

National Kaohsiung University of Applied Sciences
Chemical Engineering and Materials Engineering Department, College of Engineering
Curriculum of Doctoral Program in Academic Year 2015

Passed at Department Curriculum Committee Meeting on Feb. 10, 2015
Passed at Department Affairs Meeting on Mar. 02, 2015
Passed at College Curriculum Committee Meeting on Mar. 30, 2015
Passed at University Curriculum Committee Meeting on Apr. 27, 2015
Passed at Academic Affairs Meeting on Jun. 03, 2015

Year		1st academic year (Y1)		2nd academic year (Y2)		
Semester		Semester 1	Semester 2	Semester 1	Semester 2	
Required courses (19/23)		Seminar (1)1/2	Seminar (2)1/2 English writing for science and technology3/3	Seminar (3)1/2 Ph.d thesis6/6	Seminar (4)1/2 Ph.d thesis6/6	
Elective courses (15/15)	Energy Technology	Core subjects	Special Topics on Energy Technology 3/3 Advanced Green Energy Technology 3/3 Solar Energy Engineering 3/3	Energy storage devices 3/3 Special Topics in Energy Engineering 3/3 Advanced Thermodynamics 3/3	Special Topic of Solar Cells 3/3 Special Topics in Biomass Energy 3/3	Technologies and Materials for Carbon Capture & Storage3/3 Special Topics in renewable energy technologies 3/3
		General subjects	Special topics in electrochemistry 3/3 Special Topics in hydrogen technology 3/3	Sensor For Electrochemistry 3/3 Synthesis and Analysis For Electrochemistry 3/3 Advanced Electrochemistry 3/3	Development and fabrication of batteries 3/3 Electrochemical anticorrosive Technology 3/3 Energy Saving Technology 3/3	Noble metal materials processing technology 3/3 Special topics on fuel cells3/3 Waste-to-energy technology 3/3
	Chemical materials	Core subjects	Polymer materials 3/3 Physical Chemistry of Polymer 3/3 Ceramic materials 3/3	Thin Film Materials 3/3 Processing and applications of polymeric materials 3/3 Microscopy Techniques and Analysis 3/3	Advanced Composite Materials 3/3 Technology of material examination 3/3 Sol-Gel Science and Powder Technology 3/3	Special Topics of Optical-Electrical Materials 3/3 X-Ray Diffraction 3/3

		General subjects	Advanced Organic Chemistry 3/3 Polymer structure and physical properties 3/3 Synthesis of Organic Chemistry 3/3 Special Topics on Organic Optoelectronic Materials 3/3 Electronic ceramics 3/3 Colloid and surface science 3/3 Solid State Chemistry 3/3 Transmission Electron Microscopy 3/3 Principle and Application for Panel Display 3/3 Specialty Chemicals 3/3	Analysis of Organic Chemistry 3/3 Polymer characterization 3/3 Mechanical Properties of Polymer Materials 3/3 Special Topics of Ceramic Processing 3/3 Materials of Thin Films 3/3 Principles of plasma 3/3 Phase Equilibrium 3/3 Special Topics of Surface Chemistry 3/3 Interfacial Technology I and Application 3/3 Small Angle X-Ray Diffraction 3/3	Special synthetic resin 3/3 Polymer morphology 3/3 Polymer Rheology 3/3 Functional polymer materials 3/3 Vacuum film engineering 3/3 Semiconductor Theory and Process 3/3 Surface Science and Analysis 3/3 Manufacturing Process of Surfactant 3/3 Solidification phenomena and principles in materials processing 3/3	Colloid Technology and Applications 3/3 Optical technology specialty chemicals 3/3 Biomedical specialty chemicals 3/3 Special Topics of Polymer Optoelectronic Materials 3/3 Conducting Polymer Materials 3/3 Superconductor material 3/3 Special topics of assembly and fabrication of semiconductor materials 3/3 Special Topics in Nano-materials 3/3 Special Topics on Surface Treatment of Material 3/3 Special topics on fabrication of ceramic film 3/3
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I. Remarks:

1. This curriculum is effective as of the Academic Year 2015
2. Credit hours of each course (or total) are marked with "credit/hour."
3. Elective courses: the courses will be offered based on practical needs.
4. For other relevant regulations, please refer to guidelines on doctoral studies of the department (graduate institute).

