

**Department of Natural Science Education University course structure and Teaching subject list  
2023 Academic Year (Undergraduate Program)**

Course English name	Course Chinese name	Credits	Weekly Student Class Hours	Grade	Note
				Semesters	
<b>Graduation Credit Requirements : Compulsory 27 credits + Elective 43 credits + Flexibility Course 30 credits, Total 100 credits.</b>					
<b>◎Courses required by the department : 27 credits</b>					
Calculus ( I )	微積分(一)	3	3 Class Hours	1st grade Fall SEM	
General Chemistry ( I )	普通化學(一)	3	3 Class Hours	1st grade Fall SEM	
General Chemistry Experiment ( I )	普通化學實驗(一)	0.5	1 Class Hour	1st grade Fall SEM	
General Physics ( I )	普通物理學(一)	3	3 Class Hours	1st grade Fall SEM	
General Physics Experiment ( I )	普通物理學實驗(一)	0.5	1 Class Hour	1st grade Fall SEM	
General Biology ( I )	普通生物學(一)	3	3 Class Hours	1st grade Fall SEM	
General Biology Experiment ( I )	普通生物學實驗(一)	0.5	1 Class Hour	1st grade Fall SEM	
General Chemistry ( II )	普通化學(二)	3	3 Class Hours	1st grade Spring SEM	
General Chemistry Experiment ( II )	普通化學實驗(二)	0.5	1 Class Hour	1st grade Spring SEM	
General Physics ( II )	普通物理學(二)	3	3 Class Hours	1st grade Spring SEM	
General Physics Experiment ( II )	普通物理學實驗(二)	0.5	1 Class Hour	1st grade Spring SEM	
General Biology ( II )	普通生物學(二)	3	3 Class Hours	1st grade Spring SEM	
General Biology Experiment ( II )	普通生物學實驗(二)	0.5	1 Class Hour	1st grade Spring SEM	
Introduction to Earth Science (including Practicum)	地球科學導論(含實習)	3	3 Class Hours	1st grade Spring SEM	
<b>◎Elective courses of the department : 43 credits ( Students in this department must take at least one specialty module to meet the graduation qualifications. If they complete the required credits specified by the specialty module, they can obtain a specialty certificate )</b>					
<b>◎Other Graduation requirements : 30 credits ( Students of this department can take intensive courses of each subject among elective courses, and can also take multi-credit courses by each department, cross-department courses or education courses or foreign language general education courses offered )</b>					
Global Change	全球環境變遷	2	2 Class Hours	1st grade Fall SEM	
Plant Morphology	植物形態學	3	3 Class Hours	1st grade Spring SEM	Biology Specialty Modular Course
Calculus ( II )	微積分(二)	3	3 Class Hours	1st grade Spring SEM	Physics Advanced Course
Computer Application in Science	電腦在科學上的應用	3	3 Class Hours	1st grade Spring SEM	
Introduction to Environmental Safety and Sanitation	安全衛生導論	2	2 Class Hours	1st grade Spring SEM	
Physical Mathematics ( I )	物理數學(一)	3	3 Class Hours	2nd grade Fall SEM	Physics Specialty Modular Course
Thermal Physics	熱物理	3	3 Class Hours	2nd grade Fall SEM	Physics Specialty Modular Course
Physiology ( I )	生理學(一)	3	3 Class Hours	2nd grade Fall SEM	Biology Specialty Modular Course
Biochemistry	生物化學	3	3 Class Hours	2nd grade Fall SEM	Biology Specialty Modular Course
Physical Chemistry ( I )	物理化學(一)	3	3 Class Hours	2nd grade Fall SEM	Chemistry Specialty Modular Course
Organic Chemistry ( I )	有機化學(一)	3	3 Class Hours	2nd grade Fall SEM	Chemistry & Natural Science Specialty Modular Course
Geology (including Practicum) ( I )	普通地質學(含實習)(一)	3	3 Class Hours	2nd grade Fall SEM	Earth Science & Natural Science Specialty Modular Course
Introduction to Astronomy (including Practicum) ( I )	天文學導論(含實習)(一)	3	3 Class Hours	2nd grade Fall SEM	Earth Science & Natural Science Specialty Modular Course
Differential Equation	微分方程	3	3 Class Hours	2nd grade Fall SEM	Physics Advanced Course
Histology	組織學	3	3 Class Hours	2nd grade Fall SEM	Biology Advanced Course
Mycology	菌類學	3	3 Class Hours	2nd grade Fall SEM	Biology Advanced Course

