

# 宁波东方理工大学

## 2025 级电子科学与技术本科专业培养方案

Curriculum for the Program of Electronic Science and Technology (2025)

Eastern Institute of Technology, Ningbo

### 一、专业介绍 Introduction to the Program

电子科学与技术专业深度融合集成电路、通信、人工智能等前沿科技领域，聚焦半导体芯片和5G/6G通信等领域的难题，设置集成电路、5G/6G通信技术等方向，注重原创性基础研究与工程技术人才培养相结合。专业以实践教学与AI辅助教学结合为特色，强化学生自主创新能力，培养国际视野。师资队伍现有20余位全职专任教师，包括1名加拿大工程院院士、3名国际学术机构会士（Fellow）及7名国家级人才。教师团队均具有博士学位，90%以上具有海外背景，研究聚焦集成电路，涵盖EDA、光电子、微纳加工等领域。本专业核心课程包括电路分析基础、半导体物理与器件、模拟集成电路设计、数字集成电路设计、数字信号处理、光电子学和集成电路综合专题实验等应用领域广泛。毕业生可就业于集成电路、电子信息、通信、光电等行业，也可赴国内外顶尖高校深造。

The Program in Electronic Science and Technology strongly integrates cutting-edge fields such as integrated circuits, communications, and artificial intelligence. With a focus on critical challenges in semiconductor chips and next generation 5G/6G communications, the program offers specialized tracks in areas such as integrated circuits and advanced communication technologies. It emphasizes the synergy between pioneering fundamental research and the cultivation of world-class engineering talent. Blending practical training and AI-assisted teaching, the program strengthens students' capacity for independent innovation and fosters a global vision. Its distinguished faculty includes more than 20 full-time professors, among them one Canadian Academy of Engineering Fellow, three fellows of international academic institutions, and seven national-level talents. Over 90% of the faculty have overseas experience and all hold doctoral degrees— their research focuses on integrated circuits, spanning EDA, optoelectronics, and micro-nano processing. Core courses in the program include Fundamentals of Circuit Analysis, Semiconductor Physics and Devices, Design of Analog CMOS Integrated Circuits, Digital VLSI Design, Digital Signal Processing, Optoelectronics, and the Microelectronics Lab, among others. Graduates are well-prepared to pursue careers in electronics, communications, IC design, and related industries, or to advance their studies at top universities worldwide.

### 二、培养目标 Program Objective

本专业面向国家实现高水平科技自立自强的战略需求，培养专业基础理论扎实，工程实践与创新能力强，致力于解决电子与集成电路领域基础理论和关键技术问题、引领电子科技发展的拔尖创新人才。学生毕业后五年左右的预期目标包括：

This program is designed to support the national strategic goal of achieving high-level technological self-reliance and innovation. It aims to cultivate top-tier, innovative talents with a solid foundation in knowledge and theories in the field of Electronics and

Integrated Circuits, strong engineering practice, and creative problem-solving abilities. These graduates will be committed to addressing fundamental and critical challenges, and to driving future developments in Electronic Science and Technology. Graduates are expected to achieve the following attributes within approximately five years after graduation:

1.具备家国情怀、国际视野，拥有良好的职业道德、社会责任感、领导力等人文素养；面对挫折保持韧性，坚持追求卓越；

Demonstrate a strong sense of national commitment and global vision, with sound professional ethics, social responsibility, and leadership, as well as well-rounded character. Show resilience in the face of challenges and remain committed to the pursuit of excellence.

2.掌握扎实的数理化信基础、电子科技领域多学科交叉领域知识，具有从事高水平电子科技创新工作的专业能力，以及解决电子科技领域复杂工程问题的能力；

Have a solid foundation in mathematics, physics, chemistry, and information science, along with disciplinary and interdisciplinary knowledge in the field of Electronic Science. Demonstrate professional competence to engage in high-level innovative activities and the ability to solve complex engineering problems in the field.

3.具有思辨能力、创造性思维和工程理念，具有良好的表达与沟通能力，具备团队合作和终身学习能力。

Exhibit critical thinking, creative problem-solving, and engineering awareness, together with strong communication skills, teamwork capabilities, and a lifelong learning mindset and aptitude.

### 三、培养要求 Graduate Outcomes

1.工程知识：熟练掌握数学、物理、化学和计算机等自然科学和工程科学基础知识，熟练掌握电子科学与技术领域的工程技术知识和实践技能，具备解决电子科技领域复杂工程和科学问题的能力。

**Science and Engineering Knowledge:** Master fundamental knowledge in mathematics, physics, chemistry, and computer science, as well as foundational engineering science. Possess solid engineering knowledge and practical skills related to Electronic Science and Technology, and demonstrate the ability to identify, analyze, and solve complex scientific and engineering problems in this field.

2.问题分析：能够运用科学原理、工程知识与技能、数学和计算工具、文献调研等途径分析复杂的电子科学与工程问题，综合考虑可持续发展的要求，识别关键环节。

**Problem Analysis:** Apply scientific principles, engineering knowledge and skills, mathematical and computational tools, and literature research to analyze complex engineering problems related to Electronic Science, with a comprehensive understanding of sustainability requirements to identify key factors.

