Unit Outline
CHEN5042 Fluid and Particle Processes
Semester 1, 2017

Unit study package code: CHEN5042
Mode of study: Internal
Tuition pattern summary: Note: For any specific variations to this tuition pattern and for precise information refer to the Learning Activities section.
Lecture: 2 x 2 Hours Weekly
Workshop: 1 x 1 Hours Weekly
This unit does not have a fieldwork component.
Credit Value: 25.0
Pre-requisite units: Nil
Co-requisite units: Nil
Anti-requisite units: 302262 (v.0) Fluid and Particle Processes 324 or any previous version
AND
313836 (v.0) Advanced Particle Processes 415 or any previous version
AND
CHEN3009 (v.0) Fluid and Particle Processes or any previous version
AND
CHEN4014 (v.0) Advanced Particle Processes or any previous version
Result type: Grade/Mark
Approved incidental fees: Information about approved incidental fees can be obtained from our website. Visit fees.curtin.edu.au/incidental_fees.cfm for details.
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Acknowledgement of Country
We respectfully acknowledge the Indigenous Elders, custodians, their descendants and kin of this land past and present. The Centre for Aboriginal Studies aspires to contribute to positive social change for Indigenous Australians through higher education and research.
**Syllabus**

Compressible and incompressible flow in pipes; Choked flow; Gas/Liquid flow; Flow patterns in horizontal pipes; Energy loss calculation; Vertical flow; Fluid and particle system; Single particle in a fluid; Multiple particles systems; Porous flow; Introduction to the properties of porous media; Concurrent and Counter-current flow; Filtration; Introduction to filtration process; Incompressible and compressible cake; Filtration equipment Theory of sedimentation; Batch and continuous settler design; Flocculation; compression; settling of drops and bubbles; Fluidisation; Liquid-solid, Gas-solid systems; Centrifuge and Cyclone design Slurry transport; Pneumatic transport

**Introduction**

This is a core unit for chemical engineering. In this unit, basic principles on fluid (gas and liquid), particle and their interaction will be introduced, which will help you understand the physical and chemical processes for single and multi-phase transport, separation and reaction.

**Unit Learning Outcomes**

All graduates of Curtin University achieve a set of nine graduate attributes during their course of study. These tell an employer that, through your studies, you have acquired discipline knowledge and a range of other skills and attributes which employers say would be useful in a professional setting. Each unit in your course addresses the graduate attributes through a clearly identified set of learning outcomes. They form a vital part in the process referred to as assurance of learning. The learning outcomes tell you what you are expected to know, understand or be able to do in order to be successful in this unit. Each assessment for this unit is carefully designed to test your achievement of one or more of the unit learning outcomes. On successfully completing all of the assessments you will have achieved all of these learning outcomes.

Your course has been designed so that on graduating we can say you will have achieved all of Curtin’s Graduate Attributes through the assurance of learning process in each unit.

<table>
<thead>
<tr>
<th>On successful completion of this unit students can:</th>
<th>Graduate Attributes addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Analyse fluid and particle properties and behavior under compressible flow</td>
<td>☑️ 🌟</td>
</tr>
<tr>
<td>2 Apply theories of fluid and particle separation to utilise industrial separation processes</td>
<td>☑️ 🌟</td>
</tr>
<tr>
<td>3 Analyse designs and applications of fixed-bed and fluidised-bed reactors</td>
<td>☑️ 🌟</td>
</tr>
<tr>
<td>4 Analyse mineral process techniques using fluid particle principles</td>
<td>☑️ 🌟</td>
</tr>
</tbody>
</table>

**Curtin’s Graduate Attributes**

- 📚 Apply discipline knowledge
- 🄰 Thinking skills (use analytical skills to solve problems)
- ☑️ Information skills (confidence to investigate new ideas)
- 📚 Communication skills
- ☑️ Technology skills
- 🅰 Learning how to learn (apply principles learnt to new situations) (confidence to tackle unfamiliar problems)
- 🗣 International perspective (value the perspectives of others)
- ☑️ Cultural understanding (value the perspectives of others)
- ☑️ Professional Skills (work independently and as a team) (plan own work)

Find out more about Curtin’s Graduate attributes at the Office of Teaching & Learning website: [ctl.curtin.edu.au](http://ctl.curtin.edu.au)

**Learning Activities**

The unit includes lectures, tutorials, and assessment by assignments, in-class test and final examination.

