國立彰化師範大學

物理學系學士班畢業條件表暨課程架構表

(115學年度入學學生適用)

National Changhua University of Education

Graduation Requirements and Course Structure for Bachelor's Program of Physics

(Applicable for students in 115 academic year)

列印日期(Print Date:2026/05/04)

一.系必修課程

I.Department Required Courses

課程名稱 Course Name	學分/學時 Credit(s)/ Hour(s)	年級 Grade	學期 Semester
普通物理(一) General Physics I	4/4	1	1
普通物理實驗(一) General Physics Lab. I	1/3	1	1
微積分(一) Calculus I	4/4	1	1
普通物理(二) General Physics II	4/4	1	2
普通物理實驗(二) General Physics Lab. II	1/3	1	2
微積分(二) Calculus II	4/4	1	2
物理數學(一) Mathematical Methods for Physicists I	3/3	2	1
電磁學(一) Electromagnetics I	3/3	2	1
實驗物理(一) Basic Experimental Physics I	3/3	2	1
物理數學(二) Mathematical Methods for Physicists II	3/3	2	2
電磁學(二) Electromagnetics II	3/3	2	2
實驗物理(二) Basic Experimental Physics II	3/3	2	2
量子物理(一) Quantum Physics I	3/3	3	1
實驗物理(三) Basic Experimental Physics III	3/3	3	1
量子物理(二) Quantum Physics II	3/3	3	2

二.系必選課程

II.Department Graduation Elective Courses

課程名稱 Course Name	學分/學時 Credit(s)/ Hour(s)

程式語言 Programming Language	3/3

三.系選修課程

III.Department Elective Courses

課程名稱 Course Name	學分/學時 Credit(s)/ Hour(s)
物理發展概論(一) Introduction to Development of Physics I	3/3
基礎物理(一) Fundamental Physics I	1/1
基礎微積分(一) Fundamental Calculus I	1/1
普通化學(一) General Chemistry I	3/3
普通化學實驗(一) General Chemistry Laboratory I	1/3
普通物理演習(一) Practice in General Physics I	1/1
物理發展概論(二) Introduction to Development of Physics II	3/3
基礎物理(二) Fundamental Physics II	1/1
基礎微積分(二) Fundamental Calculus II	1/1
普通化學(二) General Chemistry II	3/3
普通化學實驗(二) General Chemistry Laboratory II	1/3
普通物理演習(二) Practice in General Physics II	1/1
觀念物理與統整(二) Conceptual Comprehension and Integration of Physics II	2/2
力學(一) Mechanics I	3/3
光電科技概論 Introduction of Photonic Technology	3/3
地球科學(一) Earth Science I	2/2
材料科學導論(一) Introduction to Material Science I	3/3
物理數學演習(一) Mathematical Physics Tutorial I	1/1
科技英文(一) English for Science Students I	3/3
計算機概論 Introduction to Computer Science	3/3
書報討論 Journal Discussion	2/2

基礎電磁學(一) Fundamental Electromagnetics I	1/1
電路學(一) Circuit Theory I	3/3
綠色科技概論 Introduction to Green Technology and Application	3/3
力學(二) Mechanics II	3/3
地球科學(二) Earth Science II	2/2
材料科學導論(二) Introduction to Material Science II	3/3
物理數學演習(二) Mathematical Physics Tutorial II	1/1
近代物理學導論 Introduction to Modern Physics	3/3
科技英文(二) English for Science Students II	3/3
基礎電磁學(二) Fundamental Electromagnetics II	1/1
電子學實驗(二) Experiments of Electronics II	1/3
電路學(二) Circuit Theory II	3/3
天文物理導論 Introduction to Astrophysics	3/3
兆赫科技專題研究(上) Special Topics on Terahertz Technology (I)	3/3
物理建模教學專題研究（上） Special Topics on Scientific Modeling in Physics I	3/3
物理數學(三) Mathematical Methods for Physicists III	3/3
表面物理與技術 Surface Physics and Techniques	3/3
流體力學(一) Fluid Dynamic I	3/3
計算物理 Computational Physics	3/3
真空實驗技術 Experimental vacuum techniques	3/3
液晶導論 Introduction to Liquid Crystals	3/3
量子物理演習(一) Practice in Quantum Physics I	1/1
電子學實驗(一) Experiments of Electronics I	1/3
電磁波 Electromagnetic Wave	3/3
數值分析 Numerical Analysis	3/3

