Guidelines for the Ph.D. program in the Department of Chemistry, NTHU

Revised after the faculty meetings on 4/12/2006, 11/1/2006, 12/6/2006, 12/12/2007, 6/4/2008, 11/12/2008, 4/8/2009, 11/4/2009, and 11/3/2010, 08/19/2011,06/26/2012 revised by MST program

(This document is only applicable to students of Academic Sinica TIGP MST program)

I. Entrance Exams: Following the rules set by the TIGP of Academic Sinica

II. After starting the Ph.D. program, Students must select a thesis advisor and prepare a signed "Thesis Advisor Commitment Form" within two months of commencement day in the first semester. If failed to do so, the laboratory will be assigned by the Admission Committee in the Department, and every Ph.D. student should not request to change lab. in their first year before the beginning of Spring semester. When students change a new thesis advisor, a second "Thesis Advisor Commitment Form" must be signed. The change will be in effect until the commitment form is submitted to the Department.

III. The thesis advisor serves as the Chair of the Dissertation Research Advisory Committee and members of the Committee consist of three or more faculty members (including assistant professors), two or more of whom are teachers in the Department or from TIGP.

IV. The roles and responsibilities of the Dissertation Research Advisory Committee:

(1) Assist the Ph.D. student with his or her dissertation research topics, and give advice on the progress in classes and research.

(2) Evaluate the student's qualification and ability to continue the Ph.D. program.

(3) Evaluate the Ph.D. candidate's research progress and see if he or she is ready to write the dissertation draft.

V. Course Requirements:

(1) Students with master degree admitted to the PhD program are required to pass 18 credits of courses before graduation. 12 of the 18 credits must be graduate-level courses offered by the Department with class numbers CHEM5 and above, or similar courses in the TIGP program (Molecular Science and Technology). Credits for the Seminar classes are counted.

(2) Required Selected Courses:

	Courses and courses description
Required Courses	1.<**Special Topic on Molecular Science and Technology** > 8 semesters are required, 3 credits for each semester. Students with bachelor degree admitted to the Ph.D. program are required to pass 2 semesters of this course in their master year (i.e. the

	first year) and pass the rest 6 semesters after they enter into Ph.D program (starting from 1st year of the Ph.D study) . 2.<**Seminar of Molecular Science and Technology** > 6 semesters are required, 1 credit for each semester. Students with bachelor degree admitted to the Ph.D. program are required to pass 2 semesters of this course in their master year (i.e. the first year) and pass the rest 4 semesters after they enter into Ph.D program (starting from 1st year of the Ph.D study) . 3. <**Colloquium**> 0 credit (CHEM5700) o pass 4 semesters are required for students admitted to the Ph.D. program with master degree, starting from the first Ph.D. year. o Pass 6 semesters are required for students admitted to the program with bachelor degree. 2 semesters colloquium course are in the master year (i.e. first year) before applying for Ph.D. The rest 4 are in Ph.D year, starting from the first Ph.D. year. 4. <**CHEM620000 (化學教學實習)**> 1 semester is required (1 credit). A student must pass the course in the 2nd year of Ph.D. study and act as a teaching assistant. 5.< **Thesis**> Required course for 1 semester, 0 credit 6. < **Elementary Chinese** > 2 semesters are required, 3 credits for each semester. This is only for international students.
Core Courses (A PhD student has to pass at least 4 courses before graduation)	Advanced Physical Chemistry I (3) Advanced Physical Chemistry II (3) Advanced Physical Chemistry III (3) Modern Experimental Techniques-Chemistry(2) Advanced Inorganic Chemistry (3) Organometallic Chemistry (3) Advanced Organic Chemistry (3) Advanced Analytical Chemistry (3)
Elective Courses	Modern Experimental Techniques-Physics(2) Molecular Physics: From Fundamentals to Practices(3) Introduction to Nanotechnology-An Overview (I) (3) Introduction to Nanotechnology-An Overview (II) (3) Solid-State Physics I (3) Special Topics on Solid State Physics: Advances and Applications (3) Computational Materials Science (3) Advanced Chemistry of Materials (3) High-Field Laser Technology(3)

	Laser-Plasma Physics(3)

(3) For students admitted to the Ph.D. program with bachelor degree, he/she should pass at least 30 credits of classes, among these at least 24 credits are graduate-level courses offered by the Department with class numbers CHEM5 and above, or similar courses in the TIGP program (Molecular Science and Technology).

