Introduction & Welcome from the Degree Programme Director

Welcome to Stage 3 of the MEng Industry course. The aim of this year is to give structure to the activities you undertake during your year in industry, so that it can be counted as Stage 3 of your Master of Engineering degree programme. You will have to undertake additional work to meet the requirements of the course, which will mean that often you are doing University work outside your normal working hours. You may find it hard to work once you get home from work and it will require commitment on your part to meet the deadlines.

During your year in industry you have to demonstrate the ability of someone who is eligible for a Masters level qualification. This means the following:

- Your work will be at the forefront of academic/professional engineering.
- You will have shown originality in the application of knowledge.
- You will be able to deal with complex issues both systematically and creatively.
- You will show originality in tackling and solving problems.

Even if you do not believe that you possess these abilities yet, the year in industry will go a long way to developing them and will benefit your chemical engineering knowledge enormously on your return to the University.

Enjoy the year in industry, work hard and show commitment to the company, in this way you will gain the maximum personal benefit from the year.

Dr. Kamelia Boodhoo
Degree Programme Director MEng Industry

September 2016
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<td></td>
</tr>
</tbody>
</table>
Section A: The Degree Programme

**The Purpose of the Industrial Year:**
You have chosen the industrial route to a Masters Degree in Chemical Engineering. The year you spend in industry will be counted as your third year. A placement year allows you to undertake one or two major projects or a number of smaller projects. The year in industry will benefit you in many ways amongst the most important are;

- It will provide you with exposure to plant, processes and people within an engineering business.
- It will motivate you on your return to University to better academic performance.
- It will further develop technical understanding and key skills (report writing, presentations and computer skills).

This will probably be your first experience of working as a Chemical Engineer. It can initially be a daunting experience working in surroundings that are different from the University environment you have been used to. The following is a list of what the company you are working for might reasonably expect from you.

- Show commitment to the company.
- Be willing to listen and learn.
- Respect the existing culture and working practices of the company.
- Undertake projects with enthusiasm.
- Build and maintain trust and good working relationships with the company and its employees.

**Responsibilities of the University:**

- If a student decides to take their year in industry as stage 3 of the MEng Industry, the DPD must liaise with the company via the placement student at least two years prior to the start of the placement in order to ensure a suitable project is offered to the student.
- Ensure that the person within the company who will be supervising the placement has been contacted at least two months before the start of the placement.
- Explain the purpose of the stage 3 MEng Industry to the Industry Supervisor, clearly stating the amount of work that the university expects the student to undertake whilst they are working for that company.
- Explain to the Industry supervisor the purpose of the design project, the scope of the design required and the milestone structure used to assess the design.
- Obtain a written agreement from placement supervisor stating that:
  - The company are willing for the student to study for the MEng Industry whilst working for the company
  - They will allow the student to attend the University for any assessments associated with work for the MEng Industry
  - Part of the work the student will undertake will include an Honours level design project
- Ensure that the engineer who will supervise the design project has a first degree in Chemical Engineering and experience of process design or is a chartered Chemical Engineer.
- Ask the student to prepare a design briefing, in consultation with the placement supervisor and/or the engineer supervising the design project, ideally at least one month before the start of the design project in industry but no later than mid-September
- Arrange the following visits:
  - 1st visit to follow the approval of the design brief submitted by the student (early in semester 1)
  - 2nd visit to coincide with the assessment of milestone 1 in semester 2
- After submission of the final design report, arrange a design presentation at the University followed by a Q&A session with at least three members of academic staff.
**Note:**
If the company is unable to provide a suitably qualified engineer to supervise the design project then the student will not be allowed to use the placement as Stage 3 of their MEng Industry

**Responsibilities of the Company:**
- To ensure the safety of the student at all times during their placement with the company.
- To ensure that the student experiences as wide an exposure to the roles and responsibilities of a design/process/research engineer as possible.
- To provide a design project, that meets the requirements of the University for a Stage 3 B.Eng. design project in Chemical Engineering. These requirements will be identified by the degree programme director.
- To inform the degree programme director for the MEng Industry of any confidentiality issues associated with the student’s work that may need agreements to be signed so that the work can be assessed by University staff.
- To provide the degree programme director for the MEng. Industry with a design project briefing at least one month prior to the start of the project or by mid-September at the latest.
- To allocate a design project supervisor who either holds a first degree in chemical engineering with process design experience or is a chartered chemical engineer.
- To allow two visits by a member of academic staff from the University to the student:
  - 1st visit to follow the approval of the design brief submitted by the placement student in early semester 1
  - 2nd visit to coincide with the assessment of milestone 1 in early semester 2.
- To be present for each of these visits to discuss the progress of the student and the quality of the work completed by the student.
- To allow the student the full support of engineering colleagues and access to all the company facilities and expertise in finding a solution to the design project.