3.设计/开发解决方案：能够运用专业知识，综合考虑健康、安全与环境、全生命周期成本与净零碳要求、法律与伦理、社会与文化等因素，设计和开发解决

方案来满足特定的系统与流程要求，并体现创新性。

**Design/Development of Solutions:** Utilize professional knowledge to design and develop solutions for systems and processes related to Electronic Science. These solutions should account for health, safety, and environmental considerations, life-cycle cost and net-zero carbon requirements, legal and ethical constraints, and social and cultural factors, while reflecting innovation.

**4.研究:** 能够运用科学原理和科学方法，探索和研究电子科学与技术领域中的科学和复杂工程问题，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

**Research:** Apply scientific principles and methodologies to investigate complex problems in the field of Electronic Science and Technology. This includes designing experiments, analyzing and interpreting data, and drawing valid and effective conclusions through the synthesis of information.

**5.使用现代工具:** 能够正确选择现代工程和信息技术工具来测试、分析、模拟电子科学与技术相关的工程系统，研究、解决相关工程和科学问题，了解所选用工具的特性和局限性。

**Modern Tool Usage:** Select and utilize appropriate modern engineering and IT tools to test, analyze, and simulate systems in Electronic Science and Technology. Understand the features and limitations of the chosen tools while applying them to address relevant engineering and scientific challenges.

**6.工程与可持续发展:** 在解决电子科学与技术领域内的复杂工程问题时，能够运用相关技术和知识分析和评价电子科学与技术工程实践和相关科研对健康、安全、环境、法律以及经济和社会可持续发展的影响，并理解应承担的责任。

**Engineering and Sustainable Development:** When addressing complex engineering problems in the field of Electronic Science and Technology, assess and evaluate the impact of engineering practices and research on health, safety, environment, law, and the sustainable development of the economy and society. Understand and undertake the corresponding responsibilities.

**7.工程伦理和职业规范:** 自觉践行社会主义核心价值观，树立正确世界观和人生观，有工程报国、为民造福的意识，具有人文社会科学素养和社会责任感。了解电子科学与技术相关的政策、法律法规和行业标准，能够理解工程伦理知识、具备工程伦理意识，并践行工程伦理，在工程实践中理解并遵循职业道德、伦理规范 and 相关法律，恪尽职守。

**Engineering Ethics and Professional Norms:** Consciously uphold the core socialist values and cultivate a correct worldview and outlook on life. Possess a sense of national service and public welfare, along with a solid foundation in humanities and social sciences and a strong sense of social responsibility. Understand relevant policies, laws, regulations, and industry standards in Engineering, demonstrate awareness and understanding of engineering ethics, and apply ethical principles and professional codes in practice.

**8.个人和团队:** 理解团队合作对于解决复杂工程问题的意义，能够在多样化、多学科背景下的团队中扮演不同角色，协作完成任务，并展现领导力，创建协作

包容的工作环境，共同设立目标、制定计划并实现目标。

**Individual and Teamwork:** Recognize the importance of teamwork in solving complex engineering problems. Be able to assume various roles in diverse, interdisciplinary teams, collaborate effectively, demonstrate leadership, and foster an inclusive working environment. Set shared goals, plan strategically, and work towards achieving collective objectives.

**9.沟通:** 具备国际视野，能够在跨文化背景下就电子科学与技术领域相关学术问题及复杂工程问题与同行及公众进行有效的沟通和交流，包括撰写报告、设计文稿、陈述发言等，理解、尊重语言和文化差异。

**Communication:** Possess a global perspective and communicate effectively with peers and the public on academic and complex engineering issues related to Electronic Science and Technology in cross-cultural contexts. This includes writing reports, designing presentations, delivering oral communications, and appreciating linguistic and cultural diversity.

**10.项目管理:** 理解并掌握工程项目相关的管理和经济决策的原理和方法，能够对电子科学与技术工程项目进行分析、评估和管理。

**Project Management:** Understand and apply the principles and methodologies of project management and economic decision-making in engineering projects. Be able to analyze, evaluate, and manage projects related to Electronic Science and Technology.

**11.终身学习:** 具有自主学习、终身学习的意识和能力，持续关注并跟进电子科学与技术领域的最新发展和前沿动态，汲取新知识，培养新能力，持续提高专业素养，理解技术变革对工程和社会的影响，适应新技术变革。

**Lifelong Learning:** Demonstrate self-directed and lifelong learning capabilities. Stay informed of the latest advancements and frontiers in Electronic Science and Technology, continuously acquire new knowledge and skills, enhance professional competence, understand the impact of technological changes on engineering and society, and adapt to new technological developments.

#### 四、培养特色 Program Highlights

人工智能（AI）时代背景下，本专业结合实践教学与AI辅助教学，培养学生的自主学习、知识融通与实践创新能力；顺应电子科学与技术行业的发展趋势，突出集成电路特色，培养具有思辨能力及国际化视野的拔尖创新人才。具体培养特色包括：

In the era of artificial intelligence (AI), this program integrates hands-on practice with AI-assisted teaching to foster students' abilities in self-directed learning, knowledge integration, and innovative problem-solving. In alignment with the evolving trends in the electronics and technology industry, the program emphasizes integrated circuits and aims to cultivate top-tier, innovative professionals with critical thinking skills and a global perspective. Key features of the program include:

**1.强化通识教育:** 全校课程设置采用“1+3”模式，第一学年不分专业，在强化数理化基础和计算能力的同时，强化科技教育与人文教育协同，提高学生创新意识，提升写作与沟通能力；学生在第二学期末开始选择专业，之后进入为期两年

的专业培养；第四学年在上专业与选修课的同时，进行创新实践与毕业设计。

**Emphasis on General Education:** The university adopts a ‘1+3’ curriculum structure: during the first academic year, students are not assigned to a specific major, enabling them to build a strong foundation in mathematics, physics, chemistry, and computational thinking ability. The program emphasizes a coordinated development of science, technology, and humanities to enhance creativity, writing, and communication skills. Students will select their majors at the end of the second term and, thereafter, enter two years of specialized study. In the fourth year, students will work on their graduation project while taking major electives.