VI. Ph.D. Qualifying Exams:

(1) Must pass the Ph.D. qualifying exams within three years after starting the Ph.D. program, otherwise the student will be dismissed from the program.

(2) Rule for the qualifying examination in physical chemistry division:

a. Finish and pass at least 9 credits of graduate-level courses offered by the department with class numbers CHEM5 and above, or similar courses in TIGP program. After that, submit the first application for research proposal defense (qualifying examination) to Physical Chemistry curriculum committee before the starting date of the third year of study. Become a PhD candidate after passing the research proposal defense.

b. Procedure for taking the Research Proposal Defense:

[1] Faculty in the physical chemistry division or TIGP should serve as the Qualifying Exam Committee, which includes 3 or more faculty members (with title of assistant professor, associate processor or professor). The Chairman of the Qualifying Examination Committee is assigned by the curriculum coordinator. Half or more than half of the committee members should be physical chemistry professors in the Department or from TIGP. However, the student's thesis advisor cannot be on the committee.

[2] The student should submit a 3 to 5 page pre-proposal to the committee. The topic of this Research Proposal should not be directly related to the research topic currently undertaking in his or her lab.With the approval of the committee (respond within one week), the student can then provide a detailed research proposal.

[3] The administration of the Research Proposal exam proceeds in two stages:

"Evaluation of the Research Proposal" and "Oral Defense". The committee should respond to the full and detailed research proposal within three weeks after the student has submitted the proposal. After successfully passing this evaluation, an oral defense exam should be held within one month.

[4] For both stages, the student needs to receive a passing grade from at least 2/3 of the committee members.

[5] If the student fails to pass the research proposal evaluation, he or she can modify the proposal, and re-submit the revised proposal to the committee within one month. If this revised proposal still does not pass the evaluation, he or she must submit a completely new proposal four months later. If the student does not re-submit a revised proposal, his or her right to re-submission is waived. In this case, the student should submit a completely new proposal four months later. Each student can at most submit two research proposals for evaluation.

[6] If the student does not pass the oral exam, he or she may apply for a re-examination within one month. After one month, the right to take another oral exam on the same proposal is waived, and he or she must submit a completely new proposal four months later. And if the student fails the second oral exam, he or she has to submit a complete new research proposal four months later.

[7] If the Research Proposal was found fraudulent with any part of its contents

derived from others' work or ideas, the right to take the oral qualifying exam is lost.

(3) *Rules for qualifying exams in the analytical chemistry division:*

Exams are given once every semester, and one can take two exams each time. One needs to pass the following two exams: [1] Instrumental Analysis and [2] Chromatographic Techniques.

(4) *Rules for qualifying exams in the organic and inorganic chemistry divisions:*

[1] Exams are given 8 times a year, 4 in each semester.

[2] Each exam taken is graded as A, B, or C. A grade of A counts as 2 points, B as 1 point, and C as 0 point. Once a student has accumulated 10 points, he or she has successfully passed the qualifying exams.

[3] A student can take either inorganic or organic exam, but he or she must accumulate at least 5 point in the division the student belongs to.

[4] Must pass the qualifying exams within 3 years.

(5) *Rules for qualifying exams in the chemical biology program:*

Plan A, pass 2 of the following 3 exam subjects: [1] Comprehensive Biochemistry, [2] Comprehensive Chemical Biology, and [3] Inorganic or Organic Cumes (5 or more points), or pass either Instrumental Analysis Qualifying Exam or Chromatographic Techniques Qualifying Exam.

Plan B, pass the following exam subjects: [1] Biochemistry (counted as 3 points), [2] Any one of the following: Bioorganic Chemistry, Bioinorganic Chemistry, Biophysics, Molecular Biology, Genomics, or Proteomics (3 points), and [3] Inorganic and Organic Cumes (accumulate 4 points), or pass either Instrumental Analysis Qualifying Exam or Chromatographic Techniques Qualifying Exam.