**Details of Stage 3 MEng (Industry):**
To pass the industrial year you will need to complete four modules satisfactorily. These are:
- Distance Learning Separations Processes Module
- Industrial Design Project (including a design presentation)
- Skills and Knowledge Acquired Report (including supervisor’s assessment)
- An electronic Placement Log-book

See *Section D* for more details for the assessment for these modules.
Section B: Responsibilities of you, the Student – Your Checklist

The list below is an essential guide to what you must do, to ensure adequate progress through your industrial year.

**Things you must do at the start of your placement:**

- Check if your company requires a Confidentiality Agreement to be in place for the duration of your placement. If an agreement is required, the DPD should be informed and arrangements should be made for one to be sent to the University for review and signing as soon as possible.
- With your Academic and Industrial Supervisor(s) plan the time that you will need to complete University related work. (See section 5)
- Write a summary and plan for the design project. Submit this plan to the Academic Supervisor by the end of the second week in September.
- Once the design brief is approved, register on the MEng Industry Degree Programme with the University.

**Things you must do during your placement:**

- Complete both Separation Processes 2 assignments during Semester 1 and send them to the School of Chemical Engineering at Newcastle.
- Arrange a day off for the Separations Processes 2 exam. The exact date is not yet known, but the examination period will be between Monday 16th January 2017 and Friday 27th January 2017 (including Saturday 21st January 2017).
- Arrange to take a day off from your placement to visit the University to undertake a group activity on HAZOP analysis. This is likely to be at the end of April (exact date to be communicated in due course).
- Fill in an online logbook using the University’s E-portfolio system throughout the placement year. This can take the form of weekly blog entries with additional documents uploaded as necessary for each entry.
- Complete Milestone 1 and submit an electronic copy via Blackboard at Newcastle by midnight on Friday 13th January 2017.
- Complete Milestone 2 and submit an electronic copy via Blackboard at Newcastle by midnight on Monday 22nd May 2017.
- Attend design presentation at the end of Semester 2 (presentations will take place 24th to 26th May 2017)
- Make sure that your Industrial Supervisor(s) has read each of your design project milestone reports and is happy for them to be released to the University for assessment.

**Things you must do at the end of your placement:**

- Ask your Industrial Supervisor(s) to complete the assessment form sent out in May.
- Complete the Skills and Knowledge Acquired Report and submit it to the School of Chemical Engineering at Newcastle University by midnight on Friday 4th August (electronic submission only via Blackboard)
**Registration & Fees**

All students on the M.Eng Industry have to register as a student. In order to do this you should tell your local authority that this is the third year of your four year Masters course and that you will be registered with the University as a student.

Once your design brief is formally approved, the MEng Industry Degree Programme Director will ensure that you are registered at the University as a student. As a registered student doing a year in industry you will be liable for a reduction in tuition fees. For 2016-2017, the tuition fees for the MEng Industry Placement Year is set at £1800/year. The Tuition Fees Team at the University will write to you during September/October asking you to pay your fees.

**Section C: Contact Details**

During your year in industry you may experience problems or just want information of events in the school, or even academic help with a project you have been set at work. In this case you should contact the MEng Industry Degree Programme Director whose contact details are given below.

☎: +44 191 208 7264  
✉: kamelia.boodhoo@ncl.ac.uk

You may want to contact other members of staff associated with specific aspects of the assessment during the year. Their contact details are given below:

**Dr. Jonathan Lee**  
☎: +44 191 208 5201  
✉: jonathan.lee@ncl.ac.uk

**Prof. Keith Scott**  
☎: +44 191 208 8771  
✉: keith.scott@ncl.ac.uk

**Prof. Jarka Glassey**  
☎: +44 191 208 7275  
✉: jarka.glassey@ncl.ac.uk

**Dr. Vladimir Zivkovic**  
☎: +44 191 208 4865  
✉: vladimir.zivkovic@ncl.ac.uk
Section D: Assessment of the Industrial Year

Your year in industry will count towards your overall degree mark. The breakdown of marks between each year of your Industrial M.Eng. (Industry) is as follows:

