

**The Undergraduate and Graduate Courses Taught in English
and Open to the International Visiting/Exchange Students
at Tsinghua University
(Spring Semester, 2017)**

Note:

- (1) *The course information provided herein may be subject to change before course registration.*
- (2) *The courses of a department/school are preferentially open to the exchange students of the department/school.*
- (3) *The graduate courses in the School of Economics and Management are open only to the exchange students majored in Economics.*
- (4) *The MBA courses are only opened to graduate level uni-wide exchange students who major in Economics.*
- (5) *The Elementary Chinese courses in ICLCC are preferentially open to the university-level exchange students.*

Department/School (Number of Courses)	Page
1 Architecture, School of (7)	2
2 Automation, Department of (3)	6
3 Automotive Engineering, Department of (3)	8
4 Chemical Engineering, Department of (3)	9
5 Civil Engineering, Department of (4)	11
6 Computer Science and Technology, Department of (7)	13
8 Economics and Management, School of (31)	16
9 Electronic Engineering, Department of (3)	31
10 Engineering Physics, Department of (1)	33
11 Environment, School of (9)	34
12 Hydraulic Engineering, Department of (1)	40
13 Industrial Engineering, Department of (5)	41
14 Interdisciplinary Information Sciences, Institute of (16)	44
15 International Chinese Language and Culture Center (ICLCC) (1)	51
16 International Relations, Department of (7)	52
17 Journalism and Communication, School of (6)	54
18 Law, School of (6)	57
19 Life Sciences, School of (4)	59
20 Materials Science and Engineering, School of (2)	61
21 Mechanical Engineering, Department of (5)	63
22 Medicine, School of (2)	66
23 Microelectronics and Nanoelectronics, Department of (1)	69
24 Physics, Department of (2)	68
25 Public Policy and Management, School of (5)	69
26 Social Sciences, School of (1)	72

1. School of Architecture

- (1) **【Course Title】** Design Theory and Methodology
设计理论与方法论

【Course Code】 30020791

【Credits】 1

【Credit Hours】 16

【Semester】 Spring

【Capacity】 30 Undergraduate Students

【Instructor】 Terrence Curry 柯瑞

【Course Description】

Over the past several decades a good deal of research and theory has been published in the areas of design cognition, aesthetic theory, expertise, psychology, philosophy and neuroscience, that sought to describe how designers work. This research has resulted in multiple methods and critiques that have lead to a deeper understanding of how designers actually design. Though it is true that one design methodology or another is no guarantee of a successful design solution, there is value in observing how others design, learning about theories, reflecting upon and considering other methods, and understanding the role of aesthetic judgment. By doing so students are better equipped to develop their own methodologies, by becoming aware of how designers work so that they might be better, self-critical designers themselves. The course will include a mutli-disciplinary overview of design theory and methodology, focusing on the work of key persons, such as: Jones, Alexander, Cross, Broadbent, Sanoff, Kuff, Schön, Arnheim, Rowe, Lynn and others; and by discussing and testing and critiquing several accepted frameworks. Topics to be discussed will include: design process/cognition, problem solving, analysis, programming, creativity, perception, systems, ideation, parametrics, materiality, tectonics, form generation, aesthetic theory, collaboration, decision-making and others. This course will be primarily a lecture/seminar course with a high expectation for student participation. Each class will include presentations of new material by the professor, a guided discussion of assigned reading (typically key 8 – 10 page article on the topic), in-class exercises and student reflection and observation. Students will be required to make in-class presentations on the design methodology of architects of their choice. Several guests will be invited to describe their design methods throughout the course.

- (2) **【Course Title】** Indoor Air and Health: Past, present and future
室内空气品质和健康概论

【Course Code】 40990181

【Credits】 1

【Credit Hours】 16

【Semester】 Spring

【Capacity】 35 Undergraduate Students, 5 Graduate Students

【Instructor】

【Course Description】

The history, presence and future of indoor air quality and health are introduced. This course can provide students a general knowledge on indoor air quality and health. In addition, students' abilities of written and oral English can be improved.

(3) **【Course Title】** Comparison of Architectural & Urban Culture between The East and The West 中外建筑与城市文化比较

【Course Code】 70000562

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 40 Graduate Students

【Instructor】 LIU Jian 刘健

【Course Description】

The opening of this course is a part of the Tsinghua School of Architecture's program to develop it into a world-class institution of research and education of architecture, urban planning and landscape architecture through high-level international education. The purpose of this course is to provide the registered students with the opportunities of listening to and dialoguing with the world-widely well-known scholars and masters, from both overseas and homeland, discussing about the hot issues of architecture, urban planning and landscape architecture from the cultural perspectives of both the east and the west and perceiving the different understanding about the fundamentals of architecture, urban planning and landscape architecture under different cultural contexts. It is hope that the communications between the east and the west from the cultural perspective will help them to broaden their academic views on architecture, urban planning, and landscape architecture.

(4) **【Course Title】** Introduction on Contemporary Urban Planning and Design
当代城市规划与设计

【Course Code】 80000841

【Credits】 1

【Credit Hours】 16

【Semester】 Spring

【Capacity】 25 Graduate Students

【Instructor】 MAO Qizhi 毛其智

【Course Description】

An introduction to the contemporary urbanization process, the theory and practice of urban development in China and abroad. Analysis some urban and regional development planning cases, including Beijing and Shanghai metropolitan areas, Yangtze River and Purl River Delta urbanizing regions and urban agglomeration development, as well as the new town development in the Shenzhen special economic zones.