II. Graduation requirements:

1. The minimal number of credit for graduation is 34 : (1) 19 credits of required courses (including dissertation writing 12 credits, based on the semester the dissertation is presented)
 (2) 15 credits of elective courses (including courses taken at other departments or institutes as specified by the department/institute)

III. Other requirements set by the department:

National Kaohsiung University of Applied Sciences
Chemical Engineering and Materials Engineering Department, College of Engineering
Curriculum of Master Program in Academic Year 2015

Passed at Department Curriculum Committee Meeting on Feb. 10, 2015
Passed at Department Affairs Meeting on Mar. 02, 2015
Passed at College Curriculum Committee Meeting on Mar. 30, 2015
Passed at University Curriculum Committee Meeting on Apr. 27, 2015
Passed at Academic Affairs Meeting on Jun. 03, 2015

Year		1st academic year (Y1)		2nd academic year (Y2)	
Semester		Semester 1	Semester 2	Semester 1	Semester 2
Required courses		Seminar (1)1/2	Seminar (2)1/2 English writing for science and technology3/3		Master thesis6/6
Elective courses	Specialty Chemicals	Specialty Chemicals 3/3 Advanced Organic Chemistry 3/3 Synthesis of Organic Chemistry 3/3 Special Topics in Industrial Chemistry 3/3 Colloid and surface science 3/3	Special Topics of Surface Chemistry 3/3 Analysis of Organic Chemistry 3/3 Specialty chemicals manufacturing process 3/3 Cosmetics Practice 3/3 Interfacial TechnologyI and Application 3/3	Special synthetic resin 3/3 Manufacturing Process of Surfactant 3/3 Sol-Gel Science and Powder Technology 3/3	Optical technology specialty chemicals 3/3 Biomedical specialty chemicals 3/3 Colloid Technology and Applications 3/3
	Materials Technology	Polymer materials 3/3 Physical Chemistry of Polymer 3/3 Polymer structure and physical properties 3/3 X-Ray Diffraction 3/3 Solid State Chemistry 3/3 Ceramic materials 3/3 Diffusion Theory3/3 Crystal chemistry 3/3 Special Topics on Organic Optoelectronic Materials 3/3 Transmission Electron Microscopy3/3	Polymer characterization 3/3 Mechanical Properties of Polymer Materials 3/3 Processing and applications of polymeric materials 3/3 Electronic ceramics 3/3 Special Topics of Ceramic Processing 3/3 Thin Film Materials 3/3 Small Angle X-Ray Diffraction 3/3 Materials of Thin Films 3/3 Microscopy Techniques and Analysis 3/3 Principles of plasma 3/3	Polymer morphology 3/3 Polymer Rheology 3/3 Functional polymer materials 3/3 Vacuum film engineering 3/3 Semiconductor Theory and Process 3/3 Surface Science and Analysis 3/3 Special Topics in Film manufacturing process 3/3 Special Topics of Optical-Electrical Materials 3/3 Technology of material examination 3/3 Solidification phenomena and principles in materials processing 3/3	Special Topics of Polymer Optoelectronic Materials 3/3 Advanced Composite Materials 3/3 Conducting Polymer Materials 3/3 Superconductor material 3/3 Special topics of assembly and fabrication of semiconductor materials 3/3 Special Topics in Nano-materials 3/3 Special Topics on Surface Treatment of Material 3/3 Plasma processing for ic manufacturing 3/3 Optical Polymer Materials 3/3 Special topics on fabrication of ceramic film 3/3
	Chemical Process	Advanced numerical analysis 3/3 Reactor design 3/3 Advanced Transport Phenomena and Unit Operation 3/3 Advanced Thermodynamics 3/3	Advanced Process Control 3/3 Phase Equilibrium 3/3 Statistics and Experimental Design 3/3 Advanced Chemical Reaction Engineering 3/3	Special Topics on Process Design 3/3 Process integration with computer-aided design 3/3	System Engineering of Manufacturing Process 3/3