- Stage 2 - 30%
- Stage 3 in Industry - 20%
- Stage 4 - 50%

As for Stages 1 and 2 of your degree, the assessment for Stage 3 (Industry) consists of passing a total of 120 credits. This assessment is split between four modules:

- CME3028 Industrial Design Project (50 credits)
- CME3037 Separations Processes 2 (Industry) (15 credits)
- CME3041 Placement Log Book (5 credits)
- CME8110 Chemical Engineering Knowledge (Industry) (50 credits)

Distance Learning Modules:
As part of Stage 3 of the MEng. (Industry), you must satisfactorily complete a distance-learning module during Semester 1, brief details of which are given below, for more details consult Appendix 4.

CME3037 Separation Processes 2 (Industry) - This module will run in parallel with the Separation Processes module being taught at the University during Semester 1. The aim of the module is to enable you to understand and design the separations processes that are used in the chemical industry. The syllabus will cover prediction of phase equilibria, azeotropic and multi-component distillation, gas adsorption, membrane separations, crystallization and solids processing. There will be two assignments:

<table>
<thead>
<tr>
<th>Assignment 1: Prediction of non ideal equilibrium data using thermodynamic models and separation of azeotropes by physical methods</th>
<th>Date Set</th>
<th>Submission Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>14th October 2016</td>
<td>11th November 2016</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assignment 2: Multicomponent adsorption equilibria and adsorption calculations</th>
<th>Date Set</th>
<th>Submission Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>18th November 2016</td>
<td>9th December 2016</td>
<td></td>
</tr>
</tbody>
</table>

Both assignments should be submitted electronically via Blackboard by midnight on the dates shown.

You will have to sit an exam at the University during the semester 1 assessment period (Monday 16th January 2017 and Friday 27th January 2017 (including Saturday 21st January 2017). The exam will last for two and a half hours. The exam rubric is as follows:

- Section A: 10 short compulsory questions covering the whole syllabus. Each question is worth 10 marks.
- Section B: A choice of 3 questions from 5. Questions on distillation, adsorption, solids processing crystallization and membrane processing. Each question is worth 100 marks.
CME3028 Industrial Design Project - This is a substantial piece of work on a technical project with a significant design element. The subject of your design project will have been agreed between your Industrial Supervisor and the Degree Programme Director prior to the start of Semester 1. The aim of the design project is to translate a business, technical, safety or environmental need into a design solution. A design supervisor at your company and the Academic Supervisor at the University will jointly supervise your design project.

The design is split into three main parts that are assessed using milestone reports, an interview and a presentation. Details of what will be assessed at each milestone are given below. Your placement supervisor at the company and the academic supervisor at the University will be jointly responsible for assessing the design project milestone reports and the interview. A panel of academics and industrialists will assess the design presentation.

The design project is worth 50 credits that equates to 500 hours of your time spent on the project. This is roughly three months of full time work.

<table>
<thead>
<tr>
<th>Start Date</th>
<th>Milestone Subject</th>
<th>Submission Time and Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer 2016</td>
<td><strong>Milestone 1:</strong> Problem identification Identification of possible solutions. “Optioneering” Material and energy balances Hazard 1 study <em>(It is advised that you spend about 160 hours on completing Milestone 1)</em></td>
<td>Electronic submission only via Blackboard Midnight on Friday 13th January 2017</td>
</tr>
<tr>
<td>13th February 2016</td>
<td><strong>Milestone 2:</strong> Chemical engineering design of process units Mechanical design/specification of process units <em>(Note: It is advised that you spend about 150 hours on the chemical and mechanical engineering aspects of the design)</em> Ancillary equipment design sizing; pumps, heat exchangers and pipelines etc. Design of measurement and control system Plant layout P &amp; I diagram Safety studies (HAZOP, HAZAN, LOPA, SIL etc.) Environmental impact and sustainability study Costing and economic appraisal of the design Project re-evaluation and design improvements</td>
<td>Electronic submission only via Blackboard Midnight on Monday 22nd May 2017</td>
</tr>
</tbody>
</table>
(It is advised that you spend about **180 hours** on the above components of Milestone 2)  
*See detailed marking scheme in Appendices*

