Programme Specification for the Certificate of Advanced Study in Industrial Pharmaceutical Chemistry

PLEASE NOTE. This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. This specification provides a source of information for students and prospective students seeking an understanding of the nature of the programme and may be used by the College for review purposes and sent to external examiners. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the course handbook. The accuracy of the information contained in this document is reviewed by the College and may be checked by the Quality Assurance Agency.

1. Awarding Institution: Imperial College London

2. Teaching Institution: GlaxoSmithKline Global Manufacturing and Supply and Imperial College London

3. External Accreditation by Professional / Statutory Body: Not applicable

4. Name of Final Award (BEng / BSc / MEng etc): Certificate of Advanced Study

5. Programme Title: Industrial Pharmaceutical Chemistry

6. Name of Department / Division: Chemistry

7. Name of Faculty: Natural Sciences

8. UCAS Code (or other coding system if relevant): F1C1, F1C2, F1C3, F1C4

9. Relevant QAA Subject Benchmarking Group(s) and/or other external/internal reference points
   Not applicable

10. Level(s) of programme within the Framework for Higher Education Qualifications (FHEQ):
    Level 7

<table>
<thead>
<tr>
<th>Level(s) of programme within the Framework for Higher Education Qualifications (FHEQ)</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor’s (BSc, BEng, MBBS)</td>
<td>Level 6</td>
</tr>
<tr>
<td>Integrated Master’s (MSci, MEng)</td>
<td>Levels 6 and 7</td>
</tr>
<tr>
<td>Master’s (MSc, MRes)</td>
<td>Level 7</td>
</tr>
</tbody>
</table>

11. Mode of Study Part time; work-based and online, distance learning

12. Language of Study: English

13. Date of production / revision of this programme specification (month/year):
    December 2009
14. Educational aims/objectives of the programme

The Certificate will aim to:

- develop in participants a range of technical competencies and skills, which they can utilise to enhance their overall job performance and can apply to the solution of problems and issues encountered in their day-to-day work;
- develop in participants, through continuing education in pharmaceutical process chemistry, a range of transferable skills of value in their career progression;
- ensure that they continue their scientific training and development in those aspects of Chemistry and related areas that are particularly relevant to the work of Pharmaceutical Process Chemists at GSK;
- involve participants in an intellectually stimulating and satisfying experience of learning, enhancing their enthusiasm for their work;
- empower employees entering the company at graduate level who will probably have started their career as a Process Development Chemist to move to different roles as specified in the Chemistry Competency Development Framework
- Enable participants who successfully complete the programme to achieve the status of Chartered Chemist and/or Chartered Scientist.

15. Programme Learning Outcomes

1. Knowledge and Understanding

<table>
<thead>
<tr>
<th>A. Knowledge and understanding of:</th>
<th>Teaching/learning methods and strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The manufacturing processes for pharmaceutical substances and intermediates that the candidates will work on including the mechanisms of each stage, the quality critical parameters for each stage, the quality specifications of each stage and the mechanisms for formation and details of control of key impurities.</td>
<td>Comprehensive and structured work-based training</td>
</tr>
<tr>
<td>2. Modern strategies for organic synthesis</td>
<td>Training packages will be available for candidates to use in a self managed e-learning environment. These e-learning modules provide links to further sources of information for further study. Direction is provided in the units for candidates to gain on-the-job experience. These are documented for ratification.</td>
</tr>
<tr>
<td>3. A range of laboratory and analytical techniques for use in process investigation and development and product characterisation.</td>
<td>For the detail for each individual unit please see the competency development framework</td>
</tr>
<tr>
<td>4. The regulated and compliant environment in which the manufacture of pharmaceutical substances must operate, including documentation requirements, Environmental Health and Safety and Good Manufacturing Practice.</td>
<td>Online lecture courses and problem classes delivered by Imperial College teachers</td>
</tr>
<tr>
<td>5. Relevant plant equipment, its operation and maintenance.</td>
<td>Independent ‘research’ of materials and sources, including access via GSK to wide range of academic literature and research papers</td>
</tr>
<tr>
<td>6. Financial considerations and supply and demand management</td>
<td>Formal training programmes will be used to meet specific needs. These may include internal GSK programmes covering behavioural or technical skills (e.g. report writing, communication, influencing, use of statistics, understanding physical properties) as well as external programmes, seminars and conferences. Internal programmes may be classroom based or virtual, (e.g. webinars).</td>
</tr>
<tr>
<td>7. The requirements of Secondary Manufacturing – taking drug substance and making the drug product.</td>
<td>Assessment of the knowledge base will be conducted through a combination of online multiple choice questions, assessment of workplace competence and assessed reflective summaries of learning achievements</td>
</tr>
<tr>
<td>8. A range of tools and methodologies for business improvement and supporting and developing processes and also for moving processes from plant to plant and troubleshooting.</td>
<td></td>
</tr>
</tbody>
</table>