(5) **【Course Title】** Practice and Theory in Green Building Design

绿色建筑理论与实践

【Course Code】 80000861

【Credits】 1

【Credit Hours】 16

【Semester】 Spring

【Capacity】 25 Graduate Students

【Instructor】 SONG Yehao 宋晔皓

【Course Description】

The course lasts eight weeks and consists of eight lectures. The first three lectures will be given by Prof. Thomas Herzog, former dean of Department of Architecture in TUM. He will concentrate on the using of solar energy in architecture and urban planning. Besides, he will introduce briefly the new trends of green building design and research. The forth lecture will be given by Prof. Qin Youguo, former dean of School of Architecture, Tsinghua University, he will show the students the overall view of the development of green building design in China. The fifth one will be given by Prof. Zhu Yingxin, which is about the recognition of the built environment. The sixth one will be given by Associate Prof. Song Yehao, which concentrates on green building design for farmers in the rural area in China. The seventh one will be given by Associate Prof. Zhou Zhengnan, which concentrates on the green building design in the urban area. The last one will be given by Associate Prof. Lin Borong, which concentrates on computer simulation in green building design. There are several seminars in the course and one paper is asked to each student at the end of course.

(6) **【Course Title】** Design Studio III

设计专题三

【Course Code】 80001063

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 7 Graduate Students

【Instructor】 ZHANG Yue 张悦

【Course Description】

The design studio will investigate the potentials of the YongDing River, Beijing's most important native waterway. We will research, map, and analyze historic, current, and future scenarios of the river in order to propose a new urban relationship between Beijing and its waters in general, and the relationship between the various neighborhoods and districts of western Beijing with the YongDing River specifically.

(7) **【Course Title】** Design Studio IV

设计专题四

【Course Code】 80001073

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 7 Graduate Students

【Instructor】 LI Xiaodong 李晓东

【Course Description】

From 1949 to 2000, a large amount of public housing was developed in Beijing under the planned socialistic welfare housing distribution system. Those former public housing areas have started to face the challenge of deterioration in terms of ageing, lack of maintenance/management, increasing mobility of residents, etc. But those areas still keep their values to a certain extent due to their central locations, easy access, convenient public spaces/facilities, or existing conditions of mixed-use, and in the collective memory of a special historical era. Within this context, urban sustainable renewal would be a potential solution for the urban problems of the former public housing area. Therefore, we chose Block 1 of Sanlihe Neighborhood 1 in Beijing Xicheng District, which was designed and constructed in 1950s, constituting a typical representative of the former public housing areas in Beijing, as the study case.

2. Department of Automation

- (1) **【Course Title】** How to Report Research Results in English and the Related Issues
英文科技论文写作与学术报告

【Course Code】 60250101

【Credits】 1

【Credit Hours】 16

【Semester】 Spring

【Capacity】 150 Graduate Students

【Instructor】 GUAN Xiaohong 管晓宏

【Course Description】

Chinese scholars and students become more and more active in international academia and publications and professional participations have become a key measure of scholarly accomplishment. With this new trend, it becomes increasingly important that Chinese scholars and students get familiar with, and abide by the international standard when writing papers, submitting them for publication, dealing with editors, and applying for funding. This course intends to give some advice to the new scholars on the etiquette of writing a paper, proper citing of reference, and giving attribution. The "conventions and protocols" of international academia are discussed together with the cultural differences between the East and the West. The norms of serving academic communities as reviewer, associate editor and programming committee member are also introduced. The advice is given for engaging in the most important activities in academic career development such as choosing research topics and writing proposals for applying for research funding.

- (2) **【Course Title】** Enterprise and Information System Modeling and Analysis
企业与信息系统建模分析

【Course Code】 40250942

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 30 Undergraduate Students

【Instructor】 LI Qing 李清

【Course Description】

Enterprise engineering and information system modeling and analysis techniques are introduced in this course. These techniques are basic methods of system design/realization, industrial engineering, management and IT consulting for graduated students from industrial engineering, management engineering, and information engineering department.

- (3) **【Course Title】** Network Security Essentials
网络安全基础

【Course Code】 40251052

【Credits】 1

【Credit Hours】 16

【Semester】 Spring

【Capacity】 16 Undergraduate Students

【Instructor】 LI Jun 李军

【Course Description】

This is a research oriented seminar course on special network security topics. Featured with small class and take-home experiments, it provides insights on industrial background and technical trends to inspire students' interest and innovation. The lectures are all in English. Homework review and discussions are sometimes mixed in English and Chinese for the convenience of TA and students.

3. Department of Automotive Engineering

- (1) **【Course Title】** Mechatronic Systems in Automotive Engineering
汽车机电系统

【Course Code】 70150163
【Credits】 3
【Credit Hours】 48
【Semester】 Spring
【Capacity】 30 Graduate Students
【Instructor】 LI Jianqiu 李建秋
【Course Description】

- (2) **【Course Title】** Automotive Engineering II
汽车工程 II

【Course Code】 70150333
【Credits】 3
【Credit Hours】 48
【Semester】 Spring
【Capacity】 30 Graduate Students
【Instructor】 ZHENG Sifa 郑四发
【Course Description】

The contents in Automotive Engineering II include:1) fundamentals requirements and analysis of vehicle vertical and lateral dynamics, excitation characteristic of the road, 2) structure and character of tires, components of suspension system and steering system, 3)single wheel model, single-track model , two-Track model for vertical dynamics, 4) Single Track Vehicle Model, Four-Wheel Vehicle Model for lateral dynamics, 5)the influence of the parameters of tires, suspension system and steering system to the vehicle vertical and lateral dynamics.

