co-creation of learning artefacts such as concept maps. These activities reinforce and consolidate the students' learning by providing opportunities to retrieve, apply, test or demonstrate their knowledge over a spaced period of time.

Formative assessments, including take-home assignments, online quizzes and mock quizzes, are used to monitor the students' understanding and provide feedback on their ability to apply their knowledge and articulate how the knowledge or solution is applied. Summative assessments in the form of a written examination determine and quantify the students' achievement by assigning marks and grades. Metacognitive wrappers collect information on the students' approach to learning and increase their awareness and self-regulation of the learning process.

Additional Course Information

Time Commitment

UNSW expects students to spend approximately 150 hours to successfully complete a 6 UOC course like CEIC2001. Of the 150 hours, 70 hours will be spent participating in face-to-face classes, 10 hours in completing examinations, with the remaining 70 hours provided for private study, including revising the lecture notes, completing the worksheet worksheets and preparing for examination. Therefore, outside the lectures and workshops, you should be spending at least 7 hours per week on this course.

A student who has a deficit in study and time management skills would be required to seek assistance from UNSW Student Support and Success. A student who has ongoing personal or health issue that is interfering their course work and attendance should register with UNSW Equitable Learning Services and discuss their study needs with the course convener prior to or at the commencement of the course.

The census date for this course is 11:59 PM Sunday 13 March 2022. The census date is the last day you can withdraw from a course without financial penalty. There may be circumstances where the student will be advised to withdraw from study, seek program leave or program discontinuation after the census date. See also fee remission, financial and academic penalty for further information.

Competency

Students are expected to enter CEIC2001 having developed competencies in all the material covered in the pre-requisite PHYS1121 or PHY1131 or DPST1021 or DPST1023 and MATH1231 or MATH1241 or MATH1251 or DPST1014 courses.

Participation

Participation in learning activities in the lectures and lectorials (face-to-face or online) are not mandatory in this course. However, watching the lecture in the week it was recorded, taking notes, asking questions, completing formative assessment tasks (take-home assignment, mock quizzes) and engaging in group learning activities have been shown to lead to better academic attainment and wellbeing in this course. UNSW expects university commitments such lecture, workshop and examination (including supplementary examination) will take precedence over work activities, sports, holidays etc. There is currently no provision for personal instruction by the lecturer or demonstrators of this course.

COVID–19 Safe Return to Campus

UNSW requires all staff and students to follow NSW Health advice. Any failure to act in accordance with that advice may amount to a breach of the Student Code of Conduct. Please refer to the Safe Return to Campus guide for information on safe practices. A summary is provided below.

Students are required to wear a mask in the classroom if asked to do so by teaching staff, such as, in situations where the 1.5 metres physical distance is difficult to maintain or where a mask is mandatory under the Public Health Order. Students must stay at home if sick or have been advised to self-isolate by NSW health or government authorities. Students will not be penalised for missing a face-to-face activity due to illness or a requirement to self-isolate. UNSW will work with students to ensure continuity of learning during isolation and have plans in place for students to catch up on any content or missed learning activities. Where this might not be possible, an application for fee remission may be discussed.

- For advice on how to deal with the disruption to course progression and seek special consideration, contact The Nucleus: Student Hub
- For help understanding for how to manage your isolation, contact Student Support Advisors
- If a COVID-19 diagnosis has triggered a serious decline in mental health, contact UNSW Mental Health Support
- If unable to complete an assessment, apply for special consideration through the Special Consideration Portal.
- To advise UNSW of a positive COVID-19 test result, fill in this form.
- Information about NSW COVID-19 case locations and contact tracing can be found here.
- Information about UNSW COVID-19 postive case alert can be found here.

Assessment

Assessment Implementation

Summative assessments in the form of four written examinations are used to determine and quantify the students' achievement by assigning marks and grades. The first three examinations, worth 10%, 20% and 30% of total course mark respectively, will be held online at the date and time shown in the Course Schedule. The final examination, worth 40% of the course mark, will be held during the exam period at a time that will be announced on myUNSW.

The examination script can be downloaded from Moodle on the day of the examination. All submission must be made as a single PDF file that is less than 200 MB in size. Instructions on how to convert handwritten document to a single PDF file can be found here. Students should start their submission process at 7:00 PM AEST and have until 7:30 PM AEST to notify the course convenor on Microsoft Team chat of any issues with the submission process. Late submission will not be accepted.

Examination scripts will be marked and returned approximately 1 week after the examination via Moodle. Students have one week after the return of the examination script to check and appeal their marks. Mark check and appeal must be made using the submission links in Moodle before the due date and time indicated in Moodle.