2. Skills and other Attributes

**Intellectual Skills**

<table>
<thead>
<tr>
<th>B Intellectual (thinking) skills - able to:</th>
<th>Teaching/learning methods and strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Certificate of Advanced Study in Industrial Pharmaceutical Chemistry (with GSK)</td>
<td></td>
</tr>
</tbody>
</table>


1. Develop or investigate a chemical process to manufacture a pharmaceutical substance or intermediate. 

2. Apply the knowledge and understanding of the Chemistry of the Process to design appropriate experiments and studies.

3. Apply tools and methodologies including lean sigma and statistical to support and investigate processes.

4. Apply knowledge to batch documentation and provide support to processes in manufacturing.

5. Support regulatory filing and validation.

6. Lead or organise a team (or self) to investigate a problem competently using lean sigma and troubleshooting tools.

7. Assess process changes for impact on secondary, understanding success criteria for technology transfer of an API.

Intellectual skills are developed through the teaching and learning methods outlined in section 12A and the programme outline described in section 13. These skills will be acquired through on the job experience. Candidates will be assigned a mentor or supervisor to support them in gaining these skills. Candidates will be expected to be proactive in seeking support from specialists or company experts and colleagues who have these skills as their mentor or supervisor will not be a specialist in all of them.

For the detail for each individual unit please see the competency development framework.

Assessment of thinking skills will be partly achieved through completion of competency assessment but also through the end of unit and end of programme discursive assignments and course problem sheets.

Practical Skills

C Practical skills – able to:

1. Apply experimentation in the laboratory to understand the critical to quality parameters in a manufacturing process and how to implement controls on plant.

2. Use a range of analytical and laboratory techniques to assist chemistry development. (B)

3. Take a key role in bringing in a process from outside of the site, e.g. taking part in defining the plant configuration and being the single point of contact for technical issues on a process.

Teaching/learning methods and strategies

Training will be provided through elearning, classroom teaching, presentations and 1:1 coaching as required. Practical skills are consolidated in the workplace with ongoing coaching and guidance. Completion of documentation and reports will be required.

For the detail for each individual unit please see the competency development framework.

Practical skills acquired through practical experience required to achieve competencies are assessed through on-the-job evaluation and signed off by supervisors and experts.

Transferable Skills

D Transferable skills – able to:

1. Make significant personal contributions to key tasks in your employment area and understand fully the chemistry objectives of the work done and its relevance to the employer or others.

2. Demonstrate a high level of appropriate professional skills in the practice of chemistry.

3. Develop your chemistry and other professional skills as required for the work undertaken and career development.

4. Demonstrate an understanding and appreciation of Health, Safety and Environmental issues and adhere to the relevant requirements relating to your role.

5. Evaluate critically and draw conclusions from scientific and other data. (B)

6. Demonstrate integrity and respect for confidentiality on work and personal issues. Demonstrate other professional attributes such as thoroughness and reliability.

7. Plan and organise time systematically, demonstrate

Teaching/learning methods and strategies

Transferable skills are developed through work experience, through the teaching and learning activities outlined above and in section 13, and through GSK elearning courses and other in-house training courses.