(6) *Rules for qualifying exams in the materials chemistry program:*

This is measured by "points". A student is considered as successfully passing the qualifying exams if he or she has accumulated 10 points. It is required that at least 3 points must be from test subjects "Materials Property and Characterization" and "Materials Synthesis and Applications". Students can take the same subject more than once and the highest score among tests on this subject is picked as the final score. Test subjects include:

[1] Materials Property and Characterization (The exam is held in Fall semester and the result is graded as 5 points, 3 points or 0 points)

[2] Materials Synthesis and Applications (The exam is held in Spring semester, and the result is graded as 5 points, 3 points or 0 points)

[3] Organic or Inorganic Cumes (the accumulated points is up to 7 points most)

[4] Either Instrumental Analysis or Chromatographic Techniques (5 points)

VII. For students admitted to the Ph.D. program with bachelor degree, he/she should pass at least 30 credits of classes, among these at least 24 credits are graduate-level courses offered by the Department with class numbers CHEM5 and above, or similar courses in the TIGP program (Molecular Science and Technology).

VIII. Ph.D. students must take 4 semesters of Colloquium (CHEM5700). Students with master degree admitted to the Ph.D. program should also take 4 semesters of Colloquium. The credits for this class are not counted.

IX. In the second year of his or her Ph.D. program, the student must serve as a teaching assistant for chemistry lab sessions. In that semester, the student has to register for the class (CHEM620000). If for some reason the student cannot perform this duty in the second year, the service can be postponed.

X. Ph.D. students should show a level of proficiency in English. Below are ways

to satisfy this requirement.

(1) Take the High-intermediate Level GEPT (General English Proficiency Test) offered by the Language Training & Testing Center and pass, or TOEFL and receive a score of 530 (or 197 for the CBT,or 71for the iBT), or IELTS (International English Language Testing System) and pass above the 5.5 level.

(2) Take one related English training course and earn 3 credits. Below are such courses: (a) Technical English Writing, (b) Training in English Speaking (I and II), (c) Listening and Writing, (d) Listening and Speaking, (e) Advanced English, (f) any course of similar level as those of (a) to (e).

(3) Foreign Ph.D. students entering the program should take the Chinese courses offered by the Department (3 credits) for two semesters in the first year (Students in the TIGP program should take the Chinese courses offered by Academia Sinica), and should pass the courses in 2 years.

(4) These language classes are not counted in the 18 credits of graduate-level courses needed for the Ph.D. program.

XI. Students with master degree admitted to the PhD program are required to take 18 credits of courses before graduation. 12 of the 18 credits must be graduate-level courses offered by the Department with class numbers CHEM5 and above, or similar courses in the TIGP program (Molecular Science and Technology). Credits for the Seminar classes are counted.

XII. Minimum research publication requirement for graduating Ph.D. students:

Each graduating Ph.D. student must have published SCI papers and be the first or second author of those papers. Also, the thesis advisor(s) in the Department must be included in the list of corresponding authors. The student will get a score for each paper according to the following rule:

	Scores obtained
first author	IF
second author	IF x 0.6

(IF= SCI impact factor)

The total accumulated scores must be at least 3.0. This requirement applies to students entering the Ph.D. program after and including Fall, 2007.

Note: Students with an accumulated score less than 3.0 may submit their cases to the Committee of Curriculum for case-by-case consideration if

(a). The published paper has an IF that ranks within 30% of his research (JCR)

sub-area;

(b). Special conditions.

XIII. Rules for the Ph.D. dissertation defense examination:

(1) Before working on the Ph.D. dissertation writing, the student should arrange to give a presentation of the research progress to the Dissertation Research Advisory Committee. With the approval of the Committee, the student can then take the Ph.D. dissertation defense exam a year later from the date of this preliminary presentation. This rule applies to all first-year Ph.D. students entering the program in and after 2002.

(2) After meeting all the Ph.D. course requirements and have finished the dissertation draft, the student may obtain a graduate school transcript, and submit the dissertation draft and abstract, transcript, and the dissertation defense exam application form to the Department. The student should arrange to submit these items at least two weeks before the examination. With the approval of the Department Chairman, the Department will submit the application form and a Committee member list to the Office of Academic Affairs for the approval of the University President. Then the dissertation defense examination can be held.

(3) Dissertation Defense Committee consists of 5 to 9 members. At least 1/3 of them are from other institutions. The student's thesis advisor is on the Committee, but cannot be the Chairman. The Chairman is chosen among the members. The Department Chairman submits a list of Committee members to the University President for appointment.

