Undergraduate Program Course Catalog of Department of Electrical Engineering, National Chi Nan University

Effective for students admitted in Fall,**2024**

Undergraduate requirements: a minimum of 131 required credits, including 16 credits in the school-wide curriculum, 15 credits of General Education courses, 58 credits of Departmental required courses and 42 credits of elective courses, including 33 credits from specialized elective courses, and at least 2 credits in a second foreign language or English listening and speaking.

1.School-Wide Curriculum

A. School-Wide Required Courses (**16** credits)

Course Code	Course Name (Chinese and English)	Credits	Notes
	Cross-disciplinary ESAP: Textual Interpretation and Composition	2	Since the first semester of 110 Academic Year (September 2021), the competence-based class grouping policy of Freshmen English (Course Title: Cross-disciplinary ESAP: Textual Interpretation and Composition) will be based on registered student's OOPT scores; Students will be accordingly divided into three different levels: advanced (top 10%), general (middle 80%) and basic (bottom 10%).
	Cross-disciplinary ESAP: Critical Thinking and Expression	2	
	Cross-disciplinary ESAP: Cross-Cultural Communicative Skills	2	
	Critical Thinking And Expression In Chinese（Ⅰ）：Reading And Writing	2	Overseas students who take Chinese for Overseas Students can be credited in field of Humanities, but cannot be certified as Critical Thinking And Expression In Chinese.
	Critical Thinking And Expression In Chinese（Ⅱ）：Multiple Applications	2	

Main Field	Sub-Field	Credits	Notes
	Service Learning	1	Students are divided into groups by their own department, without any proper reasons they cannot change the decision.
	Information Technology	1	Freshmen take courses in the first semester of each academic year, regardless of department.
	Physical Education (1)	1	In the first semester of freshman, students are arranged to take Physical Education (1) by their original department. Without any proper reasons, change will be prohibited. If a class of the department or the interdisciplinary program that is less than 40 students, the combined class will be adopted. In the second semester of freshman, studetns are able to take Physical Education (2) by their interesting.
	Physical Education (2)	1	
	Featured Sports	2	Students are limited to take 1 featured sports course each semester since sophomore. At least 2 featured sports courses are required before graduation.
	General Education Seminar	0	Students are required to attend at least 6 lectures before graduation.

B. School-Wide Elective Courses

	Sub-Field	Credits	Notes
	Second Foreign Language		Including Japanese, Korean, French, German and Spanish, etc.
	Southeast Asia Languages		Including Thai, Vietnamese, Burmese, Indonesian and Malay. These courses can be credited course credits in Topical General Education
	Advanced English		
	Other Elective Course		

2.General Education Courses

Main Field	Sub-Field	Credits	Notes

Humanities	Literature and Art	3	Students should attend a total of at least 3 credits.
	History, Philosophy and Culture		
Society	Law, Politics and Education	3	Students should attend a total of at least 3 credits.
	Society, Economy and Management		
Nature	Engineering and Technology	3	Students should attend a total of at least 3 credits.
	Life and Science		
Topical General Education	International Connection	3	Students should attend a total of at least 3 credits.
	Net-Zero Sustainability		
	Social Innovation		

General education courses from various fields (humanities, social, natural, and topical general education) can be cross-credited within a single field, up to a maximum of 4 credits (subject to approval by the General Education Center). Students are required to take at least two Information Technology courses and get 1 credit of Self-directed Learning courses out of the 15 credits of General Education Courses.

3.Departmental Courses

Course Code	Course Name (Chinese and English)	Credits	Course type (required/elective)	Course availability (freshman/sophomore/junior/senior)	Notes
230001	Physics (I)	3	required	Freshman 1st Semester	
230002	Calculus (I)	3	required	Freshman 1st Semester	
230003	Fundamental Chemistry	3	elective	Freshman	
230004	Physics Laboratory	1	elective	Freshman	
230005	Introduction to Computer Science	3	elective	Freshman	

230009	Calculus (II)	3	required	Freshman 2nd Semester	
230010	Physics (II)	3	required	Freshman 2nd Semester	
230012	Digital Logic Design	3	required	Freshman 1st Semester	
230013	Electrical Engineering Laboratory (I)	1	required	Sophomore 1st Semester	
230020	Electronics (I)	3	required	Sophomore 1st Semester	
230021	Circuitry(I)	3	required	Sophomore 1st Semester	
230023	Electrical Engineering Laboratory (II)	1	required	Sophomore 2nd Semester	
230026	Electronics (II)	3	required	Sophomore 2nd Semester	
230027	Circuitry (II)	3	required	Sophomore 2nd Semester	
230035	Linear Algebra	3	required	Freshman 2nd Semester	
230043	Modern Physics	3	elective	Junior	
230050	Stochastic Processes	3	elective	Junior	

230052	Senior Project (I)	2	required	Junior 1st Semester	
230053	Senior Project (II)	2	required	Junior 2nd Semester	
230054	Digital Communications	3	elective	Junior	
230057	Engineering Mathematics (II)	3	required	Sophomore 2nd Semester	
230059	Data Structure	3	elective	Sophomore	
230062	Digital Logic Laboratory	1	required	Freshman 2nd Semester	
230063	Electronics (III)	3	elective	Junior	
230064	Electromagnetics (I)	3	required	Junior 1st Semester	
230068	Introduction to Communication Systems	3	elective	Junior	
230073	Introduction to Control Systems	3	elective	Junior	
230074	Electromagnetics (II)	3	required	Junior 2nd Semester	
230084	Engineering Mathematics (I)	3	required	Sophomore 1st Semester	