**Milestone 3:**  
Design presentation  
*A detailed marking scheme will follow*  
24th to 26th May 2017

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Details of the Assessment</th>
</tr>
</thead>
</table>
| I         | **Report** – 20 sides of A4 at 300 words per page plus appendices.  
*Learning outcomes and breakdown of marking scheme provided in Appendices.*  
**Presentation.** 15 minutes presentation to Academic and Industrial Supervisors followed by 15 minutes of questions |
| II        | **Report** - 100 sides of A4 at 300 words per page plus appendices.  
*Learning outcomes and breakdown of marking scheme provided in Appendices.* |
| III       | **Presentation**  
The presentation should be 15 minutes long and will be followed by 10 minutes of questions from a panel of academic staff/industrialists |

**Design Project – Marks Allocation**

The marks are allocated as follows:

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Method of Assessment</th>
<th>CME3028 Weighting Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Report (70% of mark) + Interview (30% of mark)</td>
<td>25%</td>
</tr>
<tr>
<td>II</td>
<td>Report</td>
<td>60%</td>
</tr>
<tr>
<td>III</td>
<td>Presentation</td>
<td>15%</td>
</tr>
</tbody>
</table>

A more detailed marking scheme is given in the Appendices

**CME8110 Chemical Engineering Knowledge (Industry)** - Your experience in industry should benefit you in three ways:

1. Deepening of your chemical engineering knowledge through exposure to science and engineering theory that is new to you  
2. Broadening your chemical engineering knowledge through exposure to chemical engineering practice and the way in which engineering based industries operate
3. Development of key skills, for example report writing, presentations, taking responsibility and managing the work of others.

The purpose of the Chemical Engineering Knowledge module is to capture the new knowledge that you have absorbed and the key skills that you have developed. This module will be assessed by submission of a “Skills and Knowledge Acquired Report” which will consist of two distinct parts, a Knowledge Acquired Report and a Key Skills Development Report as described below.

**Knowledge Acquired Report** - The purpose of this report is for you to present the Chemical Engineering knowledge that you have learnt during your year in industry, highlighting the broadening and deepening of your chemical engineering knowledge. It should not include any material that has been covered in Stage 1 and Stage 2 of your degree programme.

Examples of the sort of material that could be included are:

- A description of the chemistry of the process / processes you are working on.
- Descriptions of science and technology underlying the process
- Principles and concepts related to safety or quality procedures.
- Descriptions of science and engineering that is new to you.

The presentation style of the report should be similar to that of a textbook as explained in Appendix 2. As well as describing new science and engineering principles, you should give examples of where they apply in your process or where you have applied them in your work.

The marking scheme for this report is given in the Appendices.

**Key Skills Development** - This part of the report should be a record of the development of your key skills, during the time you spent with the company.

It is intended that the format of this part of the report will be similar to that of the IChemE’s Competence and Commitment Report which is an evidence-based report for a range of knowledge, understanding and skills developed and documented by practising engineers when applying for Chartered membership. See [http://www.getchartered.org/professional-experience/general-guidance.aspx](http://www.getchartered.org/professional-experience/general-guidance.aspx) for more details.

You can download a copy of the template of this report from here: [http://www.getchartered.org/professional-experience/first-steps.aspx](http://www.getchartered.org/professional-experience/first-steps.aspx)

As placement students, you are only expected to focus on the “Skills Development” in Part C of the template. The guidance provided on the IChemE’s website for filling in Part C of the template should be followed.

It is expected that your key skills development during your placement year will include:

- Written Communications
- Oral Presentations
- Working in a team
- Managing the work of others
- Problem solving
- Planning and organisation
- Taking responsibility
The report should include these headings along with examples of how you have developed and applied them during the year in industry. Quite often this is the sort of information that is captured by company appraisals.

**Supervisor’s Assessment** - This is a questionnaire completed by your industrial supervisor at the end of your year in industry. This will be sent by the DPD at the end of May.

**Breakdown of Marks for CME8110**
Skills and Knowledge Acquired Report: 75% of marks for CME8110
Supervisor’s assessment: 25% of marks for CME8110

**CME3041 Placement Log Book** - It is good practice, whatever job you are doing, to keep a regularly updated logbook or a diary of activities. The purpose is primarily for you to reflect on activities already undertaken and to plan for future tasks. It is also intended that the logbook entries will provide evidence to support the claims made in your Skills and Knowledge Acquired Report, which forms a significant part of the assessment of the MEng Industry Placement Year.

It is recommended that the logbook is updated on the University’s E-portfolio system in the form of weekly blog entries from the start of Semester 1 through to the end of Semester 2. This should take no more than 1 hour at the end of every working week and in filling it out, you will have a good chance to review the work completed during the week.
Section E: Industrial Visits

The Purpose of the Visit:
Your Academic Supervisor will visit you twice during the year.

