Course	Environmental Management		
Course code	04042006		
Name of teacher	WU Jing	**Title of teacher**	Professor
Hours	34	**Credits**	2

Teaching method(teaching/discussion and time allocation)

Teaching: 70%
Team work: 20%
Presentation 10%

Introduction of content

This course was designed for college students both at the graduate and PhD level, as well for anyone interested in learning about China's environmental management. The core of this course is to comprehensively and systematically summarize the policies and systems development of China's environmental management. This course has presented the authentic, multi-faceted and overall perspective of China's environmental management and demonstrated China's determination and efforts in promoting green development of Belt and Road Initiative. Greatly benefited from the precious experiences of Western Countries and the practical experiences of exploration and implementation, domestically, through these years, China's environmental management has gradually developed into a feasible, reliable and effective system. Especially, based on the idea of sustainable development, the ecological civilization construction was proposed as the China's Scheme to properly manage the relationship between environment and development, so as to better build Chinese Spirit, to reflect Chinese Value, to demonstrate Chinese Strength, and to realize Chinese Dream.

01 Basic Themes of Environmental Management
- 1.1 Scientific uncertainty
- 1.2 Market failure
- 1.3 Mismatched scale
- 1.4 Cognitive biases
- 1.5 Nontraditional interests

02 Policy considerations
- 2.1 Environmental rights
- 2.2 Sustainable development
- 2.3 Utilitarianism and cost-benefit analysis
- 2.4 Environmental justice

Part two

03 Administration on Environmental Management
- 3.1 The History of the MEE

17.5 Recommendations for Promoting CP Development in China
17.6 Conclusions

18 Ecological Compensation
18.1 Introduction
18.2 Development of ECMs
18.3 Financial Sources for ECM in China
18.4 Major Ecological Engineering Projects in China
18.5 ECM for Sector
18.6 ECM at local level
18.7 Conclusions

Examination method (open-book exam, close-book exam or literature review etc.)

The course grade will be determined as follows:
50% Essay
50% Term paper

Textbooks

吴婧,张一心. 中国环境管理：政策与制度（Environmental Management in China-Policies and Institutions），化学工业出版社&斯普林格出版社（Springer Nature Singapore Pte Ltd.），2020 年 10 月，ISBN 9787122375889
Environmental Management in China: Policies and Institutions
https://www.springer.com/gp/book/9789811548932

Reference books
N/A

Others

Course	Progress in resource cycle science and engineering		
Course code			
Name of teacher	Mo Zhang	**Title of teacher**	Associate Professor
Hours	34	**Credits**	2

Teaching method(teaching/discussion and time allocation)

Teaching 28 hours, discussion 6 hours

Introduction of content

This course combines the frontier of resource cycle science and engineering discipline and the development status of the industry at home and abroad, and teaches students the knowledge related to the discipline by means of expert lectures, one theme at a time, centering on the progress of resource cycle science and engineering field.

Combining with the cutting-edge research achievements and innovative application technology of resource cycle science and engineering, students' comprehensive ability of scientific thinking and solving practical problems is cultivated.

Examination method (open-book exam, close-book exam or literature review etc.)

Course essay

Textbooks

Reference books

Others

Course	Biomass and bioenergy		
Course code	04022064		
Name of teacher	Xinhua Qi	Name of teacher	Xinhua Qi
Hours	34	Hours	34

Teaching method(teaching/discussion and time allocation)

Teaching, discussion and reports on the recent research progress are included, where teaching accounts for 20 hours, discussion and reports on the recent research progress accounts for 14 hours.

Introduction of content

This course mainly focus on the recent research and application progress of the transformation of biomass resources into value-added chemicals, biofuels and bio-based materials. Through the introduction on relative theory, basic knowledge and the latest development in biomass and biofuels, the students should master the principle and methods for biomass pretreatment, the variety and approaches that catalytic transformation of biomass into value-added chemicals, the production method and utilization pathways of biofuels, and the synthesis method and application of bio-based materials, so that they can enlarge their scope of professional knowledge for their future research work.

Examination method (open-book exam, close-book exam or literature review etc.)

Performance in class + final literature review and presentation, where Performance in class accounts for 50%, final literature review and presentation accounts for 50%.

Textbooks

None

Reference books

1. Junyou Shi, Catalytic transformation technology for biomass, Science Press, 2019.6
2. Min Jiang et al., Biorefinery technology for inedible biomass, Chemical Industry Press, 2018.2
3. International journals such as Green chemistry、ACS Sustainable Chemistry & Engineering、Bioresource Technology, ChemSusChem

Others

Course	industrial ecology		
Course code	04021035		
Name of teacher	Chunli chu, Meiting Ju	Title of teacher	Associate professor/professor
Hours	34	Credits	2

Teaching method(teaching/discussion and time allocation)

Teaching and discussion are both teaching methods for this class. 50% of time is allocated to the teaching on basic principles and methods of the industrial ecology . And others are for good examples and practices discussion.