**2.书院制培养:** 实行书院制和生活导师制，开展全员、全过程、全方位育人，致力于培养学生的表达与沟通能力、团队协作能力、领导力等综合素质。

**Residential College Model:** A residential college and mentorship system is in place to support holistic education through all stages of student development. This model aims to cultivate students’ communication, teamwork, and leadership abilities, as well as their overall personal growth.

**3.本研贯通:** 实行学术导师制，强化科研与创新能力培养；鼓励学生及早参与科研创新活动，融合为期一年的本科“创新实践与毕业设计”与科研课题，为学生进入国内外大学攻读硕、博研究生学位提前做好准备，加速急需拔尖人才培养。

**Integrated Undergraduate–Graduate Pathways:** An academic advisory system is implemented to strengthen research and innovation training. Students are encouraged to participate in research projects early on, with the year-long “Innovation Practice and Graduation Project” closely integrated with faculty-led research. This approach prepares students for advanced study at top universities in China and abroad, and accelerates the development of top-tier innovative professionals in high demand.

**4.加强科教实践:** 促进产教融合，设置夏季学期实践必修课程，鼓励参与夏季学期科研，系统化支持学生进入科研机构、企事业单位等，参与以实践项目为驱动的全过程人才培养。

**Enhanced Scientific and Industrial Practice:** To promote university-industry collaboration, a compulsory summer practice module is offered. Students are encouraged to participate in research activities during the summer term and are systematically supported in engaging with research institutes, enterprises, and organizations through project-based learning experiences.

**5.国际化培养:** 发挥国际化师资优势，专业课实行双语教学，支持学生赴世界一流大学与机构参与国际交流、项目合作，拓宽视野，提升国际竞争力。

**Global Competence Development:** Leveraging a globally oriented faculty team, the program incorporates bilingual instruction in core courses and supports student participation in international exchanges and collaborative projects at top world institutions, broadening their horizons and enhancing global competitiveness.

**6.智能化教育:** 探索 AI 时代的教学变革，利用智能工具提高知识传授与学习效率；开设人工智能通识课，培养学生利用数字资源和智能工具的自主学习能力。

**AI for Education:** Explore teaching transformation in the AI era, and enhance teaching and learning efficiency by making use of AI tools; Offer Introduction to AI course, enabling students to develop self-education abilities with digital resources and AI tools.

### 五、学制和授予学位 Program Duration and Degree Awarded

**专业学制:** 基本学制4年，采用学分制管理，实行弹性学习年限，最多不超过6年。

**授予学位:** 对完成并符合培养方案学位要求的学生，授予工学学士学位。

**Program Duration:** The standard duration of the program is four years. A credit-based management system is adopted, with maximum 6 years of study.

**Degree Awarded:** Students who have completed the program and met the degree requirements stipulated in this Program Curriculum will be awarded the Bachelor of Engineering degree.

### 六、毕业学分要求 Credit Requirements for Graduation

毕业最低学分要求为 155 学分。课程结构要求如下：

A minimum of 155 credits is required for graduation. The curriculum structure is as follows:

课程模块 Module	课程要求 Requirement	课程类别 Category	学分 Credits
通识与基础课程 General Education and Foundational Module (81学分/Credits)	必修 Required	公共通识必修课 General Education Required Courses	41
		理工基础课 Fundamental Science and Engineering Courses	32
	选修 Elective	通识选修课 General Education Elective Courses	8
专业课程 Major-specific Module (54学分/Credits)	必修 Required	学科基础课程 Discipline-specific Foundational Module	20
	必修 Required	专业核心课 Major Core Courses	25
	选修 Elective	专业选修课 Major Elective Courses	9
集中实践环节 Intensive Practical Training Module (20学分/Credits)	必修 Required	夏季学期实践 Internship	12 (24周 /Weeks)
		创新实践与毕业设计 Capstone Project	8 (32周 /Weeks)
毕业学分要求 Graduation Credits Requirement			155

基于国标要求的各指标如下： Credit Distribution Against National Standard Requirements

课程类别 Category	学分 Credits	所占比例 Percentage (%)	国标要求 National Standard (%)
通识教育类 General Education Module	81	52.3%	40%
思想政治教育和人文社会科学课程 Ideological, Political Theory, Humanities, and Social Sciences Module	41	26.5%	15%
数学和自然科学课程 Mathematics and Natural Sciences Module	32	20.6%	15%
专业教育类 Discipline-Specific Education	74	47.7%	50%
学科基础及专业类课程 Discipline-specific Foundational Module and Major Specialization Module	54	34.8%	30%
综合教育类 Holistic and Integrated Module	33	21.3%	10%
实践与实训教学（含课程实验折合学分） Practical training module	51.5	33.2%	25%
注：上表中，实践与实训环节学分未包含选修课实践学分。 The credit for the practical training module excludes practical credits from elective courses.			