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Food Chemistry	食品化學	3	3 Class Hours	2nd grade Fall SEM	Chemistry Advanced Course
3D modeling Application to Science	3D建模在科學上的應用	3	3 Class Hours	2nd grade Fall SEM	
Science Education for Exceptional Children	特殊兒童之科學教育	2	2 Class Hours	2nd grade Fall SEM	
Electromagnetism ( I )	電磁學(一)	3	3 Class Hours	2nd grade Spring SEM	Physics Specialty Modular Course
Thermodynamics	熱力學	3	3 Class Hours	2nd grade Spring SEM	Physics Specialty Modular Course
Animal Behavior	動物行為為學	3	3 Class Hours	2nd grade Spring SEM	Biology Specialty Modular Course
Biotaxonomy	生物分類學	3	3 Class Hours	2nd grade Spring SEM	Biology Specialty Modular Course
Physical Chemistry ( II )	物理化學(二)	3	3 Class Hours	2nd grade Spring SEM	Chemistry Specialty Modular Course
Organic Chemistry ( II )	有機化學(二)	3	3 Class Hours	2nd grade Spring SEM	Chemistry Specialty Modular Course
Introduction to Astronomy (including Practicum) ( II )	天文學導論(含實習)(二)	3	3 Class Hours	2nd grade Spring SEM	Earth Science Specialty Module Course
Introduction to Geophysics	地球物理導論	3	3 Class Hours	2nd grade Spring SEM	Earth Science Specialty Module Course
Physical Mathematics ( II )	物理數學(二)	3	3 Class Hours	2nd grade Spring SEM	Physics Advanced Course
Mechanics ( I )	力學(一)	3	3 Class Hours	2nd grade Spring SEM	Physics Advanced Course
Microbiology	微生物學	3	3 Class Hours	2nd grade Spring SEM	Biology Advanced Course
Physiology ( II )	生理學(二)	3	3 Class Hours	2nd grade Spring SEM	Biology Advanced Course
Geology (including Practicum) ( II )	普通地質學(含實習)(二)	3	3 Class Hours	2nd grade Spring SEM	Earth Science Advanced Course
Technology Creation and Teaching Practice	科技創作與教學實務	2	2 Class Hours	2nd grade Spring SEM	
History of Science	科學史	2	2 Class Hours	2nd grade Spring SEM	
Modern Physics ( I )	近代物理(一)	3	3 Class Hours	3rd grade Fall SEM	Physics & Natural Science Specialty Modular Course
Electromagnetism ( II )	電磁學(二)	3	3 Class Hours	3rd grade Fall SEM	Physics Specialty Modular Course
Analytical Chemistry	分析化學	3	3 Class Hours	3rd grade Fall SEM	Chemistry & Natural Science Specialty Modular Course
Mathematics for Chemistry	化學數學	3	3 Class Hours	3rd grade Fall SEM	Chemistry Specialty Modular Course
Entomology	昆蟲學	3	3 Class Hours	3rd grade Fall SEM	Natural Science Specialty Modular Course
Introduction to Oceanography	海洋學導論	3	3 Class Hours	3rd grade Fall SEM	Earth Science Specialty Module Course
Mechanics ( II )	力學(二)	3	3 Class Hours	3rd grade Fall SEM	Physics Advanced Course
Introduction to Material Science	材料科學導論	3	3 Class Hours	3rd grade Fall SEM	Physics Advanced Course
Quantum Physics ( I )	量子物理(一)	3	3 Class Hours	3rd grade Fall SEM	Physics Advanced Course
Cellular Biology	細胞生物學	3	3 Class Hours	3rd grade Fall SEM	Biology Advanced Course
Study of Local-Based Biology	鄉土生物研究	3	3 Class Hours	3rd grade Fall SEM	Biology Advanced Course
Biostatistics	生物統計學	2	2 Class Hours	3rd grade Fall SEM	Biology Advanced Course
Experiments in Biochemistry	生物化學實驗	1	2 Class Hours	3rd grade Fall SEM	Biology Advanced Course
Chemical Thermodynamics	化學熱力學	3	3 Class Hours	3rd grade Fall SEM	Chemistry Advanced Course
Earth Materials	地球物質	3	3 Class Hours	3rd grade Fall SEM	Earth Science Advanced Course
Environmental Science ( I )	環境科學(一)	3	3 Class Hours	3rd grade Fall SEM	
Infusing Game into the Teaching of Science	遊戲融入自然科學領域的教學	3	3 Class Hours	3rd grade Fall SEM	
Seminar	書報討論	2	2 Class Hours	3rd grade Fall SEM	

