

# Course Title-- Material characterization techniques

(by Ko-Shan Ho)

## I. General Description

This course introduces the skills for characterization on various materials including polymers, ceramics, and metals as well as for delivering an effective talk in an academic conference. The enrolled students are going to learn the principles of material characterizations and oral presentation in scientific and technical fields. Students will tune up their material characterization skills and deliver a presentation under the guidance of the instructor.

## II. Teaching Objectives

### 1. Knowledge (知識)

(1) Comprehending the characterization principle, material structure, style, and mechanism of instrumentation.

(理解材料科學鑑定，儀器原理，材料結構的課程。)

(2) Comprehending the essentials for material characterization.

(理解以英語發表檢測材料的要領與技巧。)

### 2. Skills (技能)

(1) Being able to comprehend the content of a material paper correctly.

(能正確地理解材料檢測相關論文的內容。)

(2) Being able to translation and write a material related paper in English correctly.

(能正確地翻譯以及撰寫材料相關論文。)

(3) Being able to give a 10-15 min about material in English.

(能以英語進行 10 -15 min 材料相關論文的簡報說明。)

## III. Teaching Methods

1. Lectures and case study
2. In-class exercises
3. Students presentation
4. Tutorial classes for additional assignments
5. Group Discussion

## IV. Teaching Materials

Instructor's handouts and video files.

## V. Grading Indicators

1. Homework: 30%
2. Mid exam and report: 25%
3. Final term report: 25%
4. In-class exercises: 20%

## VI. Course Outline and Class Schedule

### 1. Course Outline (教學綱要)

- (1) Type and methods of material characterization.  
(材料檢測種類及方法。)
- (2) The use of English electronic resources.  
(英文電子資料庫的使用。)
- (3) Principles of various characterization methods.  
(文獻管理軟體的使用)
- (4) Expression of figures and tables in English of material related papers.  
(材料相關論文圖形與表格的呈現技巧。)
- (5) Commonly used instruments for material characterization.  
(常用材料相關儀器論文的熟悉。)
- (6) Skills for translating and writing a material related paper.  
(材料相關期刊論文的翻譯以及撰寫技巧與方法。)
- (7) Commonly used patterns in material related papers.  
(材料相關論的慣用分析形式。)
- (8) Understanding the differences between different instruments.  
(不同儀器間相關性的理解。)
- (9) Skills for material related presentation in English.  
(以英語上臺簡報材料相關論文技巧。)

### 2. Course Schedule

Week	Course Content
01	Introduction. Commonly used characterization methods introduced. 課程簡介
02	Use of Electronic Resources 學術研究資料查詢
03	Fundamental instrumentation 儀器原理
04	Mechanical characterization-part one 機械性質鑑定－1
05	Mechanical characterization-part two

	機械性質鑑定－2
06	Mechanical characterization-viscoelastic properties 機械性質鑑定－黏彈性
07	Thermal characterization-part one 熱性質鑑定－1
08	Thermal characterization-part two 熱性質鑑定－2
09	Mid-term Examination and Reports 期中測驗與報告
10	Thermal characterization-degradation behaviors 熱性質鑑定－熱裂解行為描述
11	Thermal characterization-polymer related thermal degradation 熱性質鑑定－聚合物熱熱性質及行為描述
12	Optical property characterization-part one 光學性質鑑定－1
13	Optical property characterization-part two 光學性質鑑定－2
14	Electrical property characterization-part one 電學性質鑑定－1
15	Electrical property characterization-part two 電學性質鑑定－2
16	Term paper presentation-part one 期末報告－1
17	Term paper presentation-part two 期末報告－2
18	Final Examination 期末考

Other Remarks

# Course Title—Sol-Gel Science and Powder Technology

(by Wein-Duo Yang)

## I. General Description

Colloid chemistry, surfactants, emulsion technology, preparation of nanoparticles and nanotubes and nanofilms.

(膠體化學、界面活性劑、乳化技術、界面現象、奈米粒子奈米管奈米薄膜等製程)

## II. Teaching Objectives

The basic principles of colloid chemistry surfactants used in emulsion technology and used in high-technology, such as preparation of nanoparticles and nanotubes and nanofilms.

(膠體化學界面活性劑乳化技術等基本原理並應用於高科技之使用 如製備奈米粒子、奈米管、奈米薄膜等)

## III. Teaching Methods

1. Lectures and case study
2. In-class exercises
3. Students presentation
4. Tutorial classes for additional assignments
5. Group Discussion

## IV. Teaching Materials

1. Relva C. Buchanan, "Ceramic Materials for Electronics", Marcel Dekker
2. 電子材料相關中英文期刊 (SCI published papers)
3. Instructor's handouts and lecture notes.