- (3) **【Course Title】** Internal Combustion Engine II
内燃机 II

【Course Code】 80150183
【Credits】 3
【Credit Hours】 48
【Semester】 Spring
【Capacity】 30 Graduate Students
【Instructor】 WANG Zhi 王志
【Course Description】

This course is suitable for the postgraduate students majored in Vehicle Engineering and Power Machinery Engineering. The course mainly focuses on the working process of internal combustion engines, including gas exchange in internal combustion engine, gasoline engine and diesel engine combustion process, special combustion processes (such as HCCI, etc), supercharging for internal combustion engine, as well as the generation of pollutants formation and emission control.

4. Department of Chemical Engineering

- (1) **【Course Title】** Surface Science and Heterogeneous Catalysis
表面科学与多相催化

【Course Code】 80340112

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 WANG Dezheng 王德峥

【Course Description】

Solid-State Chemistry and Surface Chemistry of Catalysts; Fundamental Catalysis: Bonding and Elementary Steps in Catalysis; Characterizing Catalysts and Their Surfaces; Poisoning, Promotion, Deactivation and Selectivity of Catalysts;

- (2) **【Course Title】** Advanced Biological Science and Engineering
现代生命科学与生物工程进展

【Course Code】 80340502

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 ZHANG Chong、XING Xinhui、WANG Zhao、LU ZHI
张翀、邢新会、王钊、鲁志

【Course Description】

This course will introduce current development in the field of modern life science and biological engineering, which could give students advanced knowledge and thinking mode in biological science and engineering. The content includes four parts: 1, Basic knowledge: overview of modern biological science and engineering, review of classical molecular biology and basic biological engineering; 2, Current topics: bioinformatics, synthetic biology and metabolic engineering, modern biological pharmaceutical; 3, Case study: case study for previous current topics, most cutting-edge research cases from Tokyo Institute of Technology offers; 4, course summary: final reports by the students. Evaluation: homework and final report. This course will specially emphasis on case study, which could allow students to understand not only current development in the field of biological science and engineering, but also the logic behind it, and finally cultivate critical thinking in scientific research.

【注】 清华-东工大项目课程

- (3) **【Course Title】** Recent Advances in Separation Processes
分离技术最新进展

【Course Code】 80340512

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 20 Graduate Students

【Instructor】 LUO Guangsheng、WANG Yundong、LIU Zheng、CHEN Jian、
WANG Baoguo

骆广生、王运东、刘铮、陈健、王保国

【Course Description】

The course of Recent Advances in Separation Processes will mainly introduce the development of solvent extraction, adsorption, absorption, membrane separation, bio-separation, and microscale separation. Total 10 lectures will be provided by the professors from Melbourne University and Tsinghua University.

【注】 与澳大利亚墨尔本大学合作开设的 C-campus 课程

5. Department of Civil Engineering

(1) **【Course Title】** Structural Mechanics (1)

结构力学 (1)

【Course Code】 20030134

【Credits】 4

【Credit Hours】 64

【Semester】 Spring

【Capacity】 60 Undergraduate Students

【Instructor】 LI Quanwang 李全旺

【Course Description】

This course is intended to provide the student majoring in civil engineering skills of structural analysis at an elementary level. It mainly consists of structural geometric construction rules, computational methods for internal forces and deformation. The three major relations: equilibrium, deformation compatibility and stress-deformation conditions are used to study the behavior of structural components under various external loads. Emphasis is placed on the two major methods: the consistent displacement (force) method and the displacement method. The course serves as the basis for further exposure of structural theories to the student majoring in civil engineering.

(2) **【Course Title】** Construction Contracts

工程合同管理

【Course Code】 30030482

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 40 Undergraduate Students

【Instructor】 LI AO Binchao 廖彬超

【Course Description】

Legal aspects of construction contracts and specifications; contract formation, interpretation, rights and duties, and changes; legal liabilities and professional ethics of architects, engineers, and contractors.

(3) **【Course Title】** Programming Analysis of Structures

结构矩阵分析

【Course Code】 40030702

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 40 Undergraduate Students

【Instructor】 YUAN Si 袁驷

【Course Description】

(4) **【Course Title】** Advanced Experimental Soil Mechanics
高等实验土力学

【Course Code】 80030332

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 XU Ming 徐明

【Course Description】

Students will learn principles and methods of typical advanced geotechnical laboratory and field experiments in the course, as well as the latest development in soil mechanics achieved through these experiments. At the mean time, training will be given for data interpretation and analysis. Furthermore, some of the leading research projects in soil mechanics will be introduced as case studies, in which experiments are playing key roles.

6. Department of Computer Science and Technology

- (1) **【Course Title】** Distributed Database Systems
分布式数据库系统

【Course Code】 70240063

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 50 Graduate Students

【Instructor】 FENG Ling 冯玲

【Course Description】

This course consists of two parts: (1) Theoretical study of distributed database systems. It covers the core of principles of distributed database management systems, including database design, architecture of Distributed Database Management System (DDBMS), concurrency control, distributed transaction management, and recovery. This part also gives an overview introduction to parallel database systems. (2) Experimental DDBMS. In this part, students are organized in teams to design and implement a mini-DDBMS with distributed SQL query processing and optimization capacities in network environment. The system is subject to the benchmark testing of the course.