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Modern Physics ( II )	近代物理(二)	3	3 Class Hours	3rd grade Spring SEM	Physics Specialty Modular Course
Optics ( I )	光學(一)	3	3 Class Hours	3rd grade Spring SEM	Physics & Natural Science Specialty Modular Course
Genetics	遺傳學	3	3 Class Hours	3rd grade Spring SEM	Biology Specialty Modular Course
Molecular Biology	分子生物學	3	3 Class Hours	3rd grade Spring SEM	Biology Specialty Modular Course
Inorganic Chemistry	無機化學	3	3 Class Hours	3rd grade Spring SEM	Chemistry Specialty Modular Course
Principles of Instrumental Analysis	儀器分析	3	3 Class Hours	3rd grade Spring SEM	Chemistry Specialty Modular Course
Fundamental Biological Oceanography	生物海洋學概論	3	3 Class Hours	3rd grade Spring SEM	Earth Science Specialty Module Course
Introduction to Meteorology	大氣科學導論	3	3 Class Hours	3rd grade Spring SEM	Earth Science Specialty Module Course
Quantum Physics ( II )	量子物理(二)	3	3 Class Hours	3rd grade Spring SEM	Physics Advanced Course
Introduction to Optoelectrical Physics	光電物理導論	3	3 Class Hours	3rd grade Spring SEM	Physics Advanced Course
Topic in Physics	物理專題研究	2	2 Class Hours	3rd grade Spring SEM	Physics Advanced Course
Biodiversity	生物多樣性	2	2 Class Hours	3rd grade Spring SEM	Biology Advanced Course
Protein Biochemistry and Technology	蛋白質生化學與技術	2	2 Class Hours	3rd grade Spring SEM	Biology Advanced Course
Topic in Biology	生物專題研究	2	2 Class Hours	3rd grade Spring SEM	Biology Advanced Course
Polymer Chemistry	高分子化學	3	3 Class Hours	3rd grade Spring SEM	Chemistry Advanced Course
Chemical Kinetics	化學動力學	2	2 Class Hours	3rd grade Spring SEM	Chemistry Advanced Course
Topic in Chemistry	化學專題研究	2	2 Class Hours	3rd grade Spring SEM	Chemistry Advanced Course
Sedimentology and Stratigraphy	沉積與地層學	3	3 Class Hours	3rd grade Spring SEM	Earth Science Advanced Course
Teaching Materials and Methods of Science in Elementary School	國民小學自然科學領域教材教法	2	2 Class Hours	3rd grade Spring SEM	This course is compulsory for students taking the education program
Introduction to Science Education	科學教育導論	2	2 Class Hours	3rd grade Spring SEM	This course is compulsory for students taking the education program
Science-Based Integrated Curriculum	自然科課程統整的實施與評量	2	2 Class Hours	3rd grade Spring SEM	This course is compulsory for students taking the education program
Topics in Natural Science ( I )	自然科專題研究(一)	2	2 Class Hours	3rd grade Spring SEM	
Study of Elementary Science Curriculum	國小自然科課程研究	2	2 Class Hours	3rd grade Spring SEM	
Environmental Science ( II )	環境科學(二)	3	3 Class Hours	3rd grade Spring SEM	
Ecology	生態學	3	3 Class Hours	4th grade Fall SEM	Biology & Natural Science Specialty Modular Course
Earth Resources	地球資源	3	3 Class Hours	4th grade Fall SEM	Earth Science Specialty Module Course
Solid State Physics ( I )	固態物理(一)	3	3 Class Hours	4th grade Fall SEM	Physics Advanced Course
Optics ( II )	光學(二)	3	3 Class Hours	4th grade Fall SEM	Physics Advanced Course
Chemical Research Techniques	化學研究技術	2	2 Class Hours	4th grade Fall SEM	Chemistry Advanced Course
Advanced Inorganic Chemistry	高等無機化學	3	3 Class Hours	4th grade Fall SEM	Chemistry Advanced Course
Biotechnology	生物技術	2	2 Class Hours	4th grade Fall SEM	Biology Advanced Course
Paleontology and Earth History	古生物與地球歷史	3	3 Class Hours	4th grade Fall SEM	Earth Science Advanced Course
Study of Elementary Science Experiments ( I )	國小自然科學實驗研究(一)	2	3 Class Hours	4th grade Fall SEM	This course is compulsory for students taking the education program
Design and Application of Science Fair	科學展覽設計與展示	2	2 Class Hours	4th grade Fall SEM	This course is compulsory for students taking the education program

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History of Physics	物理發展史	2	2 Class Hours	4th grade Fall SEM	
Topics in Natural Science ( II )	自然科專題研究(二)	2	2 Class Hours	4th grade Fall SEM	
Study of Science Education	科學教育研究	2	2 Class Hours	4th grade Fall SEM	
Specialized practice	專業實習	2	2 Class Hours	4th grade Fall SEM	
Environmental Education	環境教育	2	2 Class Hours	4th grade Fall SEM	
Solid State Physics ( II )	固態物理(二)	3	3 Class Hours	4th grade Spring SEM	Physics Advanced Course
Applied Chemistry	應用化學	3	3 Class Hours	4th grade Spring SEM	Chemistry Advanced Course
Quantum Chemistry	量子化學	3	3 Class Hours	4th grade Spring SEM	Chemistry Advanced Course
Conservation Biology	保育生物學	2	2 Class Hours	4th grade Spring SEM	Biology Advanced Course
Geochemistry	地球化學	3	3 Class Hours	4th grade Spring SEM	Earth Science Advanced Course
Study of Elementary Science Experiments ( II )	國小自然科學實驗研究(二)	2	3 Class Hours	4th grade Spring SEM	This course is compulsory for students taking the education program
Multiple Credit Programs	多元學分學程課程		Multi-credit course electives shall be handled in accordance with the relevant regulations of the school's credit course		
Cross-department, cross-school or transnational courses	跨系、跨校或跨國課程		Cross-campus and school electives shall be handled in accordance with the relevant regulations of the school.		