The first visit will occur in October/November. The purpose of this visit is:
- To ensure that you have settled in at the company
- To meet with your supervisor to discuss the work that you will be doing and to discuss the scope of the design project.
- To deal with any difficulties that may have arisen.

The second visit will occur during February. The main purpose of this visit is to carry out an interview as part of the assessment of Milestone 1 for your design project. The other objectives of this visit are:
- To check that you are progressing with the work you need to complete to satisfy the course requirements.
- To examine the work you have started for your Milestone 2 of the design project.
- To meet with your supervisor and ensure that they know how to complete the supervisor’s assessment form due for submission in May.

Organising a Visit:
The Academic Supervisor will contact you asking you to provide him/her with a date when both you and your supervisor will be available for a visit. He/she will normally visit all the companies in a particular geographical area (e.g. the North West). When a date has been arranged it will be your responsibility to organise the visit. These arrangements should include:
- Providing directions to the site
- Arranging a plant tour (if appropriate)
- Allocating time for discussions with you and your supervisor.

Campus Visits by Placement Students:
Placement students will be expected to be on campus on three separate occasions during their placement year. The timings of these visits are as follows:
- To take Separation Processes 2 exams (January)
- To undertake HAZOP Analysis in a group with other MEng Industry Placement students (provisionally scheduled for April, exact date will be communicated closer to the date)
- To present their design project as part of Milestone 3 (normally at the end of May)
- During the last two visits, placement students will have an opportunity to discuss with their academic supervisor the progress of the work to be completed for CME8110 for submission in August.
**Section F: Appendices**

**Design Project: Learning Outcomes and Marking Scheme**

### Milestone 1 Report

<table>
<thead>
<tr>
<th>Learning outcome</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of the problem to be solved and justification for the selection of</td>
<td>20%</td>
</tr>
<tr>
<td>process route and process equipment, with detailed description of the processes</td>
<td></td>
</tr>
<tr>
<td>Creation of a process flowsheet with calculations for preliminary mass and</td>
<td>20%</td>
</tr>
<tr>
<td>energy balances</td>
<td></td>
</tr>
<tr>
<td>Identification of all key process and utility streams and specify their flow,</td>
<td>10%</td>
</tr>
<tr>
<td>composition and energy data</td>
<td></td>
</tr>
<tr>
<td>Preliminary assessment of potential hazards and general safety/sustainability</td>
<td>15%</td>
</tr>
<tr>
<td>considerations</td>
<td></td>
</tr>
<tr>
<td>Presentation of a report that communicates the preliminary design work</td>
<td>5%</td>
</tr>
</tbody>
</table>

### Milestone 1 Presentation

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical presentation that communicates the preliminary work</td>
<td>15%</td>
</tr>
<tr>
<td>Defence of the preliminary work</td>
<td>15%</td>
</tr>
</tbody>
</table>

### Milestone 2 - Report

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe a specific sub-part of the process to be designed in detail and specify</td>
<td>5%</td>
</tr>
<tr>
<td>the design objectives and constraints</td>
<td></td>
</tr>
<tr>
<td>Carry out the detailed chemical engineering design of one or more major items</td>
<td>20%</td>
</tr>
<tr>
<td>of equipment and ancillaries</td>
<td></td>
</tr>
<tr>
<td>Carry out a preliminary mechanical design of a major item of equipment,</td>
<td>10%</td>
</tr>
<tr>
<td>including selection of materials of construction</td>
<td></td>
</tr>
<tr>
<td>Produce specification sheets for selected plant items</td>
<td>10%</td>
</tr>
<tr>
<td>Carry out an extended process development to include sizing of auxiliary</td>
<td>10%</td>
</tr>
<tr>
<td>equipment and produce a process plant layout diagram showing the pipelines</td>
<td></td>
</tr>
<tr>
<td>connecting the main process units</td>
<td></td>
</tr>
<tr>
<td>Carry out a design of the instrumentation, control and monitoring system and</td>
<td>10%</td>
</tr>
<tr>
<td>produce a Piping and Instrumentation Diagram (P&amp;ID)</td>
<td></td>
</tr>
<tr>
<td>Task</td>
<td>Percentage</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Evaluate the safety, health and environment hazards of the process/unit operation, including detailed HAZOP and HAZAN studies</td>
<td>15%</td>
</tr>
<tr>
<td>Carry out a sustainability analysis of the process</td>
<td></td>
</tr>
<tr>
<td>Carry out a full costing and economic appraisal of the process/unit operation</td>
<td>10%</td>
</tr>
<tr>
<td>Discuss feasibility of final design and present suggestions for improvement</td>
<td>5%</td>
</tr>
<tr>
<td>Present a report that communicates the detailed design of a process unit and its evaluation</td>
<td>5%</td>
</tr>
</tbody>
</table>
Preparing Your Knowledge Acquired Report

Figure 1 is an illustration of a page from a textbook, which in this case is discussing heat transfer in packed beds. What you should notice from this example is the style of the writing and the layout of the page.