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. EM01 • Examination 1	10%	03/03/2022 07:00 PM	1, 2
2. EM02 • Examination 2	20%	31/03/2022 07:00 PM	1, 2, 3
3. EM03 • Examination 3	30%	14/04/2022 07:00 PM	1, 2, 3
4. EM04 • Examination 4	40%	Exam Period	1, 2, 4

Assessment 1: EM01 • Examination 1

Start date: 03/03/2022 05:00 PM
Assessment length: 2.5 hours (2 hours examination + 0.5 hour for submission)
Submission notes: Moodle submission
Due date: 03/03/2022 07:00 PM
Marks returned: 1 week after assessment date

EM01 • Examination 1 will cover the following topics:

- LM01A • Fundamental Concepts in Fluid Mechanics - Part A Fluid Properties and Behaviours
- LM01B • Fundamental Concepts in Fluid Mechanics - Part B Rheology of Fluids and Semi- Solids

Assessment 2: EM02 • Examination 2

Start date: 31/03/2022 05:00 PM
Assessment length: 2.5 hours (2 hours examination + 0.5 hour for submission)
Submission notes: Moodle submission
Due date: 31/03/2022 07:00 PM
Marks returned: 1 week after assessment date

EM02 • Examination 2 will cover the following topics:

- LM02 • Fluid Statics
- LM03 • Fluid Dynamics

Assessment 3: EM03 • Examination 3

Start date: 14/04/2022 05:00 PM
Assessment length: 2.5 hours (2 hours examination + 0.5 hour for submission)
Submission notes: Moodle submission
Due date: 14/04/2022 07:00 PM
Marks returned: 1 week after assessment date

EM03 • Examination 3 will cover the following topics:

- LM04A Fluid Handling - Part A Flow in Pipes LM04B Fluid Handling - Part B Pump and Pumping
- LM05A Fluid Modelling - Part A Dimensional Analysis and Similitude
- LM05B Fluid Modelling - Part B Differential Analysis of Fluid Flow

Assessment 4: EM04 • Examination 4

Start date: Exam Period
Assessment length: 2.5 hours (2 hours examination + 0.5 hour for submission)
Submission notes: Moodle submission
Due date: Exam Period
Marks returned: 1 week after assessment date

EM04 • Examination 4 will cover the following topics:

- LM06 • Particle Size and Size Distribution
- LM07A • Particle Process and Processing - Part A Classification
- LM07B • Particle Process and Processing - Part B Mixing and Segregation
- LM07C • Particle Process and Processing - Part C Comminution
- LM08 • Particle Settling - Single Particle
- LM09A • Particle Bed - Part A Fundamentals of Packed Bed
- LM09B • Particle Bed - Part B Fluidization

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Course Schedule

View class timetable

Timetable

Date	Type	Content
Week 1: 14 February - 18 February	Lecture	LM00 • Course Orientation (0H30M) Course Orientation Introduction to Fluid Mechanics LM01A • Fundamental Concepts in Fluid Mechanics - Part A Fluid Properties and Physical Quantities (1H30M) Characteristics of Matter Fluid Properties and Physical Quantities - Mass and Weight Properties - Force, Stress and Pressure - Velocity and Velocity Gradient - Viscosity - Surface Tension LM01B • Fundamental Concepts in Fluid Mechanics - Part B Rheology of Fluids and Semi-Solids (2H00M) Rheology of Fluids and Semi-Solids - Time Independent • Show Yield Stress - Time Independent • No Yield Stress - Time Dependent Steady-State Rheological Model of Herschel-Buckley LM02 • Fluid Statics (2H00M) Static Pressure Variation at a Point Static Pressure Variation from Point to Point Hydrostatic Force on Submerged Surface - Part 1 Formula Method Hydrostatic Force on Submerged Surface - Part 2 Integration Method
	Workshop	TM01B • Fundamental Concepts in Fluid Mechanics - Part B Rheology of Fluids and Semi-Solids (2H00m)
Week 2: 21 February - 25 February	Lecture	LM02 • Fluid Statics (2H00M) Hydrostatic Force on Submerged Surface - Part 3