## V. Grading Indicators

1. oral presentation: 30%
2. Mid exam : Open Books 30%
3. Final term report: 40%

## VI. Course Outline and Class Schedule

### Chapter 1 Colloidal Chemistry

(膠體化學)

### Chapter 2 Interfacial Science and Technology

(界面科學與技術)

### Chapter 3 Emulsion Technology

(乳化技術)

### Chapter 4 Sol-Gel Technology and its Applications

(溶膠凝膠技術及其應用)

### Chapter 5 Self-assembly

(自組裝)

### Chapter 6 Nanomaterials

(奈米材料)

### PAPERS STUDY

(研究論文)

介紹導讀兩篇國際期刊

## 2. Course Schedule

Week	Course Content
01	Colloid Chemistry 膠體化學
02	Colloid Chemistry 膠體化學
03	Interfacial Science and Technology 界面科學與技術
04	Interfacial Science and Technology 界面科學與技術
05	Emulsion Technology 乳化技術
06	Emulsion Technology 乳化技術
07	Emulsion Technology

	乳化技術
08	Emulsion Technology 乳化技術
09	Midterm Examination 期中考
10	Sol-Gel Technology and its Applications 溶膠凝膠技術及其應用
11	Sol-Gel Technology and its Applications 溶膠凝膠技術及其應用
12	Sol-Gel Technology and its Applications 溶膠凝膠技術及其應用
13	Self-assembly 自組裝
14	Self-assembly 自組裝
15	Nanomaterials 奈米材料
16	Nanomaterials 奈米材料
17	Final Term Paper Reports 期末報告
18	Final Term Paper Reports 期末報告

**Other Remarks**

# Course Title—English for Science and Technology

(by Shu-Jen Chen)

## I. General Description

This course introduces the skills for writing a clear scientific and technical document as well as for delivering an effective talk in an academic conference. The enrolled students are going to learn the principles of good writing and oral presentation in scientific and technical fields. Students will tune up their technical writing skills and deliver a presentation under the guidance of the instructor.

## II. Teaching Objectives

### 1. Knowledge (知識)

(1) Comprehending the structure, style, and wording of a scientific paper or a technical report.

(理解英文科學論文與技術報告的文章結構、文體、語法。)

(2) Comprehending the essentials for scientific English presentation.

(理解以英語宣讀論文的要領與技巧。)

### 2. Skills (技能)

(1) Being able to comprehend the content of a scientific English paper correctly.

(能正確地理解英文論文的內容。)

(2) Being able to translation and write a scientific English paper correctly.

(能正確地翻譯以及撰寫英文科技論文。)

(3) Being able to give a 10-15 min scientific English talk.

(能以英語進行 10 -15 min 簡報宣讀。)

## III. Teaching Methods

1. Lectures and case study
2. In-class exercises
3. Students presentation
4. Tutorial classes for additional assignments
5. Group Discussion

## IV. Teaching Materials

1. Textbook: William Strunk Jr. and E. B. White (2005), *The Elements of Style*, 3rd ed., Penguin Books (ISBN: 973-014-311-272-3)
2. Instructor's handouts and lecture notes.

## V. Grading Indicators

1. Quiz & homework: 30%
2. Mid exam and report: 25%
3. Final term report: 25%
4. In-class exercises: 20%

## VI. Course Outline and Class Schedule

### 1. Course Outline (教學綱要)

- (1) Type, style and format of technical papers.  
(科技論文的類型、文體與格式。)
- (2) The use of electronic resources.  
(電子資料庫的使用。)
- (3) Use of reference management software.  
(文獻管理軟體的使用)
- (4) Expression of figures and tables in English.  
(圖形與表格的呈現技巧。)
- (5) Grammars and idioms in scientific papers.  
(英文科技論文的基礎文法與慣用語。)
- (6) Skills for translating and writing a journal paper.  
(期刊論文的翻譯以及撰寫技巧與方法。)
- (7) Sentence patterns in scientific papers.  
(英文科技論文的慣用句型分析。)
- (8) The communication in technical interchange events.  
(科技交流的英語溝通。)
- (9) Skills for English presentation.  
(英語上臺簡報技巧。)

