國立中正大學

College of Science,
National Chung Cheng University

Introduction to College of Science

Departments

- Department of Mathematics
- Department of Earth and Environmental Sciences
- Department of Physics
- Department of Chemistry and Biochemistry
- Department of Biomedical Sciences

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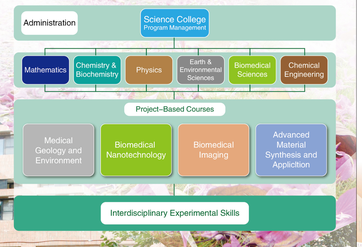
College of Science

In August 1991, National Chung Cheng University founded the College of Science with the integration of three graduate schools, which were the Institute of Applied Mathematics, the Institute of Seismology, and the Institute of Physics. Today, the College of Science comprises five departments: the Department of Mathematics, the Department of Earth and Environmental Sciences, the Department of Physics, the Department of Chemistry, and the Department of Biomedical Sciences.

The College of Science at National Chung Cheng University seeks to shape our students to excel in scientific research, application, and education. The goal of this college is to equip students with the ability to think and solve problems independently and scientifically. The college values theory as much as application and technology as much as humanities, allowing students to be innovative, practical, and of cross-disciplinary problem-solving ability, while exhibiting teamwork and humanism qualities along with good communication skills.

With the urgent demand for cross-disciplinary workers in high-tech industries as well as the required cross-disciplinary training in cutting edge research institutes, the College of Science started an all-English credit program in science, technology, environment and mathematics in 2019. With this novel method of learning as the foundation, we provide a new platform without traditional restraints to prepare our students in becoming a cross-disciplinary talent with international perspective.

STEM Program Structure



Department of Mathematics

History

The establishment of the Department of Mathematics has been aimed to develop various mathematical fields and to cultivate scientific personnel with creative thinking and problem-solving skills for interdisciplinary technological development. The Institute of Applied Mathematics was set up first when National Chung Cheng University was founded in August 1989. The undergraduate program in mathematics and the Ph.D. graduate program in applied mathematics were introduced in 1992. The Institute of Mathematical Statistics was then established in 1993. The Master and Ph.D. program in mathematics were introduced separately in 1997 and 1999. In 2000, the Institute of Mathematical Statistics was renamed the Institute of Statistical Sciences. The aforementioned programs were integrated in 2009 and became what we know now as the Mathematics Department. In 2017, all the Ph.D. degree programs merged into one Ph.D. degree program in mathematical science.

Research

The research interests of our faculty focus mainly on the following: geometric analysis, algebraic number theory, differential equation, applied mathematics, statistics and probability.

Teaching Characteristics

1. Value the development of mathematical and logical reasoning and analyzing.
2. Apply mathematical knowledge to problems in other disciplines.
3. Appreciate fundamental research and encourage cross-disciplinary collaboration as well as academic exchange.
4. Emphasize the implementation of personality education and counseling mechanism.

Five-Year BS/MS Program

The Five-Year BS/MS program is instituted to encourage distinguished undergraduate students in the Department to take graduate courses prior to receiving their BS degree, which will enable them to study continuously for a shorter period of time to receive their BS and MS degrees.

Optional Program

To prepare our students for the job market, the Department offers certificates with options in applied mathematics, statistical science, physical science, computer science, and management science. These programs are provided to keep students' future career options open.

Curriculum Regulation

Program		Compulsory Credits	Elective Credits	Free Electives	General Education	Graduation Credits	Admission Pathways
B.S.		52	20	28	28	128	Placement Application, Stars Program
M.S.	Mathematics	8	16	- -	- -	24	Admissom Exam
	Applied Mathematics	8	16			24	
	Statistical Sciences	11	21			32	
Ph.D.		2	18	- -	- -	20	

Career Opportunities for Graduates

Graduates with a mathematics degree can either go for a further study at home or abroad, or land a job in a wide variety of fields, e.g. research and development, information technology, finance, statistics, and teaching.

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Department of Earth and Environmental Sciences

History

Taiwan is situated on the collision boundary between the Philippine Sea Plate and the Eurasian Plate, resulting in frequent earthquakes that make Taiwan vulnerable to natural disasters. To promote seismological researches in different spectrums, the first research institute of Seismology in Taiwan was founded in National Chung Cheng University in 1990. The Institute of Applied Geophysics was established as well in the university in 1994. In 1997, the Ph.D. graduate program in seismology was also launched to nurture prospective students in becoming advanced seismologists. In 2002, the undergraduate program covering the fields of earth sciences and environmental sciences was started in the university. The aforementioned programs were integrated in 2009 and became what we know now as the Earth and Environmental Sciences Department (EESD).