(4) The dissertation defense exam is given in a public form. The grade received is the average scores given anonymously by all the Committee members present, and is based on the contents of the dissertation and the performance on the defense exam. The scores are given only once, with 70 being the passing grade. If 1/3 or more of the Committee members regard the student as failing the exam, the student does not pass the exam. In that case, the student may apply for a re-examination in the following semester or academic year, before the end of the stipulated duration of the Ph.D. program. The student can only have one chance for re-examination. If the student fails the second time, he or she will be dismissed from the Ph.D. program.

XIV. The stipulated length of the Ph.D. program may be extended to a maximum of 7 years.

XV. TIGP students should follow the same guidelines listed above. Places where

"The Department" is mentioned can be replaced with "TIGP" instead.

XVI. The guidelines are effective now, and will be amended after future faculty meetings.

國立清華大學化學系博士班修讀辦法

(僅適用於中研院 TIGP MST 學程)

95.4.12 系務會議修訂
95.11.1 系務會議修訂
95.12.6 課務會議修訂
96.12.12 系務會議修訂
97.06.04 系務會議修訂
97.11.12 系務會議修訂
98.04.08 系務會議修訂
98.11.04 系務會議修訂
99.11.03 系務會議修訂
100.08.18 系務會議修訂
101.06.26 MST program 修訂

一、 入學考試：照教務處現行辦法辦理。
考試科目：綜合化學。

二、 入學第一學年開學日後二個月內必須選定指導教授，並簽署「指導教授同意書」，如逾期未簽署同意書，由系所招生委員會討論後分發實驗室，每位新進博士生於博一第二學期開學日前不得要求更換實驗室;當學生更換新指導教授時須由新指導教授簽署第二份「指導教授同意書」，並交與系所存檔，始得生效。

三、 由指導教授為召集人組成論文研究指導委員會，委員由三位（含）以上的助理教授級（含）且至少二位（含）以上本系或 TIGP 教師擔任。

四、 論文研究指導委員會有下列職責：
1. 協助選定論文題目，輔導課業及研究。
2. 審定是否適合修讀博士學位。
3. 審定博士候選人之研究成果是否已達可撰寫論文初稿之水準。

五、 修課規定：
1. 博士班學生(碩士畢)至少應修滿 18 學分,專業課程至少〈12 學分〉,規定如下：
專業課程必須是 5 字頭以上或 TIGP(分子科學與技術學程、化學生物學與分子生物物理學)之課程，書報討論亦計算在內。
2. 指定必修課程：

	課程及說明
必修課	1.<**分子科學與技術專題研究**> 必修 8 學期,每學期 3 學分。直攻博士學生於碩一班必修 2 學期，由博一算起，必修 6 學期。

	2.<**分子科學與技術書報討論**> 必修 6 學期, 每學期 1 學分。直攻博士學生於碩一班必修 2 學期，由博一算起，必修 4 學期 3. <**專題演講**> 博班學生必修 4 學期。直攻博士學生碩一必修 2 學期，由博一算起，再必修 4 學期。此課程沒有學分，科號為 CHEM5700。 4.<**化學教學實習**> 必修 1 學期，1 學分。博士班二年級擔任化學系教學工作修讀。 5. <**論文研究**> 必修 1 學期，沒有學分。 6. <**初級中文**> 必修 2 學期,每學期 3 學分。僅外籍生需要。
必選課 (博班生畢業前至少選 4 門必選課程)	高等物理化學一(3) 高等物理化學二(3) 高等物理化學三(3) 現代實驗技術-化學(2) 高等無機化學 (3) 有機金屬化學 (3) 高等有機化學 (3) 高等分析化學 (3)
選修課	現代實驗技術-物理(2) 分子物理導論(3) 奈米導論一(3) 奈米導論二(3) 固態物理一(3) 固態物理專題：進階與應用(3) 計算材料(3) 高等材料化學(3) 強場雷射技術(3) 雷射電漿物理(3)