熱物理學 Thermal Physics	3/3
觀念物理評量開發專題研究（上） Conceptual Physics Assessment Design Special Topic Research I	3/3
天文學 Astronomy	3/3
半導體製程基礎 Semiconductor Process Basics	3/3
平面顯示器概論 Flat panel displays	3/3
生活科技概論 Introduction to Technology Education	3/3
兆赫科技專題研究(下) Special Topics on Terahertz Technology (II)	3/3
光電子學導論 Introduction to optoelectronics	3/3
物理建模教學專題研究（下） Special Topics on Scientific Modeling in Physics II	3/3
物理探究活動設計 Design of physical inquiry activities	2/2
物理數學(四) Mathematical Methods for Physicists IV	3/3
流體力學(二) Fluid Dynamic II	3/3
科學探索 Science Explorer	2/2
統計熱力學導論 Introduction to Thermostatistics	3/3
量子物理演習(二) Practice in Quantum Physics II	1/1
電子學(二) Electronics II	3/3
實驗物理技術 Experimental Technique in Physics	3/3
凝態理論專題研究(下) Special Topics on Condensed Matter Theory II	3/3
顯示光學 Display optics	3/3
X光繞射及應用 X-ray Diffraction and its Application	3/3
半導體物理導論 Introduction to Semiconductor Physics	3/3
光學(二) Optics II	3/3
材料模擬科學導論(一) Material Simulation Science I	3/3
固態物理導論(一) Introduction to Solid State Physics I	3/3
奈米材料(一) Nano-Materials I	3/3

非線性光學導論(一) Introduction to Nonlinear Optics I	3/3
非線性動力學(一) Nonlinear Dynamics I	3/3
相對論 Relativity	3/3
理化教材設計 Activity Design in Physics Education	2/2
理化教學實務 Practicum in Physical Science Teaching	2/4
理論物理(一) Theoretical Physics I	3/3
普通生物學(一) Biology I	2/2
量子光學 Quantum Optic	3/3
量子資訊導論(一) Introduction to Quantum Information I	3/3
雷射導論 Introduction of principles of laser	3/3
電磁波系統與元件技術(上) Techniques of Systems and Components for Electromagnetic Waves (I)	3/3
應用量子力學(一) Applied Quantum Mechanics I	3/3
半導體物理與元件 Semiconductor Physics and Device	3/3
光譜學 Spectroscopy	3/3
材料模擬科學導論(二) Material Simulation Science II	3/3
固態物理導論(二) Introduction to Solid State Physics II	3/3
奈米材料(二) Nano-Materials II	3/3
物理教材教法研究 Research on Instructional Materials	3/3
非線性光學導論(二) Introduction to Nonlinear Optics II	3/3
非線性動力學(二) Nonlinear Dynamics II	3/3
理論物理(二) Theoretical Physics II	3/3
普通生物學(二) Biology II	2/2
量子資訊導論(二) Introduction to Quantum Information II	3/3
電磁波系統與元件技術(下) Techniques of Systems and Components for Electromagnetic Waves (II)	3/3
磁性物理 Physics of Magnetism	3/3

應用量子力學(二) Applied Quantum Mechanics II	3/3
專題研究 **Special Topics**	
天文物理專題研究(上) Special Topics on Astrophysics I	3/3
光子晶體元件專題研究(上) Special Topics in Photonic Crystal Based Device I	3/3
光電元件專題研究(上) Special Topics on photonic devices I	3/3
光電半導體專題研究(上) Special Topics in Optoelectronic Semiconductors I	3/3
光電材料專題研究(上) Special Topics in Electro-Optical Materials I	3/3
低維度磁性物理專題研究（上） Special Topics on Physics of Low Dimensional Magnetism I	3/3
冷原子專題研究(上) Selected topics in ultracold atoms I	3/3
固態光學專題研究(上) Special topic on Solid State Optics I	3/3
固態物理材料專題研究(上) Special Topics on Material of Solid State Physics I	3/3
奈米結構製程專題研究(上) Special topic on nanostructure processing I	3/3
奈米電子專題研究(上) Special Topics on Nano-electronics I	3/3
物理教育專題研究(上) Special Topics in Physics Education I	3/3
計算物理專題研究 (上) Special topics in computational physics I	3/3
能源材料專題研究(上) Energy Materials I	3/3
高能物理專題研究(上) Special topics on high energy physics I	3/3
問題解決與物理教學專題研究(上) Undergraduate Research in Problem Solving and Physics Education I	3/3
理論物理專題研究(上) Special Topics in Theoretical Physics I	3/3
統計物理專題研究(上) Special Topics on statistical physics I	3/3
新穎材料專題研究(上) Special Topics on Novel Materials I	3/3
熱電材料專題研究(上) Special Topics in Thermoelectric Materials I	3/3
凝態理論專題研究(上) Special Topics on Condensed Matter Theory I	3/3
天文物理專題研究(下) Special Topics on Astrophysics II	3/3
光子晶體元件專題研究(下) Special Topics in Photonic Crystal Based Device II	3/3