### 2. Course Schedule

Week	Course Content
01	Introduction. Writing Style and Format of Technical Papers. 課程簡介、科技論文的文體與格式
02	Use of Electronic Resources 學術研究資料查詢
03	Fundamental English Grammars 基本文法
04	Use of Punctuation Marks 常見的錯別字與標點符號使用
05	Figures, Equations, Symbols and Units



	數字、圖形、符號、單位
06	Guide for Scientific Paper Translation 科技論文翻譯要領
07	Expression of Figures and Tables 圖表的設計與呈現方式
08	Idioms of Scientific English 科技英文之慣用語法
09	Mid-term Examination and Reports 期中測驗與報告
10	Sentence Patterns and Writing Skills of “Materials and Methods” 研究方法之句型範例與撰寫技巧練習
11	Sentence Patterns and Writing Skills of “Results and Discussion” (1) 結果討論之句型範例與撰寫技巧練習(1)
12	Sentence Patterns and Writing Skills of “Results and Discussion” (2) 結果討論之句型範例與撰寫技巧練習(2)
13	Sentence Patterns and Writing Skills of “Introduction” 前言之句型範例與撰寫技巧練習
14	Sentence Patterns and Writing Skills of “Conclusion” and “Abstract” 結論與摘要之範例分析與撰寫技巧練習
15	Common Mistakes in English Scientific Papers 英文科技論文常見的錯誤
16	Writing Skills of Technical Letters and Emails 科技書信與電子郵件之撰寫
17	Posters and Briefings of Academic Conferences 學術會議壁報論文與簡報
18	Final Term Paper Reports 期末報告

Other Remarks

# Course Title—Scientific English Writing

(by Shu-Jen Chen)

## I. General Description

This course introduces the skills for writing a clear scientific and technical document as well as for delivering an effective talk in an academic conference. The enrolled students are going to learn the principles of good writing and oral presentation in scientific and technical fields. Students will tune up their technical writing skills and deliver a presentation under the guidance of the instructor.

## II. Teaching Objectives

### 1. Knowledge (知識)

(1) Comprehending the structure, style, and wording of a scientific paper or a technical report.

(理解英文科學論文與技術報告的文章結構、文體、語法。)

(2) Comprehending the essentials for scientific English presentation.

(理解以英語宣讀論文的要領與技巧。)

### 2. Skills (技能)

(1) Being able to comprehend the content of a scientific English paper correctly.

(能正確地理解英文論文的內容。)

(2) Being able to translation and write a scientific English paper correctly.

(能正確地翻譯以及撰寫英文科技論文。)

(3) Being able to write a research project and patent.

(能夠撰寫研究計畫與專利)

(4) Being able to give a 10-15 min scientific English talk.

(能以英語進行 10 -15 min 簡報宣讀。)

## III. Teaching Methods

1. Lectures and case study

2. In-class exercises

3. Students presentation

4. Tutorial classes for additional assignments

## IV. Teaching Materials

1. Textbook: William Strunk Jr. and E. B. White (2005), *The Elements of Style*, 3rd ed., Penguin Books (ISBN: 973-014-311-272-3)

2. Instructor's handouts and lecture notes.

## V. Grading Indicators

1. Quiz & homework: 30%
2. Mid exam and report: 25%
3. Final term report: 25%
4. In-class exercises: 20%

## VI. Course Outline and Class Schedule

### 1. Course Outline (教學綱要)

- (1) Type, style and format of technical papers.  
(科技論文的類型、文體與格式。)
- (2) The use of electronic resources.  
(電子資料庫的使用。)
- (3) Use of reference management software.  
(文獻管理軟體的使用)
- (4) Expression of figures and tables in English.  
(圖形與表格的呈現技巧。)
- (5) Grammars and idioms in scientific papers.  
(英文科技論文的基礎文法與慣用語。)
- (6) Skills for translating and writing a journal paper.  
(期刊論文的翻譯以及撰寫技巧與方法。)
- (7) Sentence patterns in scientific papers.  
(英文科技論文的慣用句型分析。)
- (8) The communication in technical interchange events.  
(科技交流的英語溝通。)
- (9) Skills for English presentation.  
(英語上臺簡報技巧。)

### 2. Course Schedule

Week	Course Content
01	Introduction. Writing Style and Format of Technical Papers. 課程簡介、科技論文的文體與格式
02	Use of Electronic Resources 學術研究資料查詢
03	Fundamental English Grammars 基本文法
04	Use of Punctuation Marks