- (2) **【Course Title】** Human Computer Interaction Technology
人机交互技术

【Course Code】 80240533

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 SHI Yuanchun 史元春

【Course Description】

This course covers the basic understanding of human perception and cognition, interaction styles development, design and evaluation of GUI, and natural human computer interface technologies. Computer output mediums will include graphics, music, and 3-D sound. Input technologies are emphasized. Multimodality about visual, acoustic and touch sense channels are introduced with new input interfaces. Signal processing, feature extraction, and mapping schemes will also be covered. Measure methods are for the efficiency of interaction. Hands-on laboratories and independent projects, which can potentially continue as further researches.

- (3) **【Course Title】** Future Internet Architecture
下一代互联网

【Course Code】 80240563

【Credits】 3

【Credit Hours】 48
【Semester】 Spring
【Capacity】 30 Graduate Students
【Instructor】 LI Dan 李丹
【Course Description】

The development of the Internet makes more and more students get interested in related technologies. The Internet is facing regeneration, and the key technologies of new generation Internet are in dire need of spread. The course aims to enable students further understand and master the key technologies (including technical principles and specific realization) of new generation Internet after an overall understanding, and tentatively cultivate students' research ability in this field.

(4) **【Course Title】** Web Information Retrieval
Web 与信息检索

【Course Code】 80240573
【Credits】 3
【Credit Hours】 48
【Semester】 Spring
【Capacity】 30 Graduate Students
【Instructor】 ZHANG Min 张敏
【Course Description】

This course gives a survey to the new research branches, introduces the state-of-the-art technologies, and discusses on open problems and challenges on Web information retrieval (Web IR). At the same time, the course focuses on the real applications in the Internet environment, making case study and detail analysis on commercial search engines (SE). The main topics of the course includes (but not limited to): IR in Web environment, such as link analysis, anti-spam, etc; question answering; opinion / sentimental analysis; social media and IR; personalized IR and recommendation; user behavior analysis; online advertisement; mobile search; and IR and SE evaluations. The course is composed of lectures and student-conducted discussions.

(5) **【Course Title】** Fundamentals of Computer Graphics
计算机图形学基础

【Course Code】 80240593
【Credits】 3
【Credit Hours】 48
【Semester】 Spring
【Capacity】 30 Graduate Students
【Instructor】 LIU Yongjin 刘永进
【Course Description】

This course gives an introduction to computer graphics, by intergrating various skills in computer science such as programming, data structure and algorithm design. With the aid of new human-computer interface, students will learn these

fundamental knowledges in computer science in terms of fancy graphics effects that reduce the learning load through abstract data visualization. The content of this course includes raster graphics, interactive graphics, matrix representation of 3D transformation, curve and surface design, ray tracing and visual realism, all with OpenGL source code.

(6) **【Course Title】** Introduction to High Performance Computing

高性能计算导论

【Course Code】 30240192

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 60 Undergraduate Students

【Instructor】 WANG Xiaoge 王小鸽

【Course Description】

This course uses English in all the related activities. The instructions, textbook, homework and in-class discussions are all in English. In this course, the fundamentals of high performance computing, architecture of advanced computers, parallel program

(7) **【Course Title】** Foundation of Object-Oriented Programming

面向对象程序设计基础

【Course Code】 30240532

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 30 Undergraduate Students

【Instructor】 YAO Hailong 姚海龙

【Course Description】

7. School of Economics and Management

(1) **【Course Title】** Management Information Systems

管理信息系统

【Course Code】 30510202

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 55 Undergraduate Students

【Instructor】 Guoqing Chen 陈国青

【Course Description】

The objectives of the Management Information Systems (MIS) course are to provide the students with (1) a understanding of MIS essentials and prospects from a combined perspective of technology and management, in the context of big data; (2) a mastery of some classical MIS theories and methods; (3) a mastery of some new MIS concepts and techniques; and (4) a understanding of certain key issues of and thoughts on information technology (IT) management.

In light of rapid advances in information technology (IT) and Internet applications, the course covers a series of related materials as follows: (1) Gaining competitive advantages with IT (e.g., supply chain management and ERP, customer relationship management, business intelligence); (2) Business analytics for decision support (e.g., knowledge types, knowledge discovery techniques, associative patterns); (3) Modeling and decisions in having information systems (e.g., in-sourcing cycle, data modeling, business descriptions, outsourcing); (5) Emerging trends (e.g., big data/cloud computing and data-centric businesses).

The content of the course also includes case discussions (e.g., Digital China, CSC and General Dynamics), lab studies (e.g., SAP ERP, Weka, Node XL) etc

(2) **【Course Title】** Intermediate Macroeconomics

中级宏观经济学

【Course Code】 30510763

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 220 Undergraduate Students

【Instructor】 Min Ou'yang 欧阳敏, YAO Wen 姚雯

【Course Description】

We will study the economic issues within a unified framework as possible as we can. At the same time, we will also try to introduce alternative theories and models. The main purpose is to introduce the method to study macroeconomics, not the facts and the theories. We emphasize the micro-foundation, and use the neoclassical economics as the benchmark. Nevertheless, we also introduce the Keynesian economics by introducing some market imperfections such as sticky wage and search in labor market. We will start with the basic facts and issues in

macroeconomics. Then we will introduce the modern approach to address these issues. We will study how different markets work together in general equilibrium. Markets for labor, saving and investment, and financial assets interact to determine the economy's long-run growth and its fluctuations.