## 七、主要课程设置 Core Courses

电路分析基础、信号与系统、模拟电子技术、数字电子技术、电磁场与电磁波、数据结构与算法、数字信号处理、模拟集成电路设计、光电子学、半导体物理与器件、数字集成电路设计、集成电路综合专题实验。

Fundamentals of Circuit Analysis, Signals and Systems, Analog Electronics, Digital Electronics, Electromagnetic Fields and Waves, Data Structures and Algorithms, Digital Signal Processing, Design of Analog CMOS Integrated Circuits, Optoelectronics, Semiconductor Physics and Devices, Digital VLSI Design, Microelectronics Lab.

## 八、主要实践性教学环节和主要专业实验

### Practical Training Activities and Major Experiments

主要实践性教学环节包括：夏季学期认知实践、专业实践和创新实践，第四学年全年创新实践与毕业设计，以及各类国内外本科生学术竞赛、创新大赛等。另外，本科生入学即选择学术导师团队，及早参与科研，期间可以选择与夏季学期实践、第四学年创新项目相融合。

Practical Training Activities: Summer Internship I, Summer Internship II, Summer Internship III, Capstone Project, and Undergraduate Academic Competitions. Undergraduates join faculty mentors upon enrollment for early research exposure, which can be integrated with summer Internship and Capstone Project.

主要专业实验包括：电路分析基础、信号与系统、模拟电子技术、数字电子技术、电磁场与电磁波、数据结构与算法、数字信号处理、模拟集成电路设计、光电子学、半导体物理与器件、数字集成电路设计、集成电路综合专题实验、通

信原理、集成电路工艺与封装、高频电子线路、自动控制原理、微波工程、微电子器件与应用、集成电路EDA、射频电路设计、集成光子学、数字系统设计。

Experiments: Fundamentals of Circuit Analysis, Signals and Systems, Analog Electronics, Digital Electronics, Electromagnetic Fields and Waves, Data Structures and Algorithms, Digital Signal Processing, Design of Analog CMOS Integrated Circuits, Optoelectronics, Semiconductor Physics and Devices, Digital VLSI Design, Microelectronics Lab, Fundamentals of Communication Systems, Processing and Packaging of Integrated Circuits, High-Frequency Electronic Circuits, Principles of Automatic Control, Microwave Engineering, Microelectronic Devices and Applications, Electronic Design Automation for Integrated Circuits, Radio Frequency Circuit Design, Integrated Photonics, Digital System Design.

详细内容请参见附表一。

For details, please refer to Appendix Table 1.

## 九、课程设置与要求 Course Structure and Requirements

### (一) 通识与基础课程 General and Foundational Module

#### 1. 公共通识必修课 General and Foundational Courses

##### (1) 思想政治理论课 Ideological and Political Theory Courses

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
GENE1101	思想道德与法治 Ethics and Rule of Law	必 Required	3	1	3	无 None	1/秋 Y1/Fall
GENE1102	马克思主义基本原理 Basic Principles of Marxism	必 Required	3	1	3	无 None	1/春 Y1/Spring
GENE2101	中国近现代史纲要 Modern Chinese History: A Survey	必 Required	3	1	3	无 None	2/秋 Y2/Fall
GENE2102	毛泽东思想和中国特色社会 主义理论体系概论 Introduction to Maoism and Chinese Socialism	必 Required	2		2	无 None	2/春 Y2/Spring
GENE3101	习近平新时代中国特色社会主义思想 概论 Introduction to Xi Thought on Chinese Socialism	必 Required	3	1	3	无 None	3/秋 Y3/Fall
GENE1103	形势与政策I Society and Public Policy in Contemporary China I	必 Required	0.5		0.5	无 None	1/秋 Y1/Fall
GENE1104	形势与政策II Society and Public Policy in Contemporary China II	必 Required	0.5		0.5	无 None	1/春 Y1/Spring
GENE2103	形势与政策III Society and Public Policy in Contemporary China III	必 Required	0.5		0.5	无 None	2/秋 Y2/Fall
GENE2104	形势与政策IV Society and Public Policy in Contemporary China IV	必 Required	0.5		0.5	无 None	2/春 Y2/Spring
GENE3301	思想政治理论课实践 Political Theory and Ideology: Experiential Learning	必 Required	2	2	2	无 None	3/秋 Y3/Fall
GENE3302	劳动教育实践 Practical Labor Education	必 Required	1	1	2	无 None	*
小计/Subtotal			19	7	20		
*具体见通识培养方案 For details, please refer to the Curriculum for General Education.							