Introduction of content

The first part: the background and development of industrial ecology

1.The relationship of natural system and human society system from the view of industrial ecology

2.Introduction of industrial ecology

3.Life cycle thinking and system theory

The second part: the measures and tools of industrial ecology

1.The metabolism and MFA tools

2.The productivity of resources

3.LCA

4.Industrial symbiosis

The Third part: the practices of industrial ecology

1.the weight of nations and cities

2.Iron,copper and Aluminium of EU-28

3.Stock of buildings

4.LCA of PV system

5.The metabolism of energy system of Tianjin

6.The sound material recycling society plan of Japan

7.Resource efficiency for sustainable development for the group of 20

8.The industrial symbiosis in Kalundborg

Examination method (open-book exam, close-book exam or literature review etc.)

Presentation is obliged for the final examination for the students by different study groups.

Textbooks

Industrial ecology. Meiting Ju, Lianxi Sheng. High education press,2009.

Reference books

Taking stock of industrial ecology. Roland Clif. Angela Druckman editors. Springer international publishing.2016.

Others

Course	Progress in industrial ecology		
Course code	04012013		
Name of teacher	Chunli chu, Meiting Ju	**Title of teacher**	Associate professor/professor
Hours	34	**Credits**	2

Teaching method(teaching/discussion and time allocation)

Teaching and discussion are both teaching methods for this class. 50% of time is allocated to the teaching on basic principles and methods of the industrial ecology . And others are for good examples and practices discussion.

Introduction of content

The first part: the background and development of industrial ecology

1.The relationship of natural system and human society system from the view of industrial ecology

2.Introduction of industrial ecology

3.Life cycle thinking and system theory

The second part: the measures and tools of industrial ecology

1.The metabolism and MFA tools

2.The productivity of resources

3.LCA

4.Industrial symbiosis

The Third part: the practices of industrial ecology

1.the weight of nations and cities

2.Iron,copper and Aluminium of EU-28

3.Stock of buildings

4.LCA of PV system

5.The metabolism of energy system of Tianjin

6.The sound material recycling society plan of Japan

7.Resource efficiency for sustainable development for the group of 20

8.The industrial symbiosis in Kalundborg

Examination method (open-book exam, close-book exam or literature review etc.)

Presentation is obliged for the final examination for the students by different study groups.

Textbooks

Industrial ecology. Meiting Ju, Lianxi Sheng. High education press,2009.

Reference books

Taking stock of industrial ecology. Roland Clif. Angela Druckman editors. Springer international publishing.2016.

Others

Course	Ecological Remediation		
Course code	04022041		
Name of teacher	Jianv Liu, Weitao Liu	**Title of teacher**	Associate Professor
Hours	34	**Credits**	2

Teaching method(teaching/discussion and time allocation)

Teaching, 30 hours；discussion, 4 hours

Introduction of content

This course expounds the basic definition of ecological remediation and related theories, give a comprehensive introduction on physical remediation technology, chemical remediation technology, bioremediation and phytoremediation technology, presents relevant cases, and summarizes the remediation standards of the polluted environment.

Examination method (open-book exam, close-book exam or literature review etc.)

Literature review

Textbooks

Reference books

Qixing Zhou, et al.. Ecological Remediation. Chian Environmental Science Press. 2006.

Others

Course	Ecotoxicology		
Course code	04021001		
Name of teacher	Lin Zhu	**Title of teacher**	Professor
Hours	34	**Credits**	2

Teaching method (teaching/discussion and time allocation)

Teaching 24 hours; homework 8 hours; examination 2 hours

Introduction of content

This course is designed to study the adverse effects of toxicants and artificial destruction on population and their corresponding biological tissues, and the fate of the former in the eco-environment. In addition, the responses and adaptations of biological systems to these exogenous influence factors are also introduced. The basic knowledge of this course includes toxicology, ecology and environmental chemistry, and its application fields are mainly in ecological and human health risk assessments. Through the classroom learning and literature reading, students are expected to have a comprehensive understanding of the theoretical research field and practical application of ecotoxicology.

Examination method (open-book exam, close-book exam or literature review etc.)

open-book exam

Textbooks

David A. Wright and Pamela Welbourn. Environmental toxicology. Cambridge University Press, 2007.