	Electrochemical and Energy Technology	Special topics in electrochemistry 3/3 Advanced Electrochemistry 3/3 Special Topics on Energy Technology 3/3 Principle and Application for Panel Display 3/3	Sensor For Electrochemistry 3/3 Energy storage devices 3/3 Synthesis and Analysis For Electrochemistry 3/3	Electrochemical anticorrosive Technology 3/3 Development and fabrication of batteries 3/3 Special Topic of Solar Cells 3/3 Special Topics in Electrochemical Deposition Technology 3/3	Noble metal materials processing technology 3/3 Special topics on fuel cells3/3
	Environmental Technology	Advanced Environmental Chemistry 3/3 Special Topics on Environmental Engineering 3/3 Special topics of nanotechnology for environmental engineering 3/3	Special Topics of Waste-Water Treatment 3/3 Special topics of air pollution control 3/3 Environment Examination 3/3 Special Topics on Pollution Control 3/3	Treatment toxic chemicals 3/3 Environmental Toxicology 3/3 Advanced Water Purification Technology 3/3	Selected Topics on Waste Treatment 3/3 Special Topics in cleaner production 3/3 Special Topics in Environmental Biotechnology 3/3
	Biochemical Technology	Special topics in biotechnology 3/3 Micro-Organism Industry 3/3	Special topics in biochemical engineering 3/3	Biochemical separation procedures 3/3	Special Topics in Biosensor 3/3
	other		Off-Campus Practicum 2/	Seminar (3)1/2	Seminar (4)1/2

I. Remarks:

1. This curriculum is effective as of the Academic Year 2015
2. Credit hours of each course (or total) are marked with “credit/hour.”
3. Elective courses: the courses will be offered based on practical needs.
4. For other relevant regulations, please refer to guidelines on master’s studies of the department (graduate institute).

II. Graduation requirements:

1. The minimal number of credit for graduation is 34 : (1) 11 credits of required courses (including thesis writing 6 credits, based on the semester the thesis is presented) 、(2) 23 credits of elective courses (including courses taken at other departments or institutes as specified by the department/institute)

III. Other requirements set by the department:

National Kaohsiung University of Applied Sciences
 Chemical Engineering and Materials Engineering Department, College of Engineering
 Curriculum of Four-Year (Bachelor) Program in Academic Year 2015

Passed at Department Curriculum Committee Meeting on Feb. 10, 2015
 Passed at Department Affairs Meeting on Mar. 02, 2015
 Passed at College Curriculum Committee Meeting on Mar. 30, 2015
 Passed at University Curriculum Committee Meeting on Apr. 27, 2015
 Passed at Academic Affairs Meeting on Jun. 03, 2015

Year	1 st academic year (Y1)		2 nd academic year(Y2)		3 rd academic year(Y3)		4 th academic year(Y4)	
Semester	Semester 1	Semester 2	Semester 1	Semester 2	Semester 1	Semester 2	Semester 1	Semester 2
University required courses (29/51)	Physical education (1)0/2 Practical english 2/2 Chinese (1)2/2 Core curriculum (2)2/2 Service learning (1)0/2.5 Introduction to university studies0/1	Physical education (2)0/2 Advanced practical english2/2 Chinese (2)2/2 Core curriculum (1)2/2 Service learning (2)0/2.5	Physical education (3)0/2 English listening and speaking training (1) 1/2 Chinese practical writings 2/2 An extendable general knowledge course 2/2	Physical education (4)0/2 English listening and speaking training (2) 1/2 Core curriculum (3)2/2 An extendable general knowledge course 2/2	Physical education (5)0/2 core curriculum (4)2/2 An extendable general knowledge course 2/2	Physical education (6)0/2 Core curriculum (5)2/2 English competence training 0/2		Professional ethics 1/1
Total	6/11.5	6/10.5	5/8	5/8	4/6 or 4/8	2/4 or 2/6	0/0	1/1
College required courses (6/6)	Calculus (1)3/3 Physics(1) 3/3							
Total	6/6							