(2) 军事体育健康课 Military, Physical Education, and Health Courses

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
GENE1001	军事技能训练 Military Skills Training	必 Required	2	2		无 None	夏 Summer
GENE1002	军事理论与国家安全教育 Military Theory	必 Required	3			无 None	夏 Summer
GENE1401	体育与健康I Physical Education I	必 Required	0.5	0.5	2	无 None	1/秋 Y1/Fall
GENE1402	体育与健康II Physical Education II	必 Required	0.5	0.5	2	无 None	1/春 Y1/Spring
GENE2401	体育与健康III Physical Education III	必 Required	0.5	0.5	2	无 None	2/秋 Y2/Fall
GENE2402	体育与健康IV Physical Education IV	必 Required	0.5	0.5	2	无 None	2/春 Y2/Spring
GENE3401	体育与健康V Physical Education V	必 Required	0.5	0.5	2	无 None	3/秋 Y3/Fall
GENE3402	体育与健康VI Physical Education VI	必 Required	0.5	0.5	2	无 None	3/春 Y3/Spring
小计/Subtotal			8	5	12		

(3) 语言和沟通技能提升课 Language and Communication Skills Courses

英语实行 ABC 三级分级教学，根据不同等级要求，总计修满 12 学分。

The English curriculum follows a three-tier A, B, and C level system. Students are required to complete a total of 12 credits according to their assigned level.

课程代码 Course Code	课程名称 Course Name	必修选修 Required / Elective	要求 Requirements	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
LC1501	大学英语I-A General Academic English I-A	必 Required	A级修读 Required for Level A	3		4	无 None	1/秋 Y1/Fall
LC1502	大学英语II-A General Academic English II-A	必 Required		3		4	LC1501	1/春 Y1/Spring
LC2501	大学英语III-A General Academic English III-A	必 Required		3		4	LC1502	2/秋 Y2/Fall
LC1503	大学英语I-B General Academic English I-B	必 Required	B级修读 Required for Level B	3		4	无 None	1/秋 Y1/Fall
LC1504	大学英语II-B General Academic English II-B	必 Required		3		4	LC1503	1/春 Y1/Spring
LC2502	大学英语III-B General Academic English III-B	必 Required		3		4	LC1504	2/秋 Y2/Fall
LC1505	大学英语I-C General Academic English I-C	必 Required	C级修读 Required for Level C	3		4	无 None	1/秋 Y1/Fall
LC1506	大学英语II-C General Academic English II-C	必 Required		3		4	LC1505	1/春 Y1/Spring
LC2503	大学英语III-C General Academic English III-C	必 Required		3		4	LC1506	2/秋 Y2/Fall
LC2504	学术英语写作 与交流 Academic Writing and Presentation	必 Required	所有学生修读 Required for All Levels (A, B, C)	3		4	LC2501/ LC2502/ LC2503	2/春 Y2/Spring
小计/Subtotal				30		40		

其他沟通技能提升课程要求如下： Other requirements:

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
GENE2301	沟通与协作 Communication and Collaboration	必 Required	2		2	无 None	2/秋 Y2/Fall
小计/Subtotal			2		2		

## 2.理工基础课 Fundamental Science and Engineering Courses

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
MATH1101	高等数学I Calculus I	必 Required	4		5	无 None	1/秋 Y1/Fall
MATH1102	高等数学II Calculus II	必 Required	4		5	MATH1101	1/春 Y1/Spring
MATH1103	线性代数 Linear Algebra	必 Required	3		4	无 None	1/秋 Y1/Spring
MATH2101	概率论与数理统计 Probability Theory and Mathematical Statistics	必 Required	3		3	MATH1102	2/秋 Y2/Fall
PHYS1101	大学物理I General Physics I	必 Required	4		4	无 None	1/秋 Y1/Fall
PHYS1102	大学物理II General Physics II	必 Required	4		4	PHYS1101	1/春 Y1/Spring
PHYS1301	大学物理实验I General Physics Experiments I	必 Required	1	1	1	无 None	1/秋 Y1/Fall
PHYS1302	大学物理实验II General Physics Experiments II	必 Required	1	1	1	PHYS1301	1/春 Y1/Spring
CHEM1101	大学化学 General Chemistry	必 Required	3	1	3	无 None	1/春 Y1/Spring
CS1001	人工智能通识 Introduction to AI	必 Required	2	1	2	无 None	1/秋 Y1/Fall
CS1101	Python程序设计基础 Fundamentals of Python Programming	必 Required	3	1	3	无 None	1/春 Y1/Spring
小计/Subtotal			32	5	35		

## 3.通识选修课程修读要求 Requirements for General Education Elective Courses

下列类型课程有最低学分修读要求

The following types of courses have a minimum credit requirement.

课程类型 Course Type	必修选修 Required/ Elective	最低学分 要求 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	推荐修读学期 Recommended Term
人文社科类通识课 Humanity and Social Science	选 Elective	2		2		2/秋 Y2/Fall
艺术类通识课 Arts	选 Elective	2		2		2/春 Y2/Spring
创新创业类通识课 Entrepreneurship	选 Elective	2	0.5	2		3/秋 Y3/Fall
其他通识课 Others	选 Elective	2		2		3/春 Y3/Spring
小计/Subtotal		8	0.5	8		

## (二) 专业课程 Major-specific Module

### 1. 学科基础课程 Discipline-specific Foundational Module

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
EE2301	电路分析基础 Fundamentals of Circuit Analysis	必 Required	4	1	4	MATH1101 MATH1103	2/秋 Y2/Fall
EE2302	信号与系统 Signals and Systems	必 Required	4	1	4	MATH1102	2/秋 Y2/Fall
EE2303	模拟电子技术 Analog Electronics	必 Required	4	1	4	PHYS1102 EE2301	2/春 Y2/Spring
EE2304	数字电子技术 Digital Electronics	必 Required	4	1	4	PHYS1102	2/春 Y2/Spring
EE2305	电磁场与电磁波 Electromagnetic Fields and Waves	必 Required	4	1	4	EE2301	2/春 Y2/Spring
小计/Subtotal			20	5	20		