Research

EESD is the only academic department in Taiwan that integrates seismology, geophysics, geological sciences and environmental sciences in one organization. In accordance with the current development of earth and environmental sciences around the world, where environmental issues, natural hazard mitigation and energy resource exploration are popular subjects, EESD and the Department of Biomedical Sciences offer a joint program titled Environmental Biotechnology, which will lead students to become a multidisciplinary professional in environmental sciences.

(I)Seismology

Strong ground motion estimation and simulation, active faults study, numerical modeling in seismic wave propagation, earthquake geology, active structures study, earthquake source physics and mechanisms.

(II)Geology and Geophysics

Environmental geology, structural geology, numerical geodynamic modeling (oil exploration, earthquake disaster prevention), non-destructive ultrasonic testing, geophysical and seismic exploration technology (engineering geophysics, deep structure imaging techniques, propagation and scattering of acoustic waves, electromagnetic waves and elastic waves in random media, and geodesy.)

(III)Environmental Pollutions Analysis and Sustainable Use of Natural Resources

Remediation and monitoring environmental pollutions, environmental chemistry, water resource investigation and monitoring, nano-engineering in microorganism, ecology, and global environment change.

Curriculum Regulation

Program	Compulsory Credits	Elective Credits	Free Electives	General Education	Graduation Credits	Admission Pathways
B.S.	50	41	13	28	132	Placement Application, Stars Program
M.S.	7	21	- -	- -	28	Admissom Exam
Ph.D.	10	15	- -	- -	25	

Career Opportunities for Graduates

(1) Environmental Science Industry and Government：Petroleum companies, engineering consultant companies, public/private education institutions, research institutes/centers, and the Central Weather Bureau.

(2) Professional Certification：Applied Geotechnical Technician Certificate and Environmental Engineering Technician Certificate.

(3) Advanced Academic Opportunities Abroad：Students can enroll in programs such as geology, geophysics, geodesy, earth sciences, environmental sciences, and environmental engineering.

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Department of Physics

History

Following the University motto, "To innovate with earnestness; be virtuous with altruism," the Department of Physics was established in 1991 with the goal of nurturing young talents in the field of physical science for the country. Starting with the Master's program, the Department quickly launched its undergraduate program in 1992 and Ph.D. program in 1997, making itself a fully-fledged institution for both research and education in physical science.

Research

The Department aims to cultivate scientists and engineers for high-tech industries by engaging forefront researches in the fields of condensed-matter physics, theoretical and computational physics, high-energy physics, magnetism and super-conductivity, surface science, optoelectronics, atom optics and laser cooling, plasma physics, and physics of many-body systems.

The Department has active collaborations with the Institute of Physics, Academia Sinica Taipei, National Synchrotron Radiation Research Center, National Center for High-Performance Computing, Industrial Technology Research Institute, and research institutes at other universities and in industries. There have also been frequent visits of well-known scholars from abroad for research initiatives and lecture series. The Department also undertakes research projects from industries, aiming to achieve highly effective integrations between fundamental researches and industrial applications.

Curriculum Regulation

Program		Compulsory Credits	Elective Credits	Free Electives	General Education	Graduation Credits	Admission Pathways
B.S.	A	61	23	16	28	128	Placement Application, Stars Program
	B	60	24	16	28	128	
M.S.		2	24	- -	- -	26	Admissom Exam
Ph.D.		20		- -	- -	20	

Career Opportunities for Graduates

Students majoring in physics may choose to enter the job market immediately after receiving Bachelor's degrees, but most of them opt to pursue Master's degrees either in Taiwan or abroad in the fields of physics, electro-physics, applied physics, optoelectronics, material sciences, and other related disciplines. Students with Master's degrees can either pursue their PhD study or enter the job market in the areas of electronics and semiconductor industries, optoelectronics, and material sciences as research scientists, engineers, or management staffs; some others may also choose to start up their own business. Students holding PhD degrees may also take up jobs in academia. In addition to taking physics courses, the enrollment in the Teacher Education Program may offer students the opportunity to become qualified primary/high school teachers. In general, physics graduates have a broad range of career opportunities to choose from.