The GSK Primary Supply Chemistry Competency Development Framework encompasses many essential transferable skills, developed through experience, and supported by training materials. In some specific areas, such as HSE, use of IT tools, presentation skills and project management, training programmes have been put in place. This may be supplemented locally to meet site specific
Certificate of Advanced Study in Industrial Pharmaceutical Chemistry (with GSK)

GSK’s Performance and Development Process (PDP) is designed to promote the development of professional attributes in employees. Every employee has regular development reviews with their supervisors or line managers, at which agreements about priority areas for development are agreed and strategies for achieving targets identified. Both e-learning and locally provided courses are available to provide the necessary support.

16. The following reference points were used in creating this programme specification

- Subject benchmarking information for Chemistry
- Royal Society of Chemistry (RCA) Professional Attributes
- Student Handbook (in preparation)

17. Programme structure and features, curriculum units (modules), ECTS assignment and award requirements

The certificate is based mainly on the GSK Primary Supply Chemistry Competency Development Framework. The framework is a matrix of competencies describing key aspects of the work of chemists working in a primary manufacturing area (manufacture of drug substance and intermediates). It includes: definitions of competencies at specified levels for both knowledge and skills and application and supporting training materials and assessment. Units 1, 2 and 3 of the certificate require achievement of Competent level as defined in the framework. Unit 4 is the key competency in the framework and is required at the Expert level.

In addition, the Certificate requires achievement in a lecture course and problem classes delivered by Imperial College.

<table>
<thead>
<tr>
<th>Unit title</th>
<th>Level</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1: Chemistry for Manufacture</td>
<td>Level M/7</td>
<td>7.5</td>
</tr>
<tr>
<td>Unit 2: Process and Compliance</td>
<td>Level M/7</td>
<td>5</td>
</tr>
<tr>
<td>Unit 3: Application and Tools</td>
<td>Level M/7</td>
<td>7.5</td>
</tr>
<tr>
<td>Unit 4: Chemistry of the Process (expert)</td>
<td>Level M/7</td>
<td>7.5</td>
</tr>
<tr>
<td>Unit 5: Professional Achievement Review</td>
<td>Level M/7</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Total: 30 credits

Candidates will be required to pass all five units to be awarded the certificate. It will not be necessary for candidates to progress through the units sequentially. However it is expected that Unit 1 will be started first and Unit 4 will not be started until the equivalent section in Unit 1 has been completed.

Unit 5 requires a final written submission to demonstrate that the candidate has fully understood the application of the competencies in the workplace. This submission of discursive writing should refer to the end of unit submissions for Units 1 - 4 and may reference any of the supporting reports included at the unit level. Other reports may also be attached and referenced. The assignment would be normally expected to not exceed 2,000 words excluding attached reports. In addition, the assessment of Unit 5 requires demonstration of achievement of the transferable skills as outlined above, in 12D, and of the Professional Attributes of the RSC
All the competency assessments must meet GSK requirements. The discursive writing assignments must satisfy the assessment criteria for a pass.

Unit 1

Unit 1: Chemistry for Manufacture

The unit assessment may not be completed until the participant has demonstrated achievement in the five areas of competence which underpin this module:

- Competency 1: Chemistry of the Process
- Competency 2: Laboratory Techniques
- Competency 3: Design of Experiments (DOE)/Statistics
- Competency 4: Analytical Techniques
- Competency 5: Physical Properties Measurement

Detail is shown in the Chemistry Competency Development Framework

For the “Chemistry of the Process” Competency, candidates will be required to produce a presentation summarising the chemistry of the process they are working on. This will be sent in advance to Imperial, and the Imperial Assessor will grade it and carry out a viva examination via videoconferencing to test the candidate’s understanding.

The candidate will also be required to attend the online 8-lecture course entitled “Modern Methods and Strategies for Organic Synthesis” delivered by the Department of Chemistry. This material will be assessed by a short online problem sheet at the end of each lecture, and a synoptic problem sheet.

After completing these requirements, the candidate will be required to make a written submission showing that he/she has not only understood and applied the individual competencies required for this unit but has also understood how the competencies support each other and do not stand independently in the workplace. This submission of discursive writing should be supported by any relevant reports which have been written at the time of the work. These reports could be project or interim reports written to communicate information to enable management to make decisions on project activity. The end of unit assignment would be normally expected to not exceed 1,000 words excluding attached reports.