### 2. 专业核心课 Major Core Courses

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
CS2201	数据结构与算法 Data Structures and Algorithms	必 Required	4	2	4	CS1101	2/秋 Y2/Fall
EE2306	半导体物理与器件 Semiconductor Physics and Devices	必 Required	4	1	4	PHYS1102	2/春 Y2/Spring
EE3301	模拟集成电路设计 Design of Analog CMOS Integrated Circuits	必 Required	4	1	4	EE2302 EE2303	3/秋 Y3/Fall
EE3302	数字信号处理 Digital Signal Processing	必 Required	3	1	3	EE2302	3/秋 Y3/Fall
EE3303	光电子学 Optoelectronics	必 Required	4	1	4	PHYS1102	3/春 Y3/Spring
EE3304	数字集成电路设计 Digital VLSI Design	必 Required	4	1	4	EE2304	3/春 Y3/Spring
EE4301	集成电路综合专题实验 Microelectronics Lab	必 Required	2	2	2	EE3301 EE3304	4/秋 Y4/Fall
小计/Subtotal			25	9	25		

3. 专业选修课（至少修读 9 学分，可自主修读，也可参考附表二的推荐修读“套餐”）

Major Elective Courses (A minimum of 9 credits must be completed. Students may choose courses freely or follow the recommended 'bundles' outlined in Appendix Table 2.)

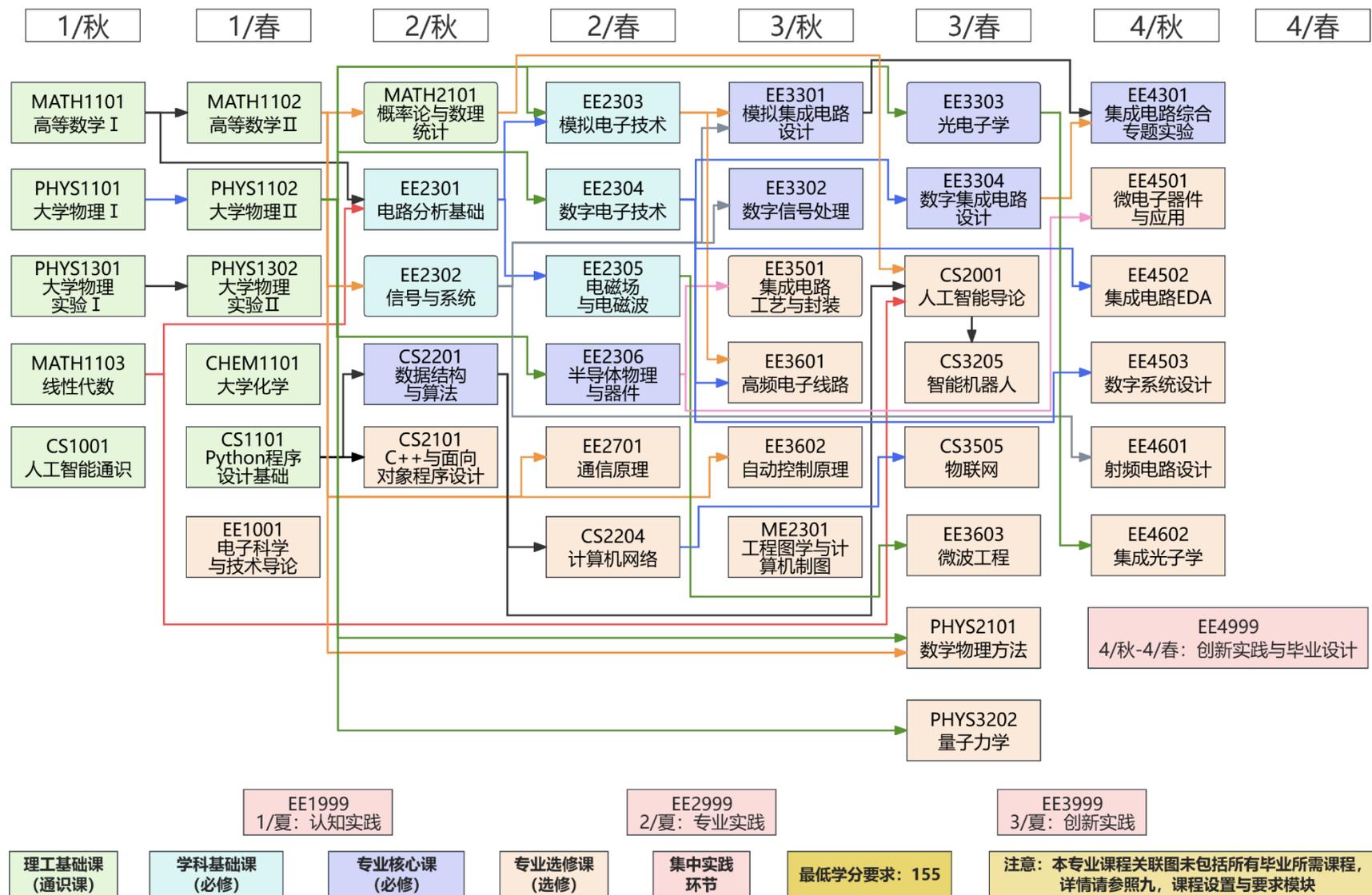
课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
EE1001	电子科学与技术导论 Electronic Science and Technology-An Overview	选 Elective	1		1	无 None	1/春 Y1/Spring
CS2101	C++与面向对象程序设计 C++ and Object-Oriented Programming	选 Elective	3	1	3	CS1101	2/秋 Y2/Fall
EE2701	通信原理 Fundamentals of Communication Systems	选 Elective	4	1	4	MATH1102	2/春 Y2/Spring
CS2204	计算机网络 Computer Networks	选 Elective	3	1	3	CS2201	2/春 Y2/Spring
EE3501	集成电路工艺与封装 Processing and Packaging of Integrated Circuits	选 Elective	3	1	3	EE2306	3/秋 Y3/Fall