230088	Computer Programming	3	required	Freshman 2nd Semester	
230090	Probability	3	elective	Sophomore	
230091	Introduction to VLSI	3	elective	Sophomore	
230103	Microwave Measurement	3	elective	Junior	
230104	System Optimization	3	elective	Junior	
230106	Introduction to Digital Signal Processing	3	elective	Junior	
230108	Signals and Systems	3	required	Sophomore 2nd Semester	
230110	Digital Systems Design	3	elective	Junior	
230113	Microprocessors Principles and Laboratory	3	required	Sophomore 1st Semester	
230118	Digital Control Systems	3	elective	Junior	
230120	Communication Laboratory	3	elective	Junior	
230121	Introduction to Solid-State Electronics	3	elective	Junior	

230122	Specialized Internship	3	elective	Senior	
230123	Enterprise Internship	6	elective	Senior	
230127	Introduction to Semiconductor Process Technolog	3	elective	Junior	
230128	Computer Organization and Architecture	3	elective	Junior	
230132	System Design and Development of Internet of Th	3	elective	Junior	
230133	Smart Life	3	elective	Freshman	
230134	Embedded System and Machine Learning Progran	3	elective	Junior	
230135	Implementation and Application of Intelligent Unr	3	elective	Sophomore	
230137	Measurement and Automation	3	elective	Sophomore	
230138	Cornerstone Course Design for Engineering Educa	3	elective	Freshman	
230139	PythonPython Programming	3	elective	Freshman	
230140	Electromagnetics Lab	3	elective	Sophomore	

230242	Digital Image Processing	3	elective	Junior	
230243	Semiconductor Devices Physics	3	elective	Junior	
230244	Semiconductor Devices Characterization and Mea	3	elective	Junior	
230245	Simulation of Semiconductor Devices	3	elective	Junior	
230246	Semiconductor Memories	3	elective	Junior	
230247	Semiconductor Sensors	3	elective	Junior	
230248	Solid-State Physics	3	elective	Junior	
230249	Solid-State Electronics Laboratory-Semiconductor	3	elective	Junior	
230250	Physics for Solid-State Electronics	3	elective	Junior	
230251	Nano CMOS Devices	3	elective	Junior	
230252	Advanced analog integrated circuit design	3	elective	Junior	
230253	FPGAHardware Description Language and FPGA	3	elective	Junior	

230254	Semiconductor Devices for Integrated Circuits	3	elective	Junior	
230255	Integrated Circuits Fabrication Technology(I)	3	elective	Junior	
230256	Integrated Circuits Fabrication Technology(II)	3	elective	Junior	
230257	VLSIAnalog VLSI Circuits Design	3	elective	Junior	
230258	Analog and Digital Signal Converter Design	3	elective	Junior	
230259	Analog VLSI System Design Applications	3	elective	Junior	
230260	RF Integrated Circuit Design	3	elective	Junior	
230261	Introduction to Wireless Power Transfer (WPT) fo	3	elective	Junior	
230262	RFIDRFID Chip Design	3	elective	Junior	
230263	Solar Cells	3	elective	Junior	
230264	Microwave Devices	3	elective	Junior	
230265	Microwave Circuits	3	elective	Junior	

230266	Microwave Engineering	3	elective	Junior	
230267	Microwave Passive Circuits	3	elective	Junior	
230268	Planar Antenna Design	3	elective	Junior	
230269	Antenna Array Design	3	elective	Junior	
230270	Numerical Methods in Electromagnetics	3	elective	Junior	
230271	Electromagnetic Compatibility	3	elective	Junior	
230272	Biomedical Electronics	3	elective	Junior	
230273	Linear System Theory	3	elective	Junior	
230274	Digital Signal Processing	3	elective	Junior	
230275	Digital Video Technology	3	elective	Junior	
230276	Digital Communication Theory and Technology	3	elective	Junior	
230277	Hardware/Software Codesign	3	elective	Junior	

230278	Pattern Recognition	3	elective	Junior	
230279	Detection and Estimation	3	elective	Junior	
230280	Mobile Network Systems	3	elective	Junior	
230281	Computer Network	3	elective	Junior	
230282	Wireless Communication	3	elective	Junior	
230283	Introduction to 5G Wireless Communication Syste	3	elective	Junior	
230284	Software Radio	3	elective	Junior	
230285	New-Generation Wireless Communication Techni	3	elective	Junior	
230286	Wireless Communication Systems	3	elective	Junior	
230287	Wireless Receiver Simulation and Implementation	3	elective	Junior	
230288	MATLABApplication of MATLAB in Electrical I	3	elective	Junior	
230289	MATLABMATLAB Programming in Machine Le	3	elective	Junior	

230290	Artificial intelligence and fuzzy neural network	3	elective	Junior	
230291	Artificial Intelligence and Neural Network	3	elective	Junior	
230292	TensorFlowProgramming and Implementations of	3	elective	Junior	
230293	Deep Learning and Speech Recognition	3	elective	Junior	
230294	Special Topics on Deep Machine Learning	3	elective	Junior	
230295	Intelligent and Adaptive Control	3	elective	Junior	
230296	Intelligent Robotics-Principles and Control	3	elective	Junior	
230297	Advanced Programming in Robotic Navigation	3	elective	Junior	
230298	Technical Presentation	3	elective	Junior	
230299	Phase Lock Loop Design	3	elective	Junior	