Unit 2

Unit 2: Process and Compliance

The unit assessment may not be completed until the participant has demonstrated achievement in the ten areas of competence which underpin this module:
Competency 6: Safety
Competency 7: Environmental
Competency 8: Yield and Quality
Competency 9: Batch Documentation
Competency 10: Plant Equipment Operation and Maintenance
Competency 11: GMP/SOP's
Competency 12: Regulatory Compliance
Competency 13: Validation
Competency 14: Unplanned Changes/Deviation Management

Detail is shown in the Chemistry Competency Development Framework

The candidate will be required to make a written submission showing that he/she has not only understood and applied the individual competencies required for this unit but has also understood how the competencies support each other and do not stand independently in the workplace. This submission of discursive writing should be supported by any relevant reports which have been written at the time of the work. These reports could be project or interim reports written to communicate information to enable management to make decisions on project activity. The end of unit assignment would be normally expected to not exceed 1,000 words excluding attached reports.

Unit 3: Application and Tools

The module assessment may not be completed until the participant has demonstrated achievement in the ten areas of competence which underpin this module:

   Competency 15: Technology Transfer – Receiving Process Knowledge
   Competency 16: Finance and standard Costs
   Competency 17: Supply and Demand Management
   Competency 18: Process Understanding, Control and Capability (PUCC)
   Competency 19: Design for Manufacture
   Competency 20: Operational Excellence
   Competency 21: Project Knowledge Sharing
   Competency 22: Procurement Support
   Competency 23: Troubleshooting
Competency 24: Customer/Secondary Processing Awareness

Detail is shown in the Chemistry Competency Development Framework

The candidate will be required to make a written submission showing that he/she has not only understood and applied the individual competencies required for this unit but has also understood how the competencies support each other and do not stand independently in the workplace. This submission of discursive writing should be supported by any relevant reports which have been written at the time of the work. These reports could be project or interim reports written to communicate information to enable management to make decisions on project activity. The end of unit assignment would be normally expected to not exceed 1,000 words excluding attached reports.

Unit 4: Chemistry of the Process (expert)

Chemistry of the Process is the central competency to the framework and is required at the expert level for the certificate in relation to the product that the chemist is working on. It is central to the whole Certificate programme as it is fundamentally important that a chemist has a good understanding of the chemical process to manufacture the product that he or she is working on. Without this knowledge and understanding, the chemist cannot design appropriate experiments and studies or carry out any activities around the product in an informed and productive way.

Detail is shown in the Chemistry Competency Development Framework

For the “Chemistry of the Process” (Expert) Competency, candidates will be required to produce a presentation summarising the development history of a GSK product which may be the product they are working on.

This unit will also test candidates’ advanced problem solving skills, building on the lecture material in Unit 1. Problem sheets (9 per year) will be set by Imperial teachers. Candidates will be able to submit written solutions via Imperial’s Blackboard by a given deadline. These will be assessed by Imperial and followed by an online problem class to review the solutions and issues arising. Candidates will be required to attain a pass mark in 5 of these problem sheets.

The candidate will be required to make a written submission showing that he/she has not only understood and applied the individual competency required for this unit but has also understood how this competency is supported by others and that it does not stand independently in the workplace. Candidates should demonstrate in this written submission that they have a good understanding of the chemistry of the process they are working on at an expert level. This submission of discursive writing should be supported by any relevant reports.
which have been written at the time of the work. These reports could be project or interim reports written to communicate information to enable management to make decisions on project activity. The end of unit assignment would be normally expected to not exceed 1,000 words excluding attached reports.

Unit 5: Professional Achievement Review

This Unit will run throughout the Certificate programme. It has been designed to link to GSK’s annual cycle of planning and review of performance and personal development. Participants will reflect on their learning achievements each year, and identify their progress in relation to the competencies that make up the GSK Primary Supply Chemistry Competency Development framework. They will also identify their achievements in relation to the RSC’s Professional Attributes required for the purpose of achieving CChem/CSci and to the QAA Benchmark Statement for Chemistry.