EE3601	高频电子线路 High-Frequency Electronic Circuits	选 Elective	4	1	4	EE2303 EE2304	3/秋 Y3/Fall
EE3602	自动控制原理 Control Theory	选 Elective	3	1	3	MATH1102	3/秋 Y3/Fall
ME2301	工程图学与计算机制图 Engineering Drawing and Computer-aided Design	选 Elective	2	1	2	无 None	3/秋 Y3/Fall
CS3205	智能机器人 Intelligent Robots	选 Elective	3	1	3	CS2001	3/春 Y3/Spring
CS2001	人工智能导论 Artificial Intelligence-An Overview	选 Elective	4	2	4	CS2201 MATH1103 MATH2101	3/春 Y3/Spring
CS3505	物联网 Internet of Things (IoT)	选 Elective	3	1	3	CS2204	3/春 Y3/Spring
EE3603	微波工程 Microwave Engineering	选 Elective	3	1	3	EE2305	3/春 Y3/Spring
PHYS2101	数学物理方法 Mathematical Physics	选 Elective	4		4	MATH1102 PHYS1102	3/春 Y3/Spring
PHYS3202	量子力学 Quantum Mechanics	选 Elective	4		4	PHYS1102	3/春 Y3/Spring
EE4501	微电子器件与应用 Microelectronic Devices and Applications	选 Elective	3	1	3	EE2306	4/秋 Y4/Fall
EE4502	集成电路EDA Electronic Design Automation for Integrated Circuits	选 Elective	3	1	3	EE2304	4/秋 Y4/Fall
EE4503	数字系统设计 Digital System Design	选 Elective	3	1	3	EE2304	4/秋 Y4/Fall
EE4601	射频电路设计 Radio Frequency Circuit Design	选 Elective	3	1	3	EE2302 EE2303	4/秋 Y4/Fall
EE4602	集成光子学 Integrated Photonics	选 Elective	3	1	3	EE3303	4/秋 Y4/Fall
小计/Subtotal			59	17	59		

### (三) 集中实践环节 Intensive Practical Training Module

课程代码 Course Code	课程名称 Course Name	必修选修 Required / Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
EE1999	认知实践 Summer Internship I	必 Required	4	4	8周/ Weeks	无 None	1/夏 Y1/Summer
EE2999	专业实践 Summer Internship II	必 Required	4	4	8周/ Weeks	无 None	2/夏 Y2/Summer
EE3999	创新实践 Summer Internship III	必 Required	4	4	8周/ Weeks	无 None	3/夏 Y3/Summer
EE4999	创新实践与毕业设计 Capstone Project	必 Required	8	8	32周/ Weeks	无 None	4/秋-4/春 Y4/Fall-Y4/Spring
小计/Subtotal			20	20	56周/ Weeks		