**HEAT TRANSFER IN PACKED BEDS**

Many catalytic reactions are carried out in multitubular reactors that are similar to shell-and-tube exchangers. The solid catalyst particles are packed in the tubes, and the reactant gases enter and leave through headers at the ends of the reactor. For an exothermic reaction, the heat of reaction is removed by a circulating coolant or a boiling fluid on the shell side. For an endothermic reaction, the energy needed for the reaction is transferred from hot fluid in the shell to the catalyst particles in the tube. The limiting heat-transfer coefficient is usually on the tube side, and the tube size and mass flow rate are often chosen to ensure a nearly constant reaction temperature or to prevent the maximum catalyst temperature from exceeding a safe value. In the following discussion, an exothermic reaction is used as an example, because this is the more common case and because too low an overall coefficient can lead to an uncontrollable rise in reactor temperature or a "runaway" reaction.

**Temperature and velocity profiles**

The radial temperature profile for an exothermic reaction in a packed tube has the shape shown in Fig. 15.18a. There is a steep gradient near the inside wall and a nearly parabolic temperature profile over the rest of the catalyst bed. The velocity profile (Fig. 15.18b) has a peak near the wall, since the particles are packed more loosely in this region than in the rest of the tube. The temperature and velocity profiles for an empty tube with turbulent flow and a homogeneous reaction would have almost all the gradient near the wall.

**Heat-transfer coefficients**

For a simple one-dimensional treatment of packed tubes, the heat-transfer coefficient is based on a radial average temperature of the gas, where $\bar{P}$ is the temperature that would result from mixing all the gas flowing through the tube at a given

![Figure 15.18](image)

Temperature and velocity profiles in a packed-tube reactor.

Figure 1 – Sample Page from a textbook.
You should have noticed the following things about figure 1:

1. The subject is introduced under the main heading. The introduction describes where the knowledge can be applied.

2. When more detail is required subheadings are used, for example "Temperature and Velocity Profiles".

3. The figure at the bottom of the page is referred to in the text, so that the reader knows what they should be looking at and how it relates to the text.

4. The present tense is used throughout the text unless historical development is being described.

Distance Learning Module Descriptions

The link http://www.ncl.ac.uk/module-catalogue gives a breakdown of study hours, laboratory work and assessment methods. The breakdown of hours may vary but not significantly.
Knowledge Acquired Report Marking Scheme

Marking Scheme for Knowledge Acquired Report

Markers Name ___________________________________________ Date _____________

This report has two purposes:

1. Demonstrate that the students have deepened their knowledge of chemical engineering whilst on placement
2. To record with evidence the development of their key skills whilst on placement.

There are two questions that should be borne in mind when assessing the knowledge-acquired part of the report:

1. Is any of the material included in the report taught as part of Stages 1, 2 or 4 of the MEng (Industry) degree? If it is then this material should not be included in your assessment

2. Does the new knowledge presented in the report, represents a deepening of the student’s knowledge of chemical engineering and associated science/engineering?
<table>
<thead>
<tr>
<th>Knowledge Acquired:</th>
<th>Maximum Mark</th>
<th>Mark Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Break down of knowledge into clearly defined areas. Has the student organised the knowledge under headings that would be recognised as subject areas in a chemical engineering course? For example Process Chemistry, separation processes, process safety</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Clarity of the student’s explanation of concepts. Are the key concepts in an area of knowledge clearly identified and explained? Concepts are explained in textbook style with appropriate use of diagrams</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Awareness of the application of knowledge acquired. Use of relevant examples from the process that the company is operating Application of new concepts to design problems, process engineering tasks or lab work completed for the company</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Key Skills Self-Assessment:</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Examples and evidence of development and deployment/demonstration of the following key skills Written Communications Oral Presentations Working in a team Managing the work of others Problem Solving Planning and Organisation Taking responsibility</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Comments