**Learning Resources**

**Essential texts**
The required textbook(s) for this unit are:

- Martin Rhodes, Introduction to Particle Technology, Wiley, Second Edition
  (ISBN/ISSN: 9780470014288)

Assessment
Assessment schedule

<table>
<thead>
<tr>
<th>Task</th>
<th>Value %</th>
<th>Date Due</th>
<th>Unit Learning Outcome(s) Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment on problem solving exercises</td>
<td>20 percent</td>
<td>Week: Week 5 Day: Friday Time: 4 pm</td>
<td>1,2,3,4</td>
</tr>
<tr>
<td>Assignment on problem solving exercises</td>
<td>20 percent</td>
<td>Week: Week 10 Day: Friday Time: 4 pm</td>
<td>1,2,3,4</td>
</tr>
<tr>
<td>Mid-Semester Test</td>
<td>20 percent</td>
<td>Week: Week 7 Day: Second Lecture Time: N/A</td>
<td>1,2,3,4</td>
</tr>
<tr>
<td>Final Examination</td>
<td>40 percent</td>
<td>Week: examination week Day: N/A Time: N/A</td>
<td>1,2,3,4</td>
</tr>
</tbody>
</table>

Detailed information on assessment tasks

1. Submission to Assignment Office
2. Submission to Assignment Office
3. 2 h Open textbook
4. 2 h Open textbook examination

Pass requirements
Students must achieve a Final Mark of 50 or greater to pass this unit

Fair assessment through moderation
Moderation describes a quality assurance process to ensure that assessments are appropriate to the learning outcomes, and that student work is evaluated consistently by assessors. Minimum standards for the moderation of assessment are described in the Assessment and Student Progression Manual, available from policies.curtin.edu.au/policies/teachingandlearning.cfm

Late assessment policy
This ensures that the requirements for submission of assignments and other work to be assessed are fair, transparent, equitable, and that penalties are consistently applied.

1. All assessments students are required to submit will have a due date and time specified on this Unit Outline.
2. Late submission of assessments is not accepted in this unit. Students will receive a zero mark for any assessment item submitted late.
Assessment extension

A student unable to complete an assessment task by/on the original published date/time (e.g. examinations, tests) or due date/time (e.g. assignments) must apply for an assessment extension using the Assessment Extension form (available from the Forms page at students.curtin.edu.au/administration/) as prescribed by the Academic Registrar. It is the responsibility of the student to demonstrate and provide evidence for exceptional circumstances beyond the student’s control that prevent them from completing/submitting the assessment task.

The student will be expected to lodge the form and supporting documentation with the unit coordinator before the assessment date/time or due date/time. An application may be accepted up to five working days after the date or due date of the assessment task where the student is able to provide an acceptable explanation as to why he or she was not able to submit the application prior to the assessment date. An application for an assessment extension will not be accepted after the date of the Board of Examiners’ meeting.

Deferred assessments

If your results show that you have been granted a deferred assessment you should immediately check OASIS for details.

Supplementary assessments

Supplementary assessments, if granted by the Board of Examiners, will have a due date or be held between 18/07/2017 and 21/07/2017. Notification to students will be made after the Board of Examiners’ meeting via the Official Communications Channel (OCC) in OASIS. It is the responsibility of students to be available to complete the requirements of a supplementary assessment. If your results show that you have been granted a supplementary assessment you should immediately check OASIS for details.

Reasonable adjustments for students with disabilities/health circumstances likely to impact on studies

A Curtin Access Plan (CAP) is a document that outlines the type and level of support required by a student with a disability or health condition to have equitable access to their studies at Curtin. This support can include alternative exam or test arrangements, study materials in accessible formats, access to Curtin’s facilities and services or other support as discussed with an advisor from Disability Services (disability.curtin.edu.au). Documentation is required from your treating Health Professional to confirm your health circumstances.

If you think you may be eligible for a CAP, please contact Disability Services. If you already have a CAP please provide it to the Unit Coordinator at the beginning of each study period.

Referencing style

The referencing style for this unit is Chicago.

More information can be found on this style from the Library web site: http://libguides.library.curtin.edu.au/referencing.

Copyright

© Curtin University. The course material for this unit is provided to you for your own research and study only. It is subject to copyright. It is a copyright infringement to make this material available on third party websites.
Academic Integrity (including plagiarism and cheating)

Any conduct by a student that is dishonest or unfair in connection with any academic work is considered to be academic misconduct. Plagiarism and cheating are serious offences that will be investigated and may result in penalties such as reduced or zero grades, annulled units or even termination from the course. Assessments under investigation will not be given a mark until the matter is concluded. This may result in the unit grade being withheld or a grade of Fail Incomplete (F-IN) until a decision has been made by the Student Disciplinary Panel. This may impact on enrolment in further units/study periods.

Plagiarism occurs when work or property of another person is presented as one’s own, without appropriate acknowledgement or referencing. Submitting work which has been produced by someone else (e.g. allowing or contracting another person to do the work for which you claim authorship) is also plagiarism. Submitted work is subjected to a plagiarism detection process, which may include the use of text matching systems or interviews with students to determine authorship.

Cheating includes (but is not limited to) asking or paying someone to complete an assessment task for you or any use of unauthorised materials or assistance during an examination or test.