	常見的錯別字與標點符號使用
05	Figures, Equations, Symbols and Units 數字、圖形、符號、單位
06	Guide for Scientific Paper Translation 科技論文翻譯要領
07	Expression of Figures and Tables 圖表的設計與呈現方式
08	Idioms of Scientific English 科技英文之慣用語法
09	Mid-term Examination and Reports 期中測驗與報告
10	Sentence Patterns and Writing Skills of “Materials and Methods” 研究方法之句型範例與撰寫技巧練習
11	Sentence Patterns and Writing Skills of “Results and Discussion” (1) 結果討論之句型範例與撰寫技巧練習(1)
12	Sentence Patterns and Writing Skills of “Results and Discussion” (2) 結果討論之句型範例與撰寫技巧練習(2)
13	Sentence Patterns and Writing Skills of “Introduction” 前言之句型範例與撰寫技巧練習
14	Sentence Patterns and Writing Skills of “Conclusion” and “Abstract” 結論與摘要範例之撰寫技巧練習
15	Common Mistakes in English Scientific Papers 英文科技論文常見的錯誤
16	Writing Skills of Patens and Research Projects 專利與研究計畫之撰寫技巧與練習
17	Posters and Briefings of Academic Conferences 學術會議壁報論文與簡報
18	Final Term Paper Reports 期末報告

Other Remarks

# Course Title—Technical English

(by Ko-Shan Ho)

## I. General Description

The goal of this course is to teach graduate students writing, reading comprehension, listening, and speaking skills in using English as the language tool in the technical studies. Class for each week will be opened with listening program from the internet English news. Guidance for writing and reading comprehension will be provided by articles studies which will be included in the handouts. And the spoken English training will be performed by the final presentation concerning with the master thesis of each student.

## II. Teaching Objectives

There are four objectives for the course, which are the main parts of any language learning.

- (1) Listening comprehension: Any language learning starts with voice hearing and it is always the easiest and acceptable way for students to continue their English learning without giving up by the boring learning proceeding.
- (2) & (3) Writing and reading skills : Both skills can be learned simultaneously with technical article teachings. The technical meaning of each sentences and paragraphs in the articles will be explained and the pronunciation ( reading ) of each academic words will be taught to help students to understand the articles.
- (4) Spoken English : The correction for pronunciation in their final presentation linking to the master thesis will be given by the instructor in hope for training graduate students to give a simple English presentation about their technical studies.

## III. Teaching Methods

- Providing the keywords or vocabularies of the English program after listening to Technical English program in the networks
- Providing articles excerpted from newspapers, textbooks, academic publications....etc.
- MP3 audio and videos which are the listening homework for students
- Corrections and asking questions in the final presentation.

## IV. Teaching Materials

- English program provide in internet

- Handouts from instructor
- Published article papers
- MP3 downloaded from internet, Studio classroom program

## V. Grading Indicators

- Mid-term Exam. 30%  
( 期中考佔 30%)
- Final Exam. 30%  
( 期末考佔 30%)
- Presentation 40%  
( 期末英文報告佔 40%)
- Extra points : improvising questions and quiz.  
( 加分：即席問答及小考)

## VI. Course Outline and Class Schedule

Week 1	Introduction ( 緒論)
Week 2	Periodical table in Chemistry ( 化學週期表)
Week 3	How to write a technical paper ( 如何以英文撰寫科技論文)
Week 4	Mass spectrometer ( 質譜儀)
Week 5	Latest Honda Runs on Hydrogen, Not Petroleum ( 本田氫能汽車)
Week 6	Overview of $\pi$ -Conjugated Polymers ( 共軛高分子回顧)
Week 7	An Easy Way to Curb Climate Change ( 簡單扼殺氣候變遷方式)
Week 8	Researchers Create Nanostructures, and Whip Up a Recipe, Too ( 菜單中也有奈米結構)
Week 9	Mid-term Exam. ( 期中考)
Week 10	Bronsted Acids and Bases in Solution

	(質子酸溶液)
Week 11	Optical Properties (光學性質)
Week 12	Scientists Envision A New Electronics, Based on Plastic (科學家遠景以塑膠做的新電子元件)
Week 13	Hens egg (母雞生蛋)
Week14	Ivory Tower Spurn (唾棄校園象牙塔)
Week15	Carbon nanotube (奈米碳管)
Week16	Efforts to Capture Vast Stores of Energy From Flammable Ice (從可燃冰中萃取能量)
Week 17	Final presentation (期末英文報告)
Week18	Final Exam. (期末考)

Other Remarks