Unit 5 will comprise two elements of assessment:

i) a final report, supported by appropriate evidence, to demonstrate that the candidate has fully understood the application of the competencies in the workplace. This submission of discursive writing should refer to the end of unit submissions and may reference any of the supporting reports included at the Unit level. Other reports may also be attached and referenced. The submission would normally be expected to not exceed 2,000 words, excluding attached reports.

ii) a reflective commentary referencing the professional attributes/transferable skills listed in 12D and other evidence of technical and professional development and demonstrating that achievement of the competencies that make up the GSK Primary Supply Chemistry Competency Development framework meets the requirements of the RSC’s Professional Attributes (as required for the purpose of achieving CChem/CSci) and to the QAA Benchmark Statement for Chemistry. The commentary will not normally exceed 2000 words, excluding attached evidence.

18. Support provided to students to assist learning (including collaborative students, where appropriate).

- Student Handbook, which includes programme and competency requirements.
- Students have access to Imperial College facilities (including those of the Students’ Union), support and networking opportunities. This includes being able to attend general interest lectures and annual GSEPS and chemistry department symposia.
- Formal training programmes, (internal to GSK or external).
- Seminars and conferences.
- ELearning and webinars.
- Learning resources, library, journals and electronic databases.
- Mentors, supervisors and subject experts.
- Access to Imperial tutors via e-mail, online forums and course blogs.
- Access to Imperial’s Department of Chemistry Postgraduate Tutor or, when appropriate a College Tutor

19. Criteria for admission:

8 Certificate of Advanced Study in Industrial Pharmaceutical Chemistry (with GSK)
The minimum qualification for admission to the Certificate is normally at least an Upper Second Class Honours degree in Chemistry from a UK academic institution or an equivalent overseas qualification. Many will have already achieved MChem or PhD. In addition, all applicants must satisfy the College’s English Proficiency Requirement.

Candidates must have completed any probationary period at GSK prior to entry to the course, and will be required to be and remain GSK employees throughout the programme. If candidates leave GSK, they may not be able to complete the Certificate programme. Imperial will make every effort, on a case-by-case basis, to allow candidates to use work they have already carried out as credit towards alternative Imperial Certificate or Masters qualifications.

Prospective candidates will be required to complete a Candidate Nomination form on which their managers will confirm that their application is supported and that they will have the opportunities to demonstrate the required competencies as part of their GSK employment. Special cases for admission will be considered by the Programme Management Committee and approved by Imperial College.

20. Processes used to select students:
Candidates with the appropriate background and whose work is likely to give them the opportunities to complete the competencies will be identified by their GSK managers.

21. Methods for evaluating and improving the quality and standards of teaching and learning
a) Methods for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards:

The external examiner system and Boards of Examiners are central to the process by which the College monitors the reliability and validity of its assessment procedures and academic standards. Boards of Examiners comment on the assessment procedures within the College and may suggest improvements for action by relevant departmental teaching Committees.

The Faculty Studies Committees and the Graduate Schools’ Postgraduate Quality Committees review and consider the reports of external examiners and accrediting bodies and conduct periodic (normally quinquennial) and internal reviews of teaching provision. Regular reviews ensure that there is opportunity to highlight examples of good practice and ensure that recommendations for improvement can be made.

At programme level, the Head of Department/Division has overall responsibility for academic standards and the quality of the educational experience delivered within the Department. The course has a Programme Management Committee with representation from each GSK site and from Imperial College. This committee reports to Imperial College. A sub-committee of this group is the Assessment Panel, which monitors student progress and makes recommendations to the Imperial Department of Chemistry Board of Examiners for the course.

Most of the College’s undergraduate programmes are accredited by professional engineering and science bodies or by the General Medical Council. Accreditation provides the College with additional assurance that its programmes are of an appropriate standard and relevant to the requirement of industry and the professions. Imperial and GSK will be seeking accreditation of this Certificate course from the Royal Society of Chemistry.

b) Committees with responsibility for monitoring and evaluating quality and standards:

The Senate oversees the quality assurance and regulation of degrees offered by the College. It is charged with promoting the academic work of the College, both in teaching and research, and with regulating and supervising the education and discipline of the students of the College. It has responsibility for approval of changes to the Academic Regulations, major changes to degree programmes and approval of new programmes.