3. 逕行修讀博士學位研究生至少應修滿三十學分，其中專業課程不得少於二十四學分。

六、 博士班資格考試：

1. 入學後三年內必須通過資格考試，未於期限內通過資格考試者，應予退學。
2. 考試辦法：

A. 物理化學學程

辦法：

a.修畢 5 字頭以上之專業課程達 9 學分以上後，最遲在三年級上學期

前，向物化組課務委員提出初次考試申請，進行研究計畫書考試，通過後方能取得博士候選人資格。

b.實施方式如下：

(1) 由物化組課務在物化組及 TIGP 教師中指定召集人，成立資格考委員會(以下稱資委會)，內含至少三位助理教授級(含)以上的教師擔任委員。資委會成員半數(含)以上須為本系物化組及 TIGP 教師，但指導教授不可擔任資委會委員。

(2) 應考博士生須先向委員會提出研究計畫書之題目與 3-5 頁構想書*，研究計畫書主題不得與考生所屬實驗室正在進行的研究題目直接相關。經資委會同意後始可再提出詳實的研究計畫書(資委會應在一星期內答覆)。

(3) 研究計畫考試分"計畫書審查"及"口頭答辯"兩階段實施。計畫書審查應在學生提出詳實之計畫書報告後三個星期內答覆。審查通過後，必須在一個月內舉行口頭答辯。

(4) 計畫書審查及口頭答辯須獲得資委會 2/3(含)以上委員通過。

(5) 計畫書審查不及格者，得於一個月內修改計劃內容，向資委會提出重審申請。若重審之結果仍未通過，則於四個月後始得提出全新的計畫書。若未於一個月內提出重審申請，則視同放棄重審權利，並於四個月後始得提出全新的計畫書。每位學生最多只能提出二次計畫書之審查申請。

(6) 口頭答辯不及格者，得於一個月內向資委會提出補考申請。若第二次仍未通過，則於四個月後始得提出全新的計畫書。若未於一個月內提出補考申請，則視同放棄補考權利，並於四個月後始得提出全新的計畫書。

(7) 若研究計畫書被發現有抄襲行為，經查屬實，則該次資格考不通過。

B. 分析化學學程：

辦法：每學期舉行一次，每次得報考二科。每科必須及格，科目如下：

(1) 儀器分析 (2) 化學分離

C. 有機化學學程與無機化學學程：

辦法：

(1) 每年舉行 8 次，每學期各考四次。

(2) 評分標準分 A, B, C 三等，獲 A 計 2 分，B 計 1 分，C 計 0 分，累計 10 分者為通過。

(3) 無機與有機組得跨組考試，但主修學程累計分數必須 5 分或 5 分以上。

D. 生物化學學程：

辦法：

A 案 (1)-(3) 三選二

(1) 綜合生物化學

(2) 綜合化學生物

(3) 有機或無機 (累計點數 5 點)或通過儀器分析或化學分離任一科

B 案

(1) 生物化學 (3 點)

(2) 生物有機、生物無機、生物物理、分子生物學、基因體學、蛋白質體學任選一門 (3 點) 考試通過

(3) 有機累計點數及無機累計點數共得 (4 點) 通過儀器分析或化學分離任一科

E. 材料化學學程：

辦法：採記點制，累計滿 10 點者為通過。其中『 材料合成與應用』與『材料性質與鑑定』兩個科目中至少必須通過 3 點，同一科得重複考試，但只計算一次，以點數最高者計算之。科目包括：

(1) 材料性質與鑑定（上學期舉行，評分分為三等，各獲 5 點，3 點與 0 點）

(2) 材料合成與應用（下學期舉行，評分分為三等，各獲 5 點，3 點與 0 點）

(3) 有機或無機組考試累計點數至多 7 點

(4) 儀器分析或化學分離任一科（以 5 點計）

七、 逕行修讀博士學位研究生至少應修滿三十學分，其中專業課程不得少於二十四學分。

八、 「專題演講」博士班必修 4 學期，直攻博士學生，由博一算起，必修 4 學期，沒有學分，科號為 5 字頭。

九、 博士班研究生在第二學年結束前，必須擔任化學系教學工作一學期，共計 1 學分(帶實驗當學期務必選修書報討論)。

十、 博士生需在畢業前應通過第一外國語文，其認定如下：

1. 參加財團法人語言訓練測驗中心中高級英文能力鑑定考試及格或托福成績 530 分(筆試)、197 分(電腦考試)或 71 分(網路考試)，或符合 IELTS (International English Language Testing System) 5.5 級分以上。
2. 選修相關英文課程，必須獲得至少三學分。英文相關課程如下：
   (a) 科技英文寫作，(b) 英語口語訓練〈上、下〉，(c) 英文聽寫，(d) 英文聽講，(e) 進階英文， (f) 與(a) –(e) 相當之課程。
3. 外籍學生入學第一年上、下學期必需各選修 3 學分的本系為外籍學生開設之中文課程（TIGP 學程之學生得修選中央研究院為 TIGP 學生開設之中文課程），且需於兩年及格通過。
4. 語文課程不算在 18 學分之內。