From Semester 1, 2016, all incoming coursework students are required to complete Curtin’s Academic Integrity Program (AIP). If a student does not pass the program by the end of their first study period of enrolment at Curtin, their marks will be withheld until they pass. More information about the AIP can be found at:
https://academicintegrity.curtin.edu.au/students/AIP.cfm

Refer to the Academic Integrity tab in Blackboard or academicintegrity.curtin.edu.au for more information, including student guidelines for avoiding plagiarism.

Information and Communications Technology (ICT) Expectations

Curtin students are expected to have reliable internet access in order to connect to OASIS email and learning systems such as Blackboard and Library Services.

You may also require a computer or mobile device for preparing and submitting your work.

For general ICT assistance, in the first instance please contact OASIS Student Support:
oasisapps.curtin.edu.au/help/general/support.cfm

For specific assistance with any of the items listed below, please contact The Learning Centre:
life.curtin.edu.au/learning-support/learning_centre.htm

- Using Blackboard, the I Drive and Back-Up files
- Introduction to PowerPoint, Word and Excel

Additional information

Enrolment

It is your responsibility to ensure that your enrolment is correct - you can check your enrolment through the eStudent option on OASIS, where you can also print an Enrolment Advice.
Student Rights and Responsibilities
It is the responsibility of every student to be aware of all relevant legislation, policies and procedures relating to their rights and responsibilities as a student. These include:

- the Student Charter
- Values and Signature Behaviours
- the University’s policy and statements on plagiarism and academic integrity
- copyright principles and responsibilities
- the University’s policies on appropriate use of software and computer facilities

Information on all these things is available through the University’s “Student Rights and Responsibilities” website at: students.curtin.edu.au/rights.

Student Equity
There are a number of factors that might disadvantage some students from participating in their studies or assessments to the best of their ability, under standard conditions. These factors may include a disability or medical condition (e.g. mental illness, chronic illness, physical or sensory disability, learning disability), significant family responsibilities, pregnancy, religious practices, living in a remote location or another reason. If you believe you may be unfairly disadvantaged on these or other grounds please contact Student Equity at eesi@curtin.edu.au or go to http://eesi.curtin.edu.au/student_equity/index.cfm for more information.

You can also contact Counselling and Disability services: http://www.disability.curtin.edu.au or the Multi-faith services: http://life.curtin.edu.au/health-and-wellbeing/about_multifaith_services.htm for further information.

It is important to note that the staff of the university may not be able to meet your needs if they are not informed of your individual circumstances so please get in touch with the appropriate service if you require assistance. For general wellbeing concerns or advice please contact Curtin’s Student Wellbeing Advisory Service at: http://life.curtin.edu.au/health-and-wellbeing/student_wellbeing_service.htm

Recent unit changes
Students are encouraged to provide unit feedback through eVALUate, Curtin’s online student feedback system. For more information about eVALUate, please refer to evaluate.curtin.edu.au/info/.

To view previous student feedback about this unit, search for the Unit Summary Report at https://evaluate.curtin.edu.au/student/unit_search.cfm. See https://evaluate.curtin.edu.au/info/dates.cfm to find out when you can eVALUate this unit.

Recent changes to this unit include:
N/A
### Program Calendar – Semester 1 2017

<table>
<thead>
<tr>
<th>Week</th>
<th>Begin Date</th>
<th>Lecture/Seminar</th>
<th>Pre-readings</th>
<th>Tutorial/Other</th>
<th>Assessment Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>20 February</td>
<td></td>
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<td>Orientation Week</td>
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<tr>
<td>1.</td>
<td>27 February</td>
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<td>2.</td>
<td>6 March</td>
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<td>3.</td>
<td>13 March</td>
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<td>4.</td>
<td>20 March</td>
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<tr>
<td>5.</td>
<td>27 March</td>
<td></td>
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<td></td>
<td>Assignment 1 (Friday)</td>
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<td>6.</td>
<td>3 April</td>
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<td>7.</td>
<td>10 April</td>
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<td>Tuition Free Week</td>
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<td>8.</td>
<td>17 April</td>
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<td></td>
<td>Tuition Free Week</td>
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<td>9.</td>
<td>24 April</td>
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<td>Test</td>
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<td>10.</td>
<td>1 May</td>
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<td>11.</td>
<td>8 May</td>
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<td>12.</td>
<td>15 May</td>
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<td>Assignment 2 (Friday)</td>
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<tr>
<td>13.</td>
<td>22 May</td>
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<td>14.</td>
<td>29 May</td>
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<td>15.</td>
<td>5 June</td>
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<td></td>
<td>Study Week</td>
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<tr>
<td>16.</td>
<td>12 June</td>
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<td>Examinations</td>
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<tr>
<td>17.</td>
<td>19 June</td>
<td></td>
<td></td>
<td></td>
<td>Examinations</td>
</tr>
</tbody>
</table>