### 十、专业课程关联图 Roadmap for Major Courses



附表一：主要专业实验和集中实践性环节

Appendix Table 1: Major Experiments and Intensive Practical Training Activities

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
EE2301	电路分析基础 Fundamentals of Circuit Analysis	必 Required	4	1	4	MATH1101 MATH1103	2/秋 Y2/Fall
EE2302	信号与系统 Signals and Systems	必 Required	4	1	4	MATH1102	2/秋 Y2/Fall
CS2201	数据结构与算法 Data Structures and Algorithms	必 Required	4	2	4	CS1101	2/秋 Y2/Fall
EE2303	模拟电子技术 Analog Electronics	必 Required	4	1	4	PHYS1102 EE2301	2/春 Y2/Spring
EE2304	数字电子技术 Digital Electronics	必 Required	4	1	4	PHYS1102	2/春 Y2/Spring
EE2305	电磁场与电磁波 Electromagnetic Fields and Waves	必 Required	4	1	4	EE2301	2/春 Y2/Spring
EE2306	半导体物理与器件 Semiconductor Physics and Devices	必 Required	4	1	4	PHYS1102	2/春 Y2/Spring
EE3301	模拟集成电路设计 Design of Analog CMOS Integrated Circuits	必 Required	4	1	4	EE2302 EE2303	3/秋 Y3/Fall
EE3302	数字信号处理 Digital Signal Processing	必 Required	3	1	3	EE2302	3/秋 Y3/Fall
EE3303	光电子学 Optoelectronics	必 Required	4	1	4	PHYS1102	3/春 Y3/Spring
EE3304	数字集成电路设计 Digital VLSI Design	必 Required	4	1	4	EE2304	3/春 Y3/Spring
EE4301	集成电路综合专题实验 Microelectronics Lab	必 Required	2	2	2	EE3301 EE3304	4/秋 Y4/Fall
CS2101	C++与面向对象程序设计 C++ and Object-Oriented Programming	选 Elective	3	1	3	CS1101	2/秋 Y2/Fall
EE2701	通信原理 Fundamentals of Communication Systems	选 Elective	4	1	4	MATH1102	2/春 Y2/Spring
CS2204	计算机网络 Computer Networks	选 Elective	3	1	3	CS2201	2/春 Y2/Spring
EE3501	集成电路工艺与封装 Processing and Packaging of Integrated Circuits	选 Elective	3	1	3	EE2306	3/秋 Y3/Fall
EE3601	高频电子线路 High-Frequency Electronic Circuits	选 Elective	4	1	4	EE2303 EE2304	3/秋 Y3/Fall
EE3602	自动控制原理 Principles of Automatic Control	选 Elective	3	1	3	MATH1102	3/秋 Y3/Fall
ME2301	工程图学与计算机制图 Engineering Drawing and Computer-aided Design	选 Elective	2	1	2	无 None	3/秋 Y3/Fall
CS3205	智能机器人 Intelligent Robots	选 Elective	3	1	3	CS2001	3/春 Y3/Spring
CS2001	人工智能导论 Artificial Intelligence-An Overview	选 Elective	4	2	4	CS2201 MATH1103 MATH2101	3/春 Y3/Spring
CS3505	物联网 Internet of Things (IoT)	选 Elective	3	1	3	CS2204	3/春 Y3/Spring
EE3603	微波工程 Microwave Engineering	选 Elective	3	1	3	EE2305	3/春 Y3/Spring
EE4501	微电子器件与应用 Microelectronic Devices and Applications	选 Elective	3	1	3	EE2306	4/秋 Y4/Fall
EE4502	集成电路EDA Electronic Design Automation for Integrated Circuits	选 Elective	3	1	3	EE2304	4/秋 Y4/Fall
EE4601	射频电路设计 Radio Frequency Circuit Design	选 Elective	3	1	3	EE2302 EE2303	4/秋 Y4/Fall

EE4602	集成光子学 Integrated Photonics	选 Elective	3	1	3	EE3303	4/秋 Y4/Fall
EE4503	数字系统设计 Digital System Design	选 Elective	3	1	3	EE2304	4/秋 Y4/Fall
EE1999	认知实践 Summer Internship I	必 Required	4	4	8周/ Weeks	无 None	1/夏 Y1/Summer
EE2999	专业实践 Summer Internship II	必 Required	4	4	8周/ Weeks	无 None	2/夏 Y2/Summer
EE3999	创新实践 Summer Internship III	必 Required	4	4	8周/ Weeks	无 None	3/夏 Y3/Summer
EE4999	创新实践与毕业设计 Capstone Project	必 Required	8	8	32周/ Weeks	无 None	4/秋-4/春 Y4/Fall- Y4/Spring
小计/Subtotal			115	51	95+56周/ Weeks		

附表二：专业选修课修读方向推荐

可侧重修读下列 2 个方向之一的课程，为未来进入该领域的研究打下基础。

Appendix Table 2: Recommended Directions for Elective Courses in the Major.  
Students may choose to focus on one of the following 2 directions, laying a foundation for future research in the field.

方向一：集成电路方向 Direction 1: Integrated Circuit		方向二：未来通信与自动控制 Direction 2: Future Communication and Automatic Control	
课程代码 Course Code	课程名称 Course Name	课程代码 Course Code	课程名称 Course Name
EE1001	电子科学与技术导论 Electronic Science and Technology-An Overview	EE1001	电子科学与技术导论 Electronic Science and Technology-An Overview
CS2101	C++与面向对象程序设计 C++ and Object-Oriented Programming	EE2701	通信原理 Fundamentals of Communication Systems
EE3501	集成电路工艺与封装 Processing and Packaging of Integrated Circuits	CS2101	C++与面向对象程序设计 C++ and Object-Oriented Programming
EE3601	高频电子线路 High-Frequency Electronic Circuits	CS2204	计算机网络 Computer Networks
ME2301	工程图学与计算机制图 Engineering Drawing and Computer-aided Design	EE3601	高频电子线路 High-Frequency Electronic Circuits
PHYS2101	数学物理方法 Mathematical Physics	EE3602	自动控制原理 Principles of Automatic Control
PHYS3202	量子力学 Quantum Mechanics	ME2301	工程图学与计算机制图 Engineering Drawing and Computer-aided Design
EE4501	微电子器件与应用 Microelectronic Devices and Applications	EE3603	微波工程 Microwave Engineering
EE4502	集成电路EDA Electronic Design Automation for Integrated Circuits	CS3505	物联网 Internet of Things (IoT)
EE4601	射频电路设计 Radio Frequency Circuit Design	CS2001	人工智能导论 Artificial Intelligence-An Overview
EE4602	集成光子学 Integrated Photonics	CS3205	智能机器人 Intelligent Robots
EE4503	数字系统设计 Digital System Design	PHYS2101	数学物理方法 Mathematical Physics