(3) **【Course Title】** Marketing Management

营销管理

【Course Code】 30510812

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 80 Undergraduate Students

【Instructor】 LIU Xia 刘霞

【Course Description】

The objective of this course is to introduce students to the concepts, analyses, and activities that comprise marketing management, and to provide practice in assessing and solving marketing problems. The course is also a foundation for advanced electives in marketing as well as other business/social science disciplines. We will explore the theory and applications of marketing concepts through a mix of cases, discussions, lectures, guest speakers, individual assignments, and group projects. We will draw materials from a variety of sources and settings including services, consumer and business-to-business products.

(4) **【Course Title】** Developmental Economics

发展经济学

【Course Code】 30510863

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 55 Undergraduate Students

【Instructor】 Xinzheng Shi 施新政

【Course Description】

Development economics is a course involving economic problems and policies of those countries that have not yet reached the level of economic well being observed in the western world. At the completion of this course, students will be familiar with theories of development and their applications in the real world. Students will have a better understanding of a number of topics that shed light on the development process, including poverty, inequality, education, international trade, the role of the government, and population issues. Students will also be trained to conduct their own research by using theories learned in class and analyzing real world data. They will also present their research results in class, which can improve their ability of public speaking and intellectual interactions.

(5) **【Course Title】** Economic Growth

经济增长

【Course Code】 30510883

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 50 Undergraduate Students

【Instructor】 LU Lin 陆琳

【Course Description】

The aim of the course is to provide students with a rigorous introduction to the empirical facts and theoretical models of economic growth. A recurring theme of this course is the question: “Why are some countries so rich, while some others are so poor?” To answer this question, we will look at various aspects of economic growth, starting from some characteristics and stylized facts of different countries across the world. We will then study some of the main theories and their predictions. Through the study of the course, the students will get familiar with the available cross-country data and use different models as a basis for understanding and distinguishing the various determinants of economic growth.

(6) **【Course Title】** Business Communication

商务沟通

【Course Code】 30510912 (2)

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 30 Undergraduate Students

【Instructor】 Nancy Han

【Course Description】

Business Communication is a course training students to be able to deliver a presentation and submit a written proposal efficiently as well as effectively in a business context. The course is delivered in English with many training activities which eventually get students to be an efficient business presenter in English. It helps the learner aware of the communication goals and therefore able to apply the principles to create an efficient and effective business presentation. It also helps the learner apply the communication principles to written formats since the written proposals are evaluated as part of the final performance.

(7) **【Course Title】** Econometrics (1)

计量经济学 (1)

【Course Code】 30510973 (1)

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 110 Undergraduate Students

【Instructor】 HONG Shengjie 洪圣杰

【Course Description】

The purpose of this course is to help students understand how to interpret economic data. It will focus on the issues that arise in using this type of data, and the methodology for solving these problems. The focus of the course is on regression analysis. Specific topics and extensions will include multivariate regression, dummy variables, heteroskedasticity, serial correlation, and instrumental variables. Problem sets will provide practical experience in addressing some of these issues using actual economic data. Chapter 1-8 and selected material in Chapter 10-15 will be covered. In addition, basics of hypothesis testing and model selection methods will be covered.

(8) **【Course Title】** Econometrics (1)

计量经济学 (1)

【Course Code】 30510973 (2)

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 110 Undergraduate Students

【Instructor】 HONG Shengjie 洪圣杰

【Course Description】

The purpose of this course is to help students understand how to interpret economic data. It will focus on the issues that arise in using this type of data, and the methodology for solving these problems. The focus of the course is on regression analysis. Specific topics and extensions will include multivariate regression, dummy variables, heteroskedasticity, serial correlation, and instrumental variables. Problem sets will provide practical experience in addressing some of these issues using actual economic data. Chapter 1-8 and selected material in Chapter 10-15 will be covered. In addition, basics of hypothesis testing and model selection methods will be covered.

(9) **【Course Title】** Corporate Strategy Management

战略管理

【Course Code】 30510992

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 80 Undergraduate Students

【Instructor】 Zhenzhen Xie 谢真臻

【Course Description】

This course introduces the concepts and tools of strategy formulation and competitive analysis. You will learn about why some firms survive and prosper while others do not, and develop critical analysis and communication skills to

create and implement firm strategy. The course focuses on the analyses, organizational processes, skills and business judgment managers must use to craft strategies, position their businesses so as to maximize long-term profits upon uncertainty and competition.

Strategic Management is an integrative and interdisciplinary course, which takes a general management perspective. It views the firm as a whole, and examines how policies in each functional area (such as accounting, economics, finance, marketing, and organizational behavior) are integrated into an overall competitive strategy. It is intended that you develop a “general management point of view” in this course. This point of view is the best vantage point for making decisions that lead to sustainable business performance. The key strategic business decisions of concern involve determining organizational purpose to evolving opportunities, creating competitive advantages, choosing competitive strategies, securing and defending sustainable market positions, and allocating critical resources over long periods. Decisions such as these can only be made effectively by viewing a firm holistically, and over the long term.

This course is intended to help you develop skills for formulating strategy. The strategy formulation process demands the mastery of a body of analytical tools and the ability to take an integrative point of view. You will develop these skills through:

- In-depth analysis of industries and competitors;
- Prediction of competitive behaviors;
- Techniques for analyzing how firms can develop and sustain competitive advantages.