光電元件專題研究(下) Special Topics on photonic devices II	3/3
光電半導體專題研究(下) Special Topics in Optoelectronic Semiconductors II	3/3
光電材料專題研究(下) Special Topics in Electro-Optical Materials II	3/3
低維度磁性物理專題研究（下） Special Topics on Physics of Low Dimensional Magnetism II	3/3
冷原子專題研究(下) Selected topics in ultracold atoms II	3/3
固態光學專題研究(下) Special topic on Solid State Optics II	3/3
固態物理材料專題研究(下) Special Topics on Material of Solid State Physics II	3/3
奈米結構製程專題研究(下) Special topic on nanostructure processing II	3/3
奈米電子專題研究(下) Special Topics on Nano-electronics II	3/3
物理教育專題研究(下) Special Topics in Physics Education II	3/3
計算物理專題研究 (下) Special topics in computational physics II	3/3
能源材料專題研究(下) Energy Materials II	3/3
高能物理專題研究(下) Special topics on high energy physics II	3/3
問題解決與物理教學專題研究(下) Undergraduate Research in Problem Solving and Physics Education II	3/3
理論物理專題研究(下) Special Topics in Theoretical Physics II	3/3
統計物理專題研究(下) Special Topics on statistical physics II	3/3
新穎材料專題研究(下) Special Topics on Novel Materials II	3/3
熱電材料專題研究(下) Special Topics in Thermoelectric Materials II	3/3
凝態理論專題研究(下) Special Topics on Condensed Matter Theory II	3/3
觀念物理評量開發專題研究（下） Conceptual Physics Assessment Design Special Topic Research II	3/3
師培領域 **Teacher Cultivation**	
趣味科學活動設計 Design of Fun Science Experiments	2/2
觀念物理與統整(一) Conceptual Comprehension and Integration of Physics I	2/2
科學史在科學教學上的應用 History of Science Applications in Education	2/2
理化教學媒體 Instructional Media for Science	2/2

理化實驗設計與示範教學 Experimental Design for Science Education & Teaching Demonstration	2/2
物理概念探究 Developing in-depth understanding of physics concepts	2/2
探究與實作課程設計 Inquiry and hands-on experiment: Curriculum design	2/2
自然科學領域探究與實作專題 Inquiry and hands-on experiment in science: Special topic	2/2
物理科教材教法 Methods and Materials in Teaching Physics	2/2
物理科教學應用與實作 Physics Teaching Application and Practice	2/2
物理科教學實習 Teaching Practicum of Physics	2/4

四.物理組 組必修課程

IV.Required Courses for Pure Physics

課程名稱 Course Name	學分/學時 Credit(s)/ Hour(s)	年級 Grade	學期 Semester
力學(一) Mechanics I	3/3	2	1
力學(二) Mechanics II	3/3	2	2
電子學(一) Electronics I	3/3	3	1
熱物理學 Thermal Physics	3/3	3	1
光學(一) Optics I	3/3	3	2

五.光電組組必修課程

V.Required Courses for Photonics

課程名稱 Course Name	學分/學時 Credit(s)/ Hour(s)	年級 Grade	學期 Semester
電子學(一) Electronics I	3/3	2	1
電子學實驗(一) Experiments of Electronics I	1/3	2	1
電子學(二) Electronics II	3/3	2	2
光學(一) Optics I	3/3	3	1
光電子學導論 Introduction to optoelectronics	3/3	3	2
光學(二) Optics II	3/3	3	2