The Quality Assurance Advisory Committee (QAAC) is the main forum for discussion of QA policy and the regulation of degree programmes at College level. QAAC develops and advises the Senate.
on the implementation of codes of practice and procedures relating to quality assurance and audit of quality and arrangements necessary to ensure compliance with national and international standards. QAAC also considers amendments to the Academic Regulations before making recommendations for change to the Senate. It also maintains an overview of the statistics on completion rates, withdrawals, examination irregularities (including cases of plagiarism), student appeals and disciplinaries.

The Faculty Studies Committees and Graduate School Postgraduate Quality Committees are the major vehicle for the quality assurance of undergraduate / postgraduate courses respectively. Their remit includes: setting the standards and framework, and overseeing the processes of quality assurance, for the areas within their remit; monitoring the provision and quality of e-learning; undertaking reviews of new and existing courses; noting minor changes in existing programme curricula approved by Departments; approving new modules, changes in module titles, major changes in examination structure and programme specifications for existing programmes; and reviewing proposals for new programmes, and the discontinuation of existing programmes, and making recommendations to Senate as appropriate.

The Faculty Teaching Committees maintain and develop teaching strategies and promote inter-departmental and inter-faculty teaching activities to enhance the efficiency of teaching within Faculties. They also identify and disseminate examples of good practice in teaching.

Departmental Teaching Committees have responsibility for the approval of minor changes to course curricula and examination structures and approve arrangements for course work. They also consider the details of entrance requirements and determine departmental postgraduate student numbers. The Faculty Studies Committees and the Graduate School Postgraduate Quality Committees receive regular reports from the Departmental Teaching Committees.

For this course, a Programme Management Committee has been established, with representation from across the participating GSK sites, from the student candidates, and from Imperial College. A subset of this is the Assessment Panel, with representation from GSK and Imperial. This group makes recommendations to the Imperial College Board of Examiners for the course, which includes an External Examiner.

c) Mechanisms for providing prompt feedback to students on their performance in course work and examinations and processes for monitoring that these named processes are effective:

Candidates will obtain feedback via:
(i) Regular discussions around work performance with supervisors and line managers;
(ii) Feedback linked to the GSK PDP process;
(iii) Feedback on the completion of multiple choice questions;
For Imperial online courses, feedback will be provided electronically online to individual students, followed by a collective problem class to discuss common errors. These processes will be monitored by the course Assessment Panel, reporting to the Programme Committee and the Imperial Board of Examiners.

d) Mechanisms for gaining student feedback on the quality of teaching and their learning experience and how students are provided with feedback as to actions taken as a result of their comments:

Feedback from candidates will be obtained via the automated feedback process linked to completion of elearning activities and discussion with supervisors and line managers. Candidates are represented on the Programme Management Committee which provides further opportunity for candidates to provide feedback on all aspects of the programme. The Programme Management Committee will receive information on course feedback from candidates. The Imperial College Programme Examiner, as part of both the Programme Management Board and the Board of Examiners of the Chemistry Department, will ensure that the candidate comments obtained have been addressed.
e) **Mechanisms for monitoring the effectiveness of the personal tutoring system:**

The effectiveness of candidates’ relationships with their managers will be monitored via GSK PDP and related development procedures. Candidates also have access to the Imperial system of pastoral support via the Postgraduate Tutor. This will be monitored by the Programme Committee and the Head of Department.

f) **Mechanisms for recognising and rewarding excellence in teaching and in pastoral care:**

Staff are encouraged to reflect on their teaching, in order to introduce enhancements and develop innovative teaching methods. Each year College awards are presented to academic staff for outstanding contributions to teaching, pastoral care or research supervision. A special award for Teaching Innovation, available each year, is presented to a member of staff who has demonstrated an original and innovative approach to teaching. Nominations for these awards come from across the College and students are invited both to nominate staff and to sit on the deciding panels.