(10) **【Course Title】** Computer Systems Architecture

计算机系统原理

【Course Code】 30511043

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 55 Undergraduate Students

【Instructor】 GUO Xunhua 郭迅华

【Course Description】

This course provides the hardware and software technology background to enable systems development and management personnel to understand tradeoffs in computer architecture for effective use in a business environment. A systematic view of computer systems will be utilized in examining the components, structures, and characteristics of computer hardware and software as the infrastructure of modern information technology.

(11) **【Course Title】** Corporate Finance

公司金融

【Course Code】 30511053 (1)

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 130 Undergraduate Students

【Instructor】 Yunling Chen 陈云玲

【Course Description】

The focus of the course is learning how a corporate manager can evaluate prospective investments and projects, and how to raise money to finance the projects. This involves four major parts. The first is discounted cash flow (DCF) valuation. This part of the course involves learning the concepts and techniques necessary to evaluate the cash flows of projects. A sample of topics covered within this part of the course includes the time value of money, compounding, annuities, perpetuities, bond prices, stock prices, net present value, and the internal rate of return. The second part of the course focuses on the relationship between risk and return. Sample topics include capital market history, market efficiency, concept of risk, diversification, the Capital Asset Pricing Model (CAPM), and the weighted average cost of capital (WACC). The third part is capital structure. More details regarding debt and equity are discussed. We use equity as example to introduce issuing securities to public. Then the famous Modigliani and Miller (MM) capital structure theory is introduced. We first discuss the M&M theory without corporate taxes. After knowing the basic ideas, corporate taxes are incorporated. The last part focused on firm valuation. Three approaches are considered: WACC, Adjusted Present Value (APV), and discounting cashflows to equity (FTE). Real world financial statement modeling is introduced as the most complicated case.

(12) **【Course Title】** Corporate Finance

公司金融

【Course Code】 30511053 (2)

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 130 Undergraduate Students

【Instructor】 CHEN Yunling 陈云玲

【Course Description】

The focus of the course is learning how a corporate manager can evaluate prospective investments and projects, and how to raise money to finance the projects. This involves four major parts. The first is discounted cash flow (DCF) valuation. This part of the course involves learning the concepts and techniques necessary to evaluate the cash flows of projects. A sample of topics covered within this part of the course includes the time value of money, compounding,

annuities, perpetuities, bond prices, stock prices, net present value, and the internal rate of return. The second part of the course focuses on the relationship between risk and return. Sample topics include capital market history, market efficiency, concept of risk, diversification, the Capital Asset Pricing Model (CAPM), and the weighted average cost of capital (WACC). The third part is capital structure. More details regarding debt and equity are discussed. We use equity as example to introduce issuing securities to public. Then the famous Modigliani and Miller (MM) capital structure theory is introduced. We first discuss the M&M theory without corporate taxes. After knowing the basic ideas, corporate taxes are incorporated. The last part focused on firm valuation. Three approaches are considered: WACC, Adjusted Present Value (APV), and discounting cashflows to equity (FTE). Real world financial statement modeling is introduced as the most complicated case.

(13) **【Course Title】** Theory of Industrial Organization

产业组织理论

【Course Code】 40510943

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 80 Undergraduate Students

【Instructor】 Alexander Cowles White

【Course Description】

Industrial Organization Theory is a set of tools that seek to provide economic answers to these and many other questions. Ranging from one extreme of monopoly to the other of perfect competition, this course will provide an introductory exploration of the rich set of models of imperfect competition, with a focus on business strategy and policymaking applications.

(14) **【Course Title】** Econometrics (2)

计量经济学 (2)

【Course Code】 40511133

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 50 Undergraduate Students

【Instructor】 ZHU Lin 祝林

【Course Description】

This course aims to equip students with modern econometric tools and modeling methods for them to set up suitable econometric models to do data analysis. Hence the approach of this course will be model-driven and data-driven, which focuses on econometric applications without pursuing technical details. This course will cover some modern topics in both macro-econometrics and micro-econometrics. For macro side, we will introduce the concept of

non-stationarity and study the problem of unit-root tests and co-integration test, as well as the famous ECM model. We will also study the vector autoregression models which play an important role in macro applications. For microeconometrics, we will cover several important models in application, namely, binary choice model, discrete choice model, models for count data, sample selection model, and the panel data model. For each model introduced, we will discuss its applicability, limitation, and estimation methods together with inference tools. Since this course focuses on applied side, we will also provide training in econometrics softwares, e.g. STATA/Eviews/R.

(15) **【Course Title】** Mathematics of Risk 1

精算学（1）

【Course Code】 40511373

【Credits】 3

【Credit Hours】 32

【Semester】 Spring

【Capacity】 50 Undergraduate Students

【Instructor】 Michael R. Powers

【Course Description】

The course provides a rigorous introduction to the basic probability theory and models used in the study of insurance and risk finance. Students are expected to be proficient in differential, integral, and multivariate calculus, and some previous exposure to probability and/or statistics is desirable. The following specific topics will be covered:

- Foundations of probability theory
- Random variables in insurance
- Parametric distributions (univariate and multivariate)
- Common probability distributions for loss frequencies
- Common probability distributions for loss severities
- Convolutions of distribution functions; total-loss models
- Alternative characterizations of random variables (survival functions, MGFs, etc.)
- Risk measures (value at risk, expected shortfall, ruin probability, etc.)
- Transformations of random variables
- Effects of insurance-policy restrictions (deductibles, limits, copayments)
- Heavy-tailed random variables