六.先修科目

VI.Prerequisite Courses

先修課程 Prerequisite Course	後修課程 Subsequent Course

七. 畢業條件 / Graduation Requirements

115學年度畢業條件表
※最低畢業學分數：128學分
1物理組5科核心必選課程，共15學分；光電組6科核心必選課程，共16學分。各組學生需修習且通過其核心必選課程始得畢業。
2.光電組與物理組的核心必選課程可相互採認為另一組的專業選修課程。
3.本系學生必須修習本系所開之系必修課程與分組核心必選課程。
4.系外選修學分數採納標準：本校其他系所及師培中心開設之科目最多16學分採計畢業學分(可含教育專業課程，不含通識課程。)；惟選修本校其他系所所開設之科目：化學系 - 普通化學(一)(二)、普通化學實驗(一)(二)、生物系 - 普通生物(一)(二)；理學院、化學系、生物系 - 生活科技概論；理學院、地理系 - 地球科學(一)(二)；電機系、電子系 - 電子學(一)(二)、電子學實驗(一)(二)、電路學(一)(二)；電機系、電子系、資工系、資管系 - 程式語言、計算機概論，不受前述之限制。
5.有意擔任中等學校教師者，須先申請通過後，始得依規定修習26個學分之教育學程。
6.學生除應修滿本系應修學分外，同時必須達本系所「資訊能力」之基本要求，方具備畢業資格。詳細內容請見本校「資訊能力檢定畢業門檻實施辦法」及本系之規定辦理。
7.輔系課程：輔系需修滿必修科目30個學分，但力學(一)、電磁學(一)(二)、量子物理(一)(二)、熱物理學、光學(一)為必選。
8.雙主修課程：雙主修總學分數為55學分，需修滿必修科目30個學分，但力學(一)、電磁學(一)(二)、量子物理(一)(二)、熱物理學 、光學(一)為必修課程，另再修習本系課程25學分，並依本校學生修讀雙主修注意事項之規定修習。
9.本校學生修習遠距教學課程，其修習學分(含抵免學分)總數以不超過畢業總學分之二分之一為限。
10.專題研究至多承認6學分。
11.本系修課方式（轉學生不受限）：(1)必修課程：二組不可跨組修課。(2)光學(一)、電子學(一)、不可跨組修課。(3)第一次修課不及格後重修可跨組，但需授課老師同意加簽方式選課。

※Minimum Graduation Credits: 128 credits.
1.Physics students must complete 15 credits of core elective courses, and optoelectronic students must complete 16 credits of core elective courses. Students from each group must pass their respective core elective courses to graduate.
2.The core elective courses of optoelectronics and physics can be recognized as professional elective courses for the other group.
3.Students in this department must take the required courses offered by this department as well as the core elective courses for their respective groups.
4. Criteria for the Recognition of External Elective Credits:
Up to 16 credits from courses offered by other departments of the University or the Center for Teacher Education may be counted toward the total graduation credit requirements (including professional education courses but excluding general education courses).
However, the following courses offered by other departments are not subject to the aforementioned credit limit:
•Department of Chemistry: General Chemistry (I)(II), General Chemistry Laboratory (I)(II).
•Department of Biology: General Biology (I)(II).
•College of Science; Department of Chemistry; Department of Biology: Introduction to Life Technology.
•College of Science; Department of Geography: Earth Science (I)(II).
•Department of Electrical Engineering; Department of Electronic Engineering: Electronics (I)(II), Electronics Laboratory (I)(II), Circuit Theory (I)(II).
•Department of Electrical Engineering; Department of Electronic Engineering; Department of Computer Science and Information Engineering; Department of Information Management: Programming Languages, Introduction to Computers.
5.Those intending to become secondary school teachers must first apply and pass to be eligible to take the 26-credit education program.
6.In addition to completing the required credits for this department, students must also meet the basic requirements for "Information Literacy" of this department in order to graduate. For detailed information, please refer to the "Implementation Measures for Information Literacy Graduation Threshold" of this university and the regulations of this department.
7.Minor courses: Minors must complete 30 credits of required courses, but Mechanics, Electromagnetics, Quantum Physics, Thermophysics, and Optics are compulsory.
8.Double Major Programs: The total credits for a double major are 55 credits, with 30 credits being required courses, including Mechanics, Electromagnetics, Quantum Physics, Thermophysics, and Optics. An additional 25 credits of courses from this department must be taken, following the regulations for students studying double majors at this university.
9.Students taking distance education courses at this university cannot exceed half of the total graduation credits.
10. Regarding the “Special Topic Research” course, the course credits are as follows: (1) If you agree to take only (Part 1) or (Part 2), both courses will be recognized. (2) In different academic years and by different topic teachers, the credits of two topic research courses (Part 1) or (Part 2) may be recognized. (3) If you take 2 Topics (Upper) or 2 Topics (Lower) from the same teacher, only one of each will be accepted. (4) A maximum of 6 credits (within the minimum graduation credits of 128) will be accepted for special research.
11. Course-taking method for this department (transfer students are not restricted): (1) Compulsory courses: Students in Class 2 cannot take courses across classes. (2)Optics (I) and Electronics (I) cannot be taken in different groups. (3) If a course you have taken is rejected and you wish to take the course a second time, you can choose to take the course in a different class, but you must agree to the course selection by signing an additional signature.