Department required professional courses (75/92)		Fundamental chemistry(1) 3/3 Introduction to chemical Engineering and materials Engineering 2/2 Basic principles and calculations in chemical engineering 3/3 Introduction to materials science3/3	Physics(2)3/3 Calculus (2)3/3 Fundamental chemistry(2)3/3 Fundamental chemistry experiment 1/3 Organic chemistry 3/3	Engineering mathematics(1)3/3 Physical chemistry(1)3/3 Polymer chemistry 3/3 Instrumental analysis 3/3 Organic chemistry experiments 1/3	Transport phenomena and unit operation (1)3/3 Engineering mathematics(2)3/3 Physical chemistry(2)3/3 Chemical engineering thermodynamics 3/3 Experiments in instrumental analysis 1/3	Transport phenomena and unit operations (2)3/3 Physical chemistry lab. 1/3 Thermodynamics of materials 3/3 Chemical material experiments 1/3 Special tractice (1)1/3	Transport phenomena and unit operation (3)3/3 Kinetics of chemical reaction engineering 3/3 Process control 3/3 Chemical engineering lab. 1/3 Special tractice (2)1/3 Off-Campus Practicum 2/	Seminar(1)1/2 Computer Aided Design and Practice 1/2	Seminar(2) 1/2
Total		11/11	13/15	13/15	13/15	9/15	13/15	2/4	1/2
Department elective professional courses	Polymer Materials Program (choose any four)				Polymer physics 3/3	Processing and applications of polymeric materials 3/3	Optoelectrical polymeric materials 2/2	Polymer nanocomposite 2/2 Off-campus practicum (1) 9	Off-campus practicum (2)9
	Optoelectronic Materials and Solar Program (choose any four)		Introduction to photo-electric engineering 2/2	Inorganic chemistry 2/2	Materials for Photo-Electric Applications 2/2	Introduction to solar cell devices 2/2	Thin film material and coating 2/2	Off-campus practicum (1) 9	Off-campus practicum (2)9
	Inorganic Materials Technology Program (choose any four)			Inorganic chemistry 2/2		Semiconductor materials 2/2	Surface treatment of materials 2/2	Thin film material and coating 2/2 Off-campus practicum (1) 9	Off-campus practicum (2)9
	Green Technology and Fuel Cell Program (choose any four)	Analytical chemistry 2/2	Introduction to greenergy technology2/2	Biochemistry 2/2	Electrochemistry 2/2	Fuel cells 2/2	Nanotechnology for environmental engineering 2/2	Thin film material and coating 2/2 Off-campus practicum (1) 9	Off-campus practicum (2)9
	Other subjects	Introduction to computer science 2/2 Industrial safety and	Environmental chemistry 2/2 Electrical engineering 2/2 Chemical technology	Analysis of Organic Chemistry2/2 Air pollution control2/2 Cosmetic chemistry2/2	Molecular Biology 2/2 Special topics of organic chemistry2/2	Introduction of Environmental Engineering2/2 Process Automatic Instruments2/2	Solid state physics2/2 Sequential Control2/2 Fundamental and Technology of Electrochemical	Wastewater treatment 2/2 Plasma engineering 2/2 Chemical process	Solid waste treatment 2/2 Plant management 2/2 Fundamental and technology of

		hygiene 2/2 Introduction to environmental science 2/2	in our lives 2/2		Food chemistry2/2	General printed circuit board technology2/2 Atomic energy and the environment3/3	Deposition2/2	design 2/2 Overview of nuclear engineering and energy technology 2/2	Electrochemical deposition 2/2
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I. Remarks:

1. This curriculum is effective as of the Academic Year 2015
2. Credit hours of each course (or total) are marked with “credit/hour.”
3. Courses of inter-disciplinary programs offered by other departments shall be regarded as elective professional courses of the department.
4. Military Education has become elective courses since the Academic Year 2011. The credits are not counted toward graduation requirements. The courses shall be offered based on practical needs.
5. The course of English Training shall be handled in accordance with the regulations governing undergraduate students’ exemption of English training courses of the University.
6. Elective courses: the courses will be offered based on practical needs.
7. For other instruction on course selection, students must follow “Course Selection Guidelines” of the University.

II. Requirement for graduation:

1. The minimal number of credit for graduation is 134: (1) 29 credits of University required courses (including General Education Core and Extension courses) (2) 6 credits of College required courses (3) 75 credits of department required professional courses (4) at least 24 credits of department elective professional courses (A maximum of 3 credits from elective professional courses offered by other departments will be recognized.)
2. Students are required to complete the courses of at least one program at the University. (Students may also fulfill the requirement by completing the courses of a module or a track and obtaining a certificate at the department.)
3. Students admitted since Academic Year 2013 are required to complete at least one (distance learning or e-learning) course in order to graduate.
4. General Education Core I to V do not have to be taken in sequence. Two to three courses are offered for each core. Students may take a course in each category and acquire 10 credits in total. Courses offered are as follows :
 General Education Core I : Reading of Humanistic Masterpieces; Introduction to Artistic Creativity
 General Education Core II: Sociology and Contemporary Society; Management and Knowledge Economics
 General Education Core III: The Laureates of Nobel Prizes; Modern Issues of Technology
 General Education Core IV: Taiwan Society and Culture; History of Modern Western Civilization; Introduction to Philosophy
 General Education Core V: Democracy and Law; Modern Civil Consciousness
5. General Education Extensions are in three categories—society, humanities, and technology. Students must take three courses for 6 credits.
6. Physical Education is a required course in the first year. The credits are not counted toward graduation requirements. Students who fail in the course are not allowed to graduate.
7. As of the academic year 2013, students of Four-year Day Program need to obtain a certificate of English proficiency of TOEIC 400 or higher, or primary test of Intermediate level of GEPT or other equivalents to graduate (Department may establish a requirement of English proficiency higher than afore-mentioned standards).
8. Off-campus Practicum is a University required course and shall be handled in accordance with “National Kaohsiung University of Applied Sciences Regulations Governing Students' Off-campus Practicum.”