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Department of Chemistry and Biochemistry

History

The Department of Chemistry and Biochemistry at National Chung Cheng University, formerly the Department of Chemistry, initiated its academic activities with Master's program in August 1992. The Department launched bachelor's degree program in 1995, and began to admit overseas students in 2002. Over the years, the Department continues to grow and has become a comprehensive education system in the research fields of Chemistry and Biochemistry.

The Department of Chemistry and Biochemistry, located within the College of Science, features excellent learning environment and state-of-the-art facilities. The Department not only provides modern teaching labs of general chemistry, organic chemistry, analytical chemistry and physical chemistry, but also accommodates cutting-edge research labs that comply with regulations of safety and environmental protection.

Research

The Department currently boasts 18 full-time and 2 adjunct members. Apart from the conventional research fields, i.e. organic chemistry, inorganic chemistry, physical chemistry and analytical chemistry, nanomaterials and biochemistry are two major new research areas. All research groups have ongoing research projects in the aforementioned fields participated by graduate students and interns under the guidance of the faculty members. In addition, the Department has established the Center for Nano Bio-detection, which focuses on the research and development of novel biodiagnostics.

Curriculum Regulation

Teaching

Curriculum at the Department of Chemistry and Biochemistry is centered on traditional chemistry, accompanied by biochemistry and material chemistry.

The Department also offers optional programs in biochemistry and material chemistry, which would guide students to acquire specialized skills and knowledge.

Graduation Requirements

Program	Compulsory Credits	Elective Credits	Graduation Credits	Admission Pathways
B.S.	70	30	128	Placement Application, Stars Program
M.S.	4	20	24	Admissom Exam
Ph.D.	4	14	18	

Career Opportunities for Graduates

Bachelor of Science in Chemistry is a door-opening degree, which may lead to postgraduate study in chemistry, chemical engineering, biochemistry, molecular biology, biomedicine, pharmacy, food science and environmental science. There are ample career opportunities in industries including, but not limited to, electrical devices, electro optical sensors, chemical engineering, material science, pharmaceuticals and biotechnology. Teaching is another obvious option. All in all, graduates of Chemistry and Biochemistry have exceptional career and academic prospects.

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Department of Biomedical Sciences

History

The Institute of Molecular Biology was first founded in August 2000, offering the M.S. degree to cultivate talents specialized in biomedical science. The faculty was recruited and curriculum was organized accordingly. The Department of Life Science was established in 2003, providing undergraduate education, while the Institute of Molecular Biology started to offer the Ph.D. degree in 2005. The Institute of Biomedical Sciences was subsequently established in 2007 with the curriculum emphasizing clinical medicine related training. In 2009, in compliance with the policy of the Ministry of Education, all the education programs were merged under the Department of Life Science with undergraduate program in Life Science, M.S. and Ph.D. program in Molecular Biology, and M.S. program in Biomedical Sciences.

In addition, in order to meet the characteristics of biochemical development, the Department of Life Sciences was renamed the Department of Biomedical Sciences in 2017.

Research

Since the field of biomedical sciences is the center of the biotechnology industry, the curriculum and research in our department focus on biological medicine. Particular emphasis is placed on fundamental courses, including biochemistry, molecular biology, and cell biology. Courses discussing latest development in the post-genomic era of biomedical sciences are offered as advanced training. The research fields of the faculty include the molecular mechanisms and therapeutic strategy for cancer, autoimmune neuromuscular diseases, structures and functions of protein, developmental biology, viral replication, epigenetics, nano-medicine, system biology, bioinformatics, and physical chemistry.

Curriculum Regulation

Program	Compulsory Credits	Elective Credits	Free Electives	General Education	Graduation Credits	Admission Pathways
B.S.	61	22	17	28	128	Placement Application, Stars Program
M.S.	13	11	- -	- -	24	Admissom Exam
Ph.D.	10	8	- -	- -	18	

Career Opportunities for Graduates

Look for Employment:

Academia	research assistants in research institutes, universities, or hospitals
Industry	research assistants or sales representatives in the biotechnology industry
Teaching	teachers in junior or senior high school (after completion of required education programs)
Government	special personnel for crime scene investigation in Investigation Bureau (after passing the Special Examination for Investigative Agents in Medical Forensic Division)

Pursue Further Study:

Life Science Related	pursuing graduate studies in the fields of life sciences,such as bioinformatics, biomaterials, bioengineering, biotechnological law and management offered by domestic and foreign academic institutes
Medical Related	pursuing post-graduate medical training offered by medical schools

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