g) **Staff development priorities for this programme include:**

- Training materials produced to support achievement of competencies within the framework have been developed by GSK specialists and subject matter experts. These experts and specialists will take the lead in providing staff development for the staff who will provide support to candidates, in the form of mentoring and direct supervision, as they progress through the Certificate programme. This will ensure that individuals who have not been directly involved in preparation of the training materials will receive the necessary guidance and development to ensure that they are fully aware of what is required. Support to candidate supervisors will also be provided from the Programme Management team. Most of the assessment of the knowledge outcomes will be integrated in the electronic training modules. Where this is not the case guidance will be provided by the subject matter experts who developed the training material. Understanding and practical competency outcomes will be captured in on-the-job training documentation and signed off by relevant managers, who will be supported by the Programme Management team.

- Staff development and support will be provided by Imperial College for the three named chemistry leaders.

22. **Regulation of Assessment**

a) **Assessment Rules and Degree Classification:**

For **postgraduate taught programmes**: The Pass Mark for postgraduate taught courses is 50%. In order to be awarded a result of merit, a candidate must obtain an aggregate mark of 60% or greater; a result of distinction requires an aggregate mark of 70% or greater.

Where appropriate, a Board of Examiners may award a result of merit where a candidate has achieved an aggregate mark of 60% or greater across the programme as a whole AND has obtained a mark of 60% or greater in each element with the exception of one element AND has obtained a mark of 50% or greater in this latter element.

Where appropriate, a Board of Examiners may award a result of distinction where a candidate has achieved an aggregate mark of 70% or greater across the programme as a whole AND has obtained a mark of 70% or greater in each element with the exception of one element AND has obtained a mark of 60% or greater in this latter element.

b) **Marking Schemes for undergraduate and postgraduate taught programmes:**

The Pass Mark for all **postgraduate** taught course modules is 50%. Students must pass all elements in order to be awarded a degree.
c) Processes for dealing with mitigating circumstances:

For postgraduate taught programmes: A candidate for a Master’s degree who is prevented owing to illness or the death of a near relative or other cause judged sufficient by the Graduate Schools from completing at the normal time the examination or Part of the examination for which he/she has entered may, at the discretion of the Examiners,

(a) Enter the examination in those elements in which he/she was not able to be examined on the next occasion when the examination is held in order to complete the examination,

or

(b) be set a special examination in those elements of the examination missed as soon as possible and/or be permitted to submit any work prescribed (e.g. report) at a date specified by the Board of Examiners concerned. The special examination shall be in the same format as specified in the course regulations for the element(s) missed.

Applications, which must be accompanied by a medical certificate or other statement of the grounds on which the application is made, shall be submitted to the Academic Registrar who will submit them to the Board of Examiners.

d) Processes for determining degree classification for borderline candidates:

For postgraduate taught programmes: Candidates should only be considered for promotion to pass, merit or distinction if their aggregate mark is within 2.5% of the relevant borderline. Nevertheless, candidates whom the Board deems to have exceptional circumstances may be considered for promotion even if their aggregate mark is more than 2.5% from the borderline. In such cases the necessary extra marks should be credited to bring the candidate’s aggregate mark into the higher range.

e) Role of external examiners:

The primary duty of external examiners is to ensure that the degrees awarded by the College are consistent with that of the national university system. External examiners are also responsible for approval of draft question papers, assessment of examination scripts, projects and coursework (where appropriate) and in some cases will attend viva voce and clinical examinations. Although external examiners do not have power of veto their views carry considerable weight and will be treated accordingly. External examiners are required to attend each meeting of the Board of Examiners where recommendations on the results of individual examinations are considered. External examiners are required to write an annual report to the Rector of Imperial College which may include observations on teaching, course structure and course content as well as the examination process as a whole. The College provides feedback to external examiners in response to recommendations made within their reports.

23. Indicators of Quality and Standards

- Favourable comments by External Examiners.
- Popularity of the programme and favourable student feedback on the course
- Accreditation by the Royal Society of Chemistry (to be sought)

24. Key sources of information about the programme can be found in GSK e-learning system; Imperial College Blackboard Virtual Learning Environment