Reference books

1. Qixing Zhou, Fanxiang Kong, and Lin Zhu. Ecotoxicology. Science Press, 2004.
2. Tieheng Sun. Pollution Ecology. Science Press, 2001.
3. Ecotoxicology and Environmental Safety. Journal of ELSEVIER.
4. Ecotoxicology. Journal of Springer.
5. Journal of Ecotoxicology. Chinese Journal.

Others

Course	Environmental metabolomics		
Course code	04022063		
Name of teacher	ZHAO Hongzhi	**Title of teacher**	Associate professor
Hours	34	**Credits**	2

Teaching method(teaching/discussion and time allocation)

Teaching

Introduction of content

This course includes the methodology of metabolomics, the platform of sample collection, preparation, data collection and analysis, as well as the application of metabolomics study in environmental science, environmental toxicology, disease and other research areas.

The students who take this course will have the knowledge of the basic framework on metabolomics, and understand sample collection, preparation, data collection and analysis as well as the application of metabolomics study in environmental science, toxicology disease and other areas. This course will give the students a better understanding of the connection among environmental chemistry, analytical chemistry and biochemistry knowledge. It also provides the students with the expanded knowledge and vision of advanced technology related to the study of environment and health, and improves the ability to discover and solve problems.

Examination method (open-book exam, close-book exam or literature review etc.)

Literature review and presentation

Textbooks

No textbook.

Reference books

Lindon, J., The handbook of metabonomics and metabolomics, Science Press, 2008

Others

Course	Environmental data processing and application of Biomathematics software		
Course code	04022013		
Name of teacher	ZENG Wenlu	**Title of teacher**	Associate professor
Hours	34	**Credits**	2

Teaching method (teaching / discussion and time allocation)

It is mainly based on classroom teaching (6-8 class hours for each unit), supplemented by computer practice of about 2 class hours (or through unit homework).

Introduction of content

(1) Unit 1: graphical presentation of experimental data

Understand and preliminarily master the commonly used graphic methods of experimental data (scatter chart, broken line chart, pie chart, histogram, control chart, box line chart), linear and nonlinear fitting, graph digitization, etc., as well as the operation of the software involved.

(2) Unit 2: basic principle and software implementation of experimental design

Understand and preliminarily master the principle and software implementation method of common experimental design (single factor experiment, two factor experiment, orthogonal design and response surface design), and the statistics and analysis means of preliminary experimental data (analysis of variance and regression analysis).

(3) Unit 3: software solution of common mathematical models

Understand and preliminarily master the solution and drawing of mathematical models of commonly used mathematical software in relevant experiments and even professional courses (algebraic equations, inequalities, extremum, differential equations, limits, linear programming, interpolation, etc.).

(4) Unit 4: simulation, simulation and software implementation of experimental phenomena

Using the corresponding software, the preliminary simulation and simulation operation are carried out around the experimental phenomena and the theoretical models of related disciplines.

Examination method (open-book exam, close-book exam or literature review etc.)

Corresponding to the four modules taught in class, there are four unit-assignments, accounting for 20% each; The usual classroom performance accounts for 20%.

Textbooks

None

Reference books

1. Zhang Jianwei. Super learning manual of origin 9.0: technology drawing and data analysis. People's Posts and Telecommunications Press, 2014

2. Ge Yiyuan. Experimental design method and design expert software application. Harbin University of Technology Press, 2015

3. Ding Dazheng. Mathematica foundation and application. Electronic Industry Press, 2013

4. Zhong Yongguang. System dynamics (2nd Edition). Science Press, 2013

Others

Course	Conservation Biology and Biodiversity		
Course code	04022074		
Name of teacher	Yanyu Bao	**Title of teacher**	Associate professor
Hours	34	**Credits**	2

Teaching method (teaching/discussion and time allocation)

Lecture

Introduction of content

This course mainly teaches the following contents: (1) the origin, development, research contents and methods of conservation biology, (2) the concept, importance, species origin and evolution of biodiversity, (3) the protection of species diversity, genetic diversity and ecosystem diversity, (4) biological invasion and the reasons for biodiversity loss and protection methods, etc.

Examination method (open-book exam, close-book exam or literature review etc.)

close-book exam (70%) and homework and attendance (30%)

Textbooks

Reference books

1. Zhang Hengqing, Zhang Wenhui. Conservation Biology (3rd Edition). 2017, Science Press
2. Zhang Hengqing. Conservation Biology. 2005, Science Press
3. Jared Farmer. Icons of Early Conservation Biology. Science, 2010, 327, 5963

Others