(16) **【Course Title】** Managerial Accounting (1)

管理会计（1）

【Course Code】 40510343

【Credits】 3

【Credit Hours】 32

【Semester】 Spring

【Capacity】 50 Undergraduate Students

【Instructor】 Haiyan Zhang

【Course Description】

The goal of management accounting is to provide relevant information for top executives' decision, management accounting includes decision related cost measurement, pricing strategy, organization design, budgeting management and performance evaluation. This course will introduces concepts, methods and techniques related to management accounting. Topics can be summarized as the following three areas: (1) fundamental concepts and methods, including cost concept and classification, cost measurement, cost behavior and CVP analysis; (2) fundamental decision process, including marketing decision and production decision; (3) the specific decisions, including standard costing, static budgeting, flexible budgeting, organization design, transferring price, and performance evaluation etc. Based on the trends of modern management accounting, this course will also focus on activity-based costing (ABC), balanced scorecard (BSC), total quality management (TQM) and some other newly developed techniques in this area.

The objective of this course is to enable you to do the following:

1. Understand basic costing concepts, cost measurement methods and system;
2. Under the basic process of decision making in modernized enterprises;
3. Hold a whole picture of budgeting management and performance evaluation;
4. Can solve some management accounting problems in the real world.

(17) **【Course Title】** Information Resource Management

信息资源管理

【Course Code】 40511273

【Credits】 3

【Credit Hours】 32

【Semester】 Spring

【Capacity】 50 Undergraduate Students

【Instructor】 Cheng Yi

【Course Description】

With the explosive growth in the variety of information resources nowadays, effective management and use of information resource becomes a key issue. Effective information resource management depends upon a comprehensive awareness of the information architecture and a deep understanding of the social, technological and cognitive environments. This course will introduce the concepts and methods related to information organization, retrieval, and dissemination (especially in online environment), as well as the economics of information in various contexts. It illustrates how effective information resource management can benefit individuals, organizations, and the public in general. Issues and policies related to information resource use will also be discussed.

(18) **【Course Title】** Human-Computer Interaction

人机接口设计

【Course Code】 40511323

【Credits】 3
【Credit Hours】 32
【Semester】 Spring
【Capacity】 50 Undergraduate Students
【Instructor】 Cheng Yi
【Course Description】

This course is intended for students whose work interacts with user interface issues in the design of social and software systems. The course stresses the importance of user-centered design and usability in the development of software applications and systems. Students will receive theoretical training on the analysis, design, and evaluation of user interfaces. They will also acquire hands-on design skills through a graphical user interface design project. The module takes into account contextual, organizational, and social factors in system design.

(19) **【Course Title】** China Roots Seminar (MBA course)
中国根基系列讲座

【Course Code】 80516321-1
【Credits】 1
【Credit Hours】 16
【Semester】 Spring
【Capacity】
【Instructor】 LI Jinliang 郦金梁
【Course Description】

The course provides an overview of China's social, economic and political system and its challenges. Students may gain industrial insights from invited industry experts, and grasp some unique philosophy deeply rooted in Chinese. A company visit will be arranged to help students to experience real business in China. China Roots Seminar will cover more social and management-specific topics. Different industries will be introduced at both parts.

(20) **【Course Title】** Corporate Mergers and Acquisitions (M&A) (MBA course)
公司并购

【Course Code】 80512682-1
【Credits】 2
【Credit Hours】 32
【Semester】 Spring
【Capacity】 40 Graduate Students
【Instructor】 Professor LEE, Hoan Soo
【Course Description】

This course is an advanced treatment of corporate finance topics with a focus on mergers & acquisitions, cross-border investments, alternative investments and investment strategies. Introduction to Corporate Finance offered to first year MBA is a strongly recommended prerequisite.

(21) **【Course Title】** Marketing Research (MBA course)

营销研究

【Course Code】 80510872-2

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Instructor】 Professor ZHENG Yuhuang

【Course Description】

1. To develop an understanding of the role of marketing research in the business world.
2. To provide a fundamental foundation in marketing research concepts and methods
3. To provide you with the skills necessary to design, conduct a market research project

(22) **【Course Title】** Knowledge Management in the Age of Big Data (MBA course)

大数据与社会化背景下的知识管理

【Course Code】 80515693-2

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Instructor】 Professor LIN Lihui

【Course Description】

The face of knowledge management has been changed by the latest developments in new technologies, especially big data, artificial intelligence (AI), and social networking. This course provides thorough coverage of the latest theory and practice of Knowledge Management (KM), with an interdisciplinary presentation that integrates technical, business, and strategic KM perspectives. Topics covered include (but are not limited to): knowledge management theories and models; knowledge discovery and artificial intelligence, impacts of big data technologies on KM; knowledge sharing; online communities of practice; knowledge management strategies driven by big data and social networks; business analytics; use of social networks in enterprise KM system; crowdsourcing and open innovation; KM and new business models, etc.

(23) **【Course Title】** Enterprise Organization and Analysis (MBA course)

产业组织与分析

【Course Code】 80510912-1

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Instructor】 Professor WHITE, Alexander

【Course Description】

As technology advances and both business and talent becomes increasingly global, it is no longer safe to assume that any previously successful way of doing things will continue to thrive. This fundamentally affects our understanding of strategy, management, and entrepreneurship. Innovative managerial approaches are essential in order to navigate novel industry structures and to recognize new opportunities for startups. The goal of this class is to think hard about the major shifts in technology that we are currently living through, and how founders and managers can adapt accordingly. We will focus on three themes.