		Geometrical Method Hydrostatic Force on Submerged Surface - Part 4 Projection Method Buoyancy, Flotation and Stability Pressure Measurement Absolute Pressure and Gauge Pressure LM03 • Fluid Dynamics (2H00M) Eulerian Specification of the Flow Field Continuity Equation Momentum Equation Bernoulli's Equation Angular Momentum
	Workshop	TM02-1 • Fluid Statics (2H00M) TM02-2 • Fluid Statics (2H00M)
Week 3: 28 February - 4 March	Workshop	TM03 • Fluid Dynamics (2H00M)
	Lecture	LM04A • Fluid Handling - Part A Flow in Pipes (4H00M) Relative Roughness of a Pipe Reynolds Number Friction Losses Minor Losses
	Assessment	EM01 • Examination 1
Week 4: 7 March - 11 March	Lecture	LM04B • Fluid Handling - Part B Pump and Pumping (4H00M) Pump Classification Hydraulic Head, Suction Head, Discharge Head and Total Dynamic Head Pump Performance Curve - Single Pump Pump Performance Curve - Multiple Pumps System Resistance Cavitation Specific Speed
	Workshop	TM04A • Fluid Handling - Part A Flow in Pipes (2H00M) TM04B-1 • Fluid Handling - Part B Pump and Pumping (2H00M)
Week 5: 14 March - 18 March	Lecture	LM05A • Fluid Modelling - Part A Partial Differential Analysis of Fluid Flow (2H00M) Control Volume and Control Surfaces Conservation of Mass - Continuity Equation Conservation of Momentum - Part 1 General Form - Part 2 Navier-Stokes Equations Cylindrical and Spherical Coordinate

		LM05B • Fluid Modelling - Part B Dimensional Analysis and Similitude (2H00M) Dimensionless Groups Buckingham π Theorem Dimensionless Group from Indicial Method Dimensionless Group from Group Method
	Workshop	TM04B-2 • Fluid Handling - Part B Pump and Pumping (2H00M) TM05A • Fluid Modelling - Part A Partial Differential Analysis of Fluid Flow (2H00M)
Week 7: 28 March - 1 April	Lecture	LM06 • Particle Size and Size Distribution (2H00M) Particle Size Size of Single Particles Size Distribution of Multiple Particles Particle Surface, Mass and Volume Distributions from Number Distribution Mode, Median and Mean of a Distribution LM07A • Particle Process and Processing - Part A Classification (1H00M) Industrial Scale Sizing and Classification Classification with Cyclone and Hydrocyclone Mass Balance in Cyclones and Hydrocyclones Separation Efficiency and Grade Efficiency Cyclone and Hydrocyclone Configuration LM07B • Particle Process and Processing - Part B Mixing and Segregation (1H00M) Particle Segregation Quality of Mixture
	Workshop	TM05B • Fluid Modelling - Part B Dimensional Analysis and Similitude (2H00M)
	Assessment	EM02 • Examination 2
Week 8: 4 April - 8 April	Lecture	LM07C • Particle Process and Processing - Part C Comminution (2H00M) Introduction to Comminution Energy Requirement for Communition Change in Size Distribution After Communition LM08 • Particle Settling - Single Particle (2H00M) Single Particle Settling
	Workshop	TM06 • Particle Size and Size Distribution (2H00M) TM07A • Particle Process and Processing - Part A Classification (2H00M)

Week 9: 11 April - 15 April	Lecture	LM09A • Particle Bed - Part A Fundamentals of Packed Bed (2H00M) Packed Bed LM09B • Particle Bed - Part B Fluidization (2H00M) Fluidization
	Workshop	TM07C • Particle Process and Processing - Part C Comminution (2H00M)
	Assessment	EM03 • Examination 3
Week 10: 18 April - 22 April	Workshop	TM08 • Particle Settling - Part A Single Particle (2H00M) TM09B • Particle Bed (2H00M)

Resources

Prescribed Resources

Lecture slides, lecture recordings, workshop worksheets, discussion forums and links to Microsoft Team and Microsoft Stream sites will be available from Week 0 of Term 1 from the course's Moodle site.

Course reading list will be available from Week 0 of Term 1 from the course's Leganto site. Additional resources are available from the UNSW Library.

Recommended Resources

Textbooks

Engineering Fluid Mechanics, by D. F. Elger, B. A. LeBret, C. T. Crowe, J. A. Roberson, Wiley.
Fluid Mechanics in SI Units, by R. C. Hibbeler, Pearson.
Introduction to Particle Technology, by M. Rhodes, Wiley.

Supplementary Texts

Schaum's Outline of Fluid Mechanics, M. C. Potter, D. C. Wiggert, McGraw Hill.
Schaum's Outline of Fluid Mechanics and Hydraulics, by R. V. Giles, J. B. Evett, C. Liu, McGraw Hill.
Applied Fluid Mechanics for Engineers, M. T. Schobeiri, McGraw Hill.
Solution of Problems in Fluid Mechanics: A Problem-Based Textbok, J. F. Douglas, Pitman.