III. Other requirements set by the department:

National Kaohsiung University of Applied Sciences
 Chemical Engineering and Materials Engineering Department, College of Engineering
 Curriculum of Two-Year Program in Academic Year 2015

Passed at Department Curriculum Committee Meeting on Feb. 10, 2015
 Passed at Department Affairs Meeting on Mar. 02, 2015
 Passed at College Curriculum Committee Meeting on Mar. 30, 2015
 Passed at University Curriculum Committee Meeting on Apr. 27, 2015
 Passed at Academic Affairs Meeting on Jun. 03, 2015

Year	1 st academic year		2 nd academic year	
Semester	Semester 1	Semester 2	Semester 1	Semester 2
University required common courses (8/17)	Chinese Practical Writings2/2 Physical education (1)0/2 Service learning (1)0/2.5	Physical education (2)0/2 Advanced Practical English2/2 Service learning (2)0/2.5	Core curriculum (5)- democracy & rule of law2/2 General course2/2	
Total	2/6.5	2/6.5	4/4	0/0
Department required professional courses (31/43)	Transport phenomena and unit operation (1)3/3 Engineering mathematics3/3 Thermodynamics of materials3/3 Introduction to Materials Science3/3 Experiments in instrumental analysis 1/3	Transport phenomena and unit operation (2)3/3 Kinetics of chemical reaction engineering3/3 Chemical engineering thermodynamics3/3 Special tractice (1)1/3 Off-Campus Practicum 2	Process control3/3 Seminar (1)0/2 Special tractice (2)1/3 Chemical material experiments1/3	Chemical engineering lab.1/3 Seminar (2)0/2
Total	13/15	12/12	5/11	1/5

Department elective professional courses (33)	Electrochemistry2/2 Electrical engineering2/2 Synthesis of Organic Chemistry2/2 Analytical chemistry2/2 Polymer chemistry3/3 Polymer physics3/3 Biochemistry2/2 Introduction to biotechnology2/2 Inorganic Optoelectronic Materials2/2 Special Topics on Nano-microscopic Technology2/2 Solid state physics2/2 Atomic energy and the environment3/3 Introduction to Environmental Science2/2 Special topics of organic chemistry2/2 Industrial safety and hygiene2/2 Environmental Chemistry2/2 Introduction of Environmental Engineering2/2 Nanotechnology for environmental engineering2/2 Analysis of Organic Chemistry2/2 Inorganic chemistry2/2 General printed circuit board technology2/2 Process Automatic Instruments2/2 Introduction to photo-electric engineering2/2 Materials for photo-electric applications2/2 Introduction to solar cell devices2/2 Plant Management2/2	Computer Aided Design and Practice 1/2 Off-campus practicum (1) 9 Off-campus practicum (2) 9 Introduction to Biochemical Engineering2/2 Polymer nanocomposite2/2 Fabrication of ceramic film2/2 System Engineering2/2 Principles of electrochemical sensors and biosensors2/2 Special Topics on Organic Optoelectronic Materials2/2 Processing and applications of polymeric materials3/3 Nano-materials2/2 Optoelectrical polymeric materials2/2 Environment Examination2/2 Overview of nuclear engineering and energy technology3/3 Interface sciences2/2 Sequential Control2/2 Fundamental and Technology of Electrochemical Deposition2/2 Wastewater treatment2/2 Solid Waste Treatment2/2 Air pollution control2/2 Principles of plasma2/2 Cosmetic chemistry2/2 Semiconductor Materials 2/2 Metallic Materials and Surface Treatment2/2 Fuel Cells2/2 Thin film material and coating2/2 Introduction to greenergy technology2/2 Surface treatment of materials 2/2 Chemical process design3/3
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I. Remarks:

1. This curriculum is effective as of the Academic Year 2015
2. Credit hours of each course (or total) are marked with “credit/hour.”
3. Courses of inter-disciplinary programs offered by other departments shall be regarded as elective professional courses of the department.
4. Elective courses: the courses will be offered based on practical needs.
5. For other instruction on course selection, students must follow “Course Selection Guidelines” of the University.