(24) **【Course Title】** Customer Focused Innovation (MBA course)
以客户为导向的创新

【Course Code】 80515991-1

【Credits】 1

【Credit Hours】 16

【Semester】 Spring

【Instructor】 Professor JI Bo

【Course Description】

This course aims to explore innovative customer-focused business strategy of how we can help create a new and more profitable business future. Nowadays, companies usually use the following three types of innovation for growing strategy:

- 1) Technological innovation: the development of cutting-edge technology in order to win the competition
- 2) Differentiation: products, services, marketing and other differences in innovation.
- 3) Continuous improvement: all aspects of small innovation

All of these innovations are focus on the competition with their competitors. It ends up with a zero-sum game in this competition.

(25) **【Course Title】** Management Practice Seminar on Family Business (MBA course)
企业实践研讨课-家族企业管理

【Course Code】 80515941-1

【Credits】 1

【Credit Hours】 16

【Semester】 Spring

【Instructor】 Professor JI Bo

【Course Description】

Family firms are prevalent, accounting for two thirds of all businesses across the globe. As the intersection of two distinctive logics, family firms face unique challenges in their survival and prosperity. On one hand, the formal structure of a firm demands rational decisions, contract-based exchange, competence, limited liability, future orientation, and money making, which characterize the business logic. On the other hand, family members initiate the enterprise and bring in the

family logic with an emphasis on emotional caring, relationship-based interaction, birthright, perpetual responsibility, memory orientation, and love maintenance. Due to the competition of these two logics, only 30 percent of family firms survive into the second generation, among which 85-90 percent fail or are sold before the third generation succession. The average life span of family firms is around 24 years, which is similar with the average tenure of their founders. This management practice seminar specifically targets students who are the second-generation owners and leaders of their family firms, helps them understand a series of representative problems originated from the logic conflicts in their daily practices, and discusses possible solutions that may benefit their families and their businesses. The course will focus on family business succession planning as it is one of the most pertinent issues facing family businesses.

(26) **【Course Title】** The Rise of Fintech & Securitization (MBA course)

坐看云起时：金融科技和资产证券化

【Course Code】 80515941-1

【Credits】 1

【Credit Hours】 16

【Semester】 Spring

【Instructor】 Professor Jim Kok

【Course Description】

“The Rise of Fintech & Securitization” is designed to help graduate students at Tsinghua University establish their understanding about China’s financial technology (fintech) industry. Specifically, students will comprehend how institutional investors analyze, price and trade securitized products backed by assets that are created by financial technologies such as big data risk management and machine learning. This course will introduce the students to acquiring critical information about different fintech business models in China. The first quarter of the lecture will be focused on general education of fintech in China, the second quarter of the lecture on business models of the asset generation side of the value chain, with the remaining half of the lecture on a mock securitization process role-playing an investment banker, and experiencing their work in bringing their clients’ innovative financial instruments to market. This course requires the students to proactively contribute to class discussions, as well as to plan and execute a group project, in the form of a pitch book for road-show purpose.

(27) **【Course Title】** Practical Strategic Management (MBA course)

战略管理实务

【Course Code】 80511541-0

【Credits】 1

【Credit Hours】 16

【Semester】 Spring

【Instructor】 Dr. Ingo Beyer von Morgenstern

【Course Description】

An understanding of the tools and frameworks used to manage a global enterprise, with special focus on the application of globally proven concepts to technology-oriented industries and China business specifics. An overview on strategic, operational and organizational state of the art frameworks will be provided. Teaching approach will emphasize the discussion of application of frameworks and tools, as well as a built-in case study.

(28) **【Course Title】** Intermediate Chinese (MBA course)

中级汉语

【Course Code】 60610172-3

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 25 Graduate Students

【Instructor】 ZHOU Shujun

【Course Description】

This course is designed for students who have 1 year' experience in Mandarin Chinese and know something about basic grammatical structure of Chinese, with the purpose of communicating in some business circumstances in Chinese.

Topics discussed in class covers something in companies mainly in oral Chinese. Students are expected to know how to pronounce Chinese well and how to write Chinese characters. Students aim to learn some more basic grammatical structure of Chinese. With this basic grasp of the Chinese language, students will be able to apply their Chinese knowledge to deal with some basic problems in business circumstances, such as self-introduction and culture in companies, etc.

The exams only have oral section.

(29) **【Course Title】** Advanced Chinese (MBA course)

高级汉语

【Course Code】 60610182-2

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 25 Graduate Students

【Instructor】 GAO Ning

【Course Description】

This course is set up in order to make the advanced students to further improve the level of Chinese senior stage. The goal is to improve the ability of students in the context of real heard.

This textbook learning content is a sitcom family life. The content is humor and fun. The characters in the story are very typical and vivid. Textbooks used real and vivid language, which can reflect the connotation of Chinese culture from various angles. Through the study of the textbook, students can master a lot of expression, which is commonly used in daily life, including words, sentence structure and

discourse language knowledge. This textbook is very helpful to improve the students' daily communication skills.

8. Department of Electronic Engineering

(1) **【Course Title】** Signals and Systems

信号与系统

【Course Code】 30230654

【Credits】 4

【Credit Hours】 64

【Semester】 Spring

【Capacity】 60 Undergraduate Students

【Instructor】 SONG Jian 宋健

【Course Description】

This course covers the signal representation/analysis, especially how to represent the complex signals in simple format either in