Handbooks

Perry Chemical Engineering Handbook, by D. W. Green, M. Z. Southard, R. H. Perry, McGraw-Hill.
Chemical Properties Handbook, by C. L. Yaws, McGraw Hill.
The Properties of Gases and Liquids, by B. E. Poling, J. M. Prausnitz, J. P. O'Connell, McGraw Hill.
Lange's Handbook of Chemistry, by J. G. Speight, McGraw Hill.
Fluid Flow Handbook, by J. M. Saleh, McGraw Hill.
Piping Handbook, by M. L. Nayyar, McGraw Hill.
Valve Handbook, by P. L. Skousen, McGraw Hill.
Pump Handbook, by I. J. Karassik, J. P. Messina, P. Cooper, C. C. Heald, McGraw Hill.
Pump Users Handbook, by R. Rayner, Elsevier Advanced Technology.
Sulzer Centrifugal Pump Handbook, by Sulzer Pump, Butterworth-Heinemann.

Handbook of Civil Engineering Calculations, by T. G. Hicks, McGraw Hill.
Handbook of Mechanical Engineering Calculations, by T. G. Hicks, McGraw Hill.
Marks' Standard Handbook for Mechanical Engineers, by A. M. Sadegh, W. M. Worek, McGraw Hill.

Course Evaluation and Development

Course Evaluation

Formal feedback will be gathered at the end of term using myExperience survey. Informal feedback will be gathered throughout the terms using Moodle Feedback activity.

Course Development

2022 • PVC Education and Student Experience hybrid delivery pilot.
2021 • Change in assessment question types.
2020 • Large Cohort Active Learning Initiative pilot with UNSW PVC Education.
2020 • Student support in the form of virtual study room in Microsoft Team.
2020 • Development of students' evaluative judgement skill in formative and summative assessment.
2019 • Use of Padlet to share learning artifacts and provide feedback in active learning.
2019 • Use of metacognitive wrapper to develop students' ability to self-monitor and self-evaluate.
2018 • $10,000 to Develop Adaptive Paper Tutor for UNSW3+.
2017 • Sewer Vent Shaft Design Work Integrated Learning micro-project with SVSR.
2016 • $30,000 for the Digital Uplift of CEIC2001, CVEN2501 and MMAN2600.
2016 • $8000 to develop Moodle Question Bank for CEIC2001 Fluid and Particle Mechanics.

Submission of Assessment Tasks

In the School of Chemical Engineering, all written work will be submitted for assessment via Moodle unless otherwise specified. Attaching cover sheets to uploaded work is generally not required; when you submit work through Moodle for assessment you are agreeing to uphold the Student Code.

Some assessments will require you to complete the work online and it may be difficult for the course coordinator to intervene in the system after the due date. You should ensure that you are familiar with assessment systems well before the due date. If you do this, you will have time to get assistance before the assessment closes.

All submissions are expected to be neat and clearly set out. Your results are the pinnacle of all your hard work and should be treated with due respect. Presenting results clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect.

Marking guidelines for assignment submissions will be provided at the same time as assignment details to assist with meeting assessable requirements. Submissions will be marked according to the marking guidelines provided.

Late penalties

Unless otherwise specified, submissions received after the due date and time will be penalised at a rate of 5% per day or part thereof (including weekends). For some activities including Moodle quizzes and Team Evaluation surveys, extensions and late submissions are not possible.

Special consideration

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to submitting an assessment or sitting an exam.

UNSW has a Fit to Sit / Submit rule, which means that if you attempt an exam or submit a piece of assessment, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

Please note that students will need to provide some documentary evidence to support absences from any assessments missed because of COVID-19 public health measures such as isolation. UNSW will **not** be insisting on medical certificates for COVID-related absences of 7 days or less, with the positive PCR or RAT result being sufficient. Longer absences due to self-isolation or COVID-related illness will still need documentation such as a medical certificate.

Applications for special consideration **will still be required** for assessment and participation absences related to COVID-19. Special consideration requests should not be lodged for missing classes if there are no assessment activities in that class.

Academic Honesty and Plagiarism

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage (International Center for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013). At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.

Further information about academic integrity and plagiarism can be located at:

- The Current Students site
- The ELISE training site

The Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: https://student.unsw.edu.au/conduct.

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism. Further information about referencing styles can be located at https://student.unsw.edu.au/referencing.

For assessments in the School of Chemical Engineering, we recommend the use of referencing software such as Mendeley or EndNote for managing references and citations. Unless required otherwise specified (i.e. in the assignment instructions) students in the School of Chemical Engineering should use either the APA 7th edition, or the American Chemical Society (ACS) referencing style as canonical author-date and numbered styles respectively.