II. Requirement for graduation:

1. The minimal number of credit for graduation is 72: (1) 8 credits of University required common courses (2) 0 credits of College required common courses (3) 31 credits of department required professional courses (4) at least 33 credits of department elective professional courses (A maximum of 4 credits from elective professional courses offered by other departments will be recognized.)
2. General Education courses can be exempted with General Education Core I, II, and III; the courses of history and law category can be exempted with General Education Core IV or V of four-year programs.
3. Physical Education is a required course in the first year. The credits are not counted graduation requirements. Students who fail in the course are not allowed to graduate.
4. Off-campus Practicum is a University required course and shall be handled in accordance with “National Kaohsiung University of Applied Sciences Regulations Governing Students' Off-campus Practicum.”

III. Other requirements set by the department:

National Kaohsiung University of Applied Sciences
 Division of Continuing and Extension Education
 Chemical Engineering and Materials Engineering Department, College of Engineering
 Curriculum of Specialized Master Program

Passed at Department Curriculum Committee Meeting on Feb. 10, 2015
 Passed at Department Affairs Meeting on Mar. 02, 2015
 Passed at College Curriculum Committee Meeting on Mar. 30, 2015
 Passed at University Curriculum Committee Meeting on Apr. 27, 2015
 Passed at Academic Affairs Meeting on Jun. 03, 2015

Year		1 st academic year		2 nd academic year	
Semester		Semester 1	Semester 2	Semester 1	Semester 2
Required courses		Seminar (1)2/2	Seminar (2)2/2		Master thesis6/6
Elective courses	Specialty Chemicals	Specialty Chemicals 3/3 Advanced Organic Chemistry 3/3 Synthesis of Organic Chemistry 3/3 Special Topics in Industrial Chemistry 3/3 Colloid and surface science 3/3	Special Topics of Surface Chemistry 3/3 Analysis of Organic Chemistry 3/3 Specialty chemicals manufacturing process 3/3 Cosmetics Practice 3/3 Interfacial Technology I and Application 3/3	Seminar (3)2/2 Special synthetic resin 3/3 Manufacturing Process of Surfactant 3/3 Sol-Gel Science and Powder Technology 3/3	Seminar (4)2/2 Optical technology specialty chemicals 3/3 Biomedical specialty chemicals 3/3 Colloid Technology and Applications 3/3
	Materials Technology	Polymer materials 3/3 Physical Chemistry of Polymer 3/3 Polymer structure and physical properties 3/3 X-Ray Diffraction 3/3 Solid State Chemistry 3/3 Ceramic materials 3/3 Diffusion Theory 3/3 Crystal chemistry 3/3 Special Topics on Organic Optoelectronic Materials 3/3 Transmission Electron Microscopy 3/3	Polymer characterization 3/3 Mechanical Properties of Polymer Materials 3/3 Processing and applications of polymeric materials 3/3 Electronic ceramics 3/3 Special Topics of Ceramic Processing 3/3 Thin Film Materials 3/3 Small Angle X-Ray Diffraction 3/3 Materials of Thin Films 3/3 Microscopy Techniques and Analysis 3/3 Principles of plasma 3/3	Polymer morphology 3/3 Polymer Rheology 3/3 Functional polymer materials 3/3 Vacuum film engineering 3/3 Semiconductor Theory and Process 3/3 Surface Science and Analysis 3/3 Special Topics in Film manufacturing process 3/3 Special Topics of Optical-Electrical Materials 3/3 Technology of material examination 3/3 Solidification phenomena and principles in materials processing 3/3	Special Topics of Polymer Optoelectronic Materials 3/3 Advanced Composite Materials 3/3 Conducting Polymer Materials 3/3 Superconductor material 3/3 Special topics of assembly and fabrication of semiconductor materials 3/3 Special Topics in Nano-materials 3/3 Special Topics on Surface Treatment of Material 3/3 Plasma processing for ic manufacturing 3/3 Optical Polymer Materials 3/3

					Special topics on fabrication of ceramic film 3/3
	Chemical Process	Advanced numerical analysis 3/3 Reactor design 3/3 Advanced Transport Phenomena and Unit Operation 3/3 Advanced Thermodynamics 3/3	Advanced Process Control 3/3 Phase Equilibrium 3/3 Statistics and Experimental Design 3/3 Advanced Chemical Reaction Engineering 3/3	Special Topics on Process Design 3/3 Process integration with computer-aided design 3/3	System Engineering of Manufacturing Process 3/3
	Electrochemical and Energy Technology	Special topics in electrochemistry 3/3 Advanced Electrochemistry 3/3 Special Topics on Energy Technology 3/3 Principle and Application for Panel Display 3/3	Sensor For Electrochemistry 3/3 Energy storage devices 3/3 Synthesis and Analysis For Electrochemistry 3/3	Electrochemical anticorrosive Technology 3/3 Development and fabrication of batteries 3/3 Special Topic of Solar Cells 3/3 Special Topics in Electrochemical Deposition Technology 3/3	Noble metal materials processing technology 3/3 Special topics on fuel cells 3/3
	Environmental Technology	Advanced Environmental Chemistry 3/3 Special Topics on Environmental Engineering 3/3 Special topics of nanotechnology for environmental engineering 3/3	Special Topics of Waste-Water Treatment 3/3 Special topics of air pollution control 3/3 Environment Examination 3/3 Special Topics on Pollution Control 3/3	Treatment toxic chemicals 3/3 Environmental Toxicology 3/3 Advanced Water Purification Technology 3/3	Selected Topics on Waste Treatment 3/3 Special Topics in cleaner production 3/3 Special Topics in Environmental Biotechnology 3/3
	Biochemical Technology	Special topics in biotechnology 3/3 Micro-Organism Industry 3/3	Special topics in biochemical engineering 3/3	Biochemical separation procedures 3/3	Special Topics in Biosensor 3/3
	other		Scientific Reports and Writing 3/3	English writing for science and technology 3/3	

Remarks:

1. This curriculum is effective as of the Academic Year 2015
2. Credit hours of each course (or total) are marked with "credit/hour."
3. The minimal number of credit for graduation is 38, including 8 credits of seminars on special topics, 6 credits of thesis writing (based on the semester the thesis is presented), and 24 credits of elective courses.
4. Elective courses: the courses will be offered based on practical needs.
5. For other relevant regulations, please refer to the guidelines on studies for master degrees established by the department.

National Kaohsiung University of Applied Sciences
 Division of Continuing and Extension Education
 Chemical Engineering and Materials Engineering Department, College of Engineering
 Curriculum of Four-Year Program

Passed at Department Curriculum Committee Meeting on Feb. 10, 2015

Passed at Department Affairs Meeting on Mar. 02, 2015

Passed at College Curriculum Committee Meeting on Mar. 30, 2015

Passed at University Curriculum Committee Meeting on Apr. 27, 2015

Passed at Academic Affairs Meeting on Jun. 03, 2015

Year	1 st academic year		2 nd academic year		3 rd academic year		4 th academic year	
	Semester 1	Semester 1	Semester 1	Semester 2	Semester 1	Semester 2	Semester 1	Semester 2
University required common courses (20/30)	Practical English2/2 Chinese (1)2/2	Advanced Practical English2/2 Chinese (2)2/2	Advanced english listening and speaking training (1)1/2 Core Curriculm (1)2/2	Advanced english listening and speaking training (2)1/2 Core Curriculm (2)2/2	Physical education (1)0/2 Core Curriculm (3)2/2	Physical education (2)0/2 Core Curriculm (4)2/2	Physical Education (3)0/2 Core curriculm (5)-law & civic consciousness2/2	Physical education (4)0/2
小計 Total	4/4	4/4	3/4	3/4	2/4	2/4	2/4	0/2
College required common courses (0/0)								
Total								
Department required professional courses (76/92)	Calculus-1 3/3 Fundamental physics(1) 3/3 Fundamental Chemistry(1) 3/3 Calculations of Chemical Engineering 3/3 Introduction to Chemical Engineering and Materials Engineering 2/2	Fundamental physics(2) 3/3 Calculus (2) 3/3 Fundamental Chemistry(2) 3/3 An Introduction to Bio-Engineering Material 3/3 Fundamental chemistry experiment 1/3	Engineering mathematics (1)3/3 Physical chemistry(1)3/3 Polymer chemistry3/3 Organic chemistry3/3	Engineering mathematics (2) 3/3 Physical chemistry(2) 3/3 Instrumental analysis 3/3 Chemical engineering thermodynamics 3/3 Organic chemistry experiments 1/3	Physical chemistry lab.1/3 Transport phenomena and unit operation (1)3/3 Thermodynamics of materials3/3 Experiments in instrumental analysis1/3	Transport phenomena and unit operation (2)3/3 Kinetics of chemical reaction engineering3/3 Practical project (1)1/3	Transport phenomena and unit operation (3)3/3 Practical project (2)1/3 Chemical material experiments1/3 Process control3/3	Chemical engineering lab.1/3
Total	14/14	13/15	12/12	13/15	8/12	7/9	8/12	1/3

<p>Department elective professional courses (35)</p>	<p>Introduction to life science 2/2 Electrical engineering2/2 Water Treatment2/2 Analytical chemistry2/2 Environmental Chemistry2/2 An introduction to computer science2/2 Food chemistry2/2 Food Industry2/2 Petroleum refining technology2/2 Introduction to Environmental Science2/2 Chemical Technology in Our Lives2/2</p>	<p>Industrial safety and hygiene 2/2 Industrial Economics 2/2 Inorganic chemistry 2/2 Introduction to photo-electric engineering 2/2 Biochemistry 2/2 Special topics of organic chemistry 2/2 Electrochemistry 2/2 Interface sciences 2/2 Wastewater treatment 2/2 Air pollution control 2/2 Cosmetic chemistry2/2 Polymer physics 3/3 Introduction to nano-materials 2/2 Composite materials 2/2 Energy Storage Materials 2/2 Thin Film Ceramics 2/2 Introduction of Environmental Engineering 2/2 Principle of Ironmaking and Steelmaking 2/2 Molecular Biology 2/2 Atomic energy and the environment 3/3</p>	<p>Materials of Chemical Engineering 2/2 Pollution and Prevention2/2 Quality control2/2 Synthesis of Organic Chemistry2/2 Computer Programming and Application2/2 Analysis of Organic Chemistry2/2 Materials for photo-electric applications2/2 Semiconductor Materials2/2 Fuel Cells2/2 Process Automatic Instruments2/2 Polymer nanocomposite2/2 Off-Campus Practicum 2/320 Processing and applications of polymeric materials 3/3 Plant Management2/2 Introduction to biotechnology 2/2 Introduction to greenergy technology 2/2 Industrial instruments 2/2 Application and preparation of microsensor for microfabrication technology2/2 Thin film material and coating2/2 Overview of nuclear engineering and energy technology3/3</p>	<p>Computer Aided Design and Practice 1/2 Special Topics of Ceramic Materials 2/2 Manufacturing Process in Chemical Engineering 2/2 Environment Examination 2/2 Solid Waste Treatment 2/2 Separation process 2/2 Optoelectrical polymeric materials 2/2 Introduction to solar cell devices 2/2 Surface Treatment of Materials 2/2 Nanotechnology for enviromental engineering 2/2 Solid state physics 2/2 Chemical process design 2/2 Polymeric materials for high-tech applications 2/2 Principles of plasma 2/2 Chemical of electronics industry 2/2 Fundamental and Technology of Electrochemical Deposition 2/2 Introduction to nano-scale surface coating technology 2/2 Sequential Control 2/2 Equipments Design 2/2</p>
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Remarks:

1. This curriculum is applied to students admitted in Academic Year 2015
2. Credit hours of each course (or total) are marked with "credit/hour."
3. The minimal credit number for graduation is 131, including 20 credits of university required common courses, 0 credits of college required common courses, 76 credits of department required professional courses, at least 35 credits of department elective professional courses. (Students may have a maximum of 7 credits from courses offered by other departments or not offered by Center of General Education.)
4. Courses of inter-disciplinary programs offered by other departments may be regarded as elective professional courses of the department.
5. For General Education, students are required to take 2 credits/hours in the categories of "Humanities and Art," "Nature & Technology," "Society & Management" respectively and acquire 6 credits/hours in total. The courses do not have to be taken in sequence and can be exempted with General Education Core IV or V of four-year daytime programs.
6. General Education Core IV (category of history) and General Education Core V (category of law) may be exempted with General Education Core IV and V of four-year daytime programs respectively or with relevant courses in the category of history and law offered in Division of Continuing and Extension Education.
7. Physical Education I to Physical Education IV are required courses. The credits are not counted to meet graduation requirements, but students who fail in the courses will not be allowed to graduate.
8. Elective Military Education course credits are not counted to meet graduation requirements.
9. Elective courses: the courses listed in the table are planned courses, which will be offered based on practical needs.
10. For other instruction on course selection, students must follow "Division of Continuing and Extension Education Course Selection Guidelines."