十一、博士班修專業課程〈12 學分〉規定如下：

專業課程必須是 5 字頭以上或 TIGP(分子科學與技術學程、化學生物學與分子生物物理學)之課程，書報討論亦計算在內。

十二、博士生畢業最低學術研究要求：所有博士畢業學生都必須要有發表為第一或第二作者的 SCI 論文，且該文通信作者必須包含本系論文指導老師。該生若為第一作者，其所獲點數等同該文之 IF 值(impact factor)，第二作者

點數以六折計算。原則上，累積總點數須達到 3.0 方能畢業。自 96 學年入學新生開始實施。註：若該論文之 IF 值為研讀次領域之前 30%，但 IF 值未達 3.0 則提交課務委員會議定，特殊情況亦可提交相關委員會議決。

十三、博士生學位考試：

1. 博士班研究生在撰寫論文初稿前，需向系內提出研究報告，邀請本系助理教授級（含）以上教師指導，經其論文研究指導委員一致同意後，原則上，由報告日起算一年後始准提出學位考試申請。本辦法自 91 學年度入學博一生開始實施。
2. 博士班研究生於修畢規定學科並完成論文初稿後，得檢具歷年成績表、論文初稿及提要、博士學位考試申請表。申請博士學位考試者，至遲於口試日期二週前提出申請，經系主任同意後，由系造具博士學位考試委員名冊連同其申請表，送教務處核轉校長批准，即得舉行博士學位考試。
3. 博士學位考試置考試委員五人至九人，校外委員至少須三分之一〈含〉以上。指導教授為當然委員，但不得為主持人，主持人由出席委員互推舉之。校內外考試委員由系主管提請校長聘請之。
4. 博士學位考試之論文考試以公開口試行之。論文考試成績以論文內容及口試成績綜合評定，以出席委員無記名評定分數平均決定之。評定以一次為限，七十分為及格。但三分之一〈含〉以上委員評定為不及格者，即以不及格論。博士學位考試不及格者，在修業年限未屆滿前，得於次學期或次學年申請重考，重考以一次為限，仍不及格者，應予退學。

十四、博士班研究修業年限，得延長至七年。

十五、中研院國際研究生院學程(分子科學與技術學程、化學生物學與分子生物物理學)學生生亦適用本辦法，且上列條款中「本系」一詞得以「中研院國際研究生院各學程」取代。

十六、本辦法經系務會議通過後實施。

國立清華大學化學系 碩博士班研究生指導教授同意書

Thesis Advisor Commitment Form

注意事項：

1. 研究生請於選定論文指導教授，於入學當年度 10 月底前持同意書送系辦公室登記。
2. 其他注意事項請參閱本系碩博士班修業規定。

學生姓名 **Name of Student**		**學號** **Student ID Number**	
身分證字號 **ARC Number**		**出生年月日** **Date of Birth**	
聯絡手機/電話 **Mobile/Telephone**		**電子信箱** **Email Address**	
聯絡地址 **Current Address**			

研究生簽名 Signature by Student：_____

Date：　　yy(年)　　mm(月)　　dd(日)

指導教授簽名 **Signature of Advisor**：_____

國立清華大學化學系物化組計畫構想書

學號：_____姓名：_____

Brief Contents of Research Pre-proposal：

Page Limit：5 pages

1. **Research Background ＆ present situation（相關研究的背景與目前狀況）**
2. **expected goal（希望突破之目標）**
3. **Design of research methods（研究方法之設計）**
4. **Step of Research（研究步驟）**
5. **Analysis of possible result（可能結果之分析）**
6. **Discussion（討論）**
7. **Conclusion（結論）**