Academic Information

To help you plan your degree, assistance is available from academic advisors in The Nucleus and also in the School of Chemical Engineering.

Additional support for students

- Current Student Gateway
- Engineering Current Student Resources
- Student Support and Success
- Academic Skills
- Student Wellbeing, Health and Safety
- Equitable Learning Services
- IT Service Centre

Course workload

Course workload is calculated using the Units-Of-Credit (UOC). The normal workload expectation for one UOC is approximately 25 hours per term. This includes class contact hours, private study, other learning activities, preparation and time spent on all assessable work.

Most coursework courses at UNSW are 6 UOC and involve an estimated 150 hours to complete, for both regular and intensive terms. Each course includes a prescribed number of hours per week (h/w) of scheduled face-to-face and/or online contact. Any additional time beyond the prescribed contact hours should be spent in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations.

On-campus class attendance

Physical distancing recommendations must be followed for all face-to-face classes. To ensure this, only students enrolled in those classes will be allowed in the room. Class rosters will be attached to corresponding rooms and circulated among lab demonstrators and tutors. No over-enrolment is allowed in face-to-face class. Students enrolled in online classes can swap their enrolment from online to a **limited** number of on-campus classes by Sunday, Week 1.

In certain classroom and laboratory situations where physical distancing cannot be maintained or the staff running the session believe that it will not be maintained, face masks will be designated by the course coordinator as **mandatory PPE** for students and staff. Students are required to bring and use their own face mask. Mask can be purchased from IGA Supermarket (Map B8, Lower Campus), campus pharmacy (Map F14, Middle Campus), the post office (Map F22, Upper Campus) and a vending machine in the foyer of the Biological Sciences Building (Map E26, Upper Campus).

Your health and the health of those in your class is critically important. You must stay at home if you are sick or have been advised to self-isolate by NSW health or government authorities. Current alerts and a list of hotspots can be found here. Do not come to campus if you have any of the following symptoms: fever (37.5 °C or higher), cough, sore throat, shortness of breath (difficulty breathing), runny nose, loss of taste, or loss of smell. If you need to have a COVID-19 test, you must not come to campus and remain in self-isolation until you receive the results of your test.

You will not be penalised for missing a face-to-face activity due to illness or a requirement to self-

isolate. We will work with you to ensure continuity of learning during your isolation and have plans in place for you to catch up on any content or learning activities you may miss. Where this might not be possible, an application for fee remission may be discussed. Further information is available on any course Moodle or Teams site.
For more information, please refer to the FAQs: https://www.covid-19.unsw.edu.au/safe-return-campus-faqs

Image Credit

Lauryn Srethbhakdi, 2020

Our Real World!

The artist merged fluid and particle mechanics concepts by presenting fluids and particles as Pac-men. In the artist's own word, "The work represents my understanding of many real-life practical concepts, one of which is our world is not ideal. We cannot truly deliver fluid or particles from point A to point B without interference from friction, drag, pressure losses and turbulence. We cannot truly form an ideal mixture. We cannot truly break something into equal-sized parts. But we can account for deviations from ideal scenario using statistical methods. As engineers, we overcome these limitations through the use of scientific and mathematical models. Because our world is complex and non-ideal, we must make assumptions and simplifications that lend to our ability to create such solutions."

About the Artist

Lauryn Srethbhakdi is a student of the course CEIC2001 Fluid and Particle Mechanics in Term 1 of 2020.

CRICOS

CRICOS Provider Code: 00098G

Acknowledgement of Country

We acknowledge the Bedegal people who are the traditional custodians of the lands on which UNSW Kensington campus is located.

Appendix: Engineers Australia (EA) Professional Engineer Competency Standard

Program Intended Learning Outcomes	
Knowledge and skill base	
PE1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline	✓
PE1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline	✓
PE1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline	
PE1.4 Discernment of knowledge development and research directions within the engineering discipline	
PE1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline	
PE1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline	
Engineering application ability	
PE2.1 Application of established engineering methods to complex engineering problem solving	
PE2.2 Fluent application of engineering techniques, tools and resources	✓
PE2.3 Application of systematic engineering synthesis and design processes	
PE2.4 Application of systematic approaches to the conduct and management of engineering projects	
Professional and personal attributes	
PE3.1 Ethical conduct and professional accountability	
PE3.2 Effective oral and written communication in professional and lay domains	
PE3.3 Creative, innovative and pro-active demeanour	
PE3.4 Professional use and management of information	✓
PE3.5 Orderly management of self, and professional conduct	
PE3.6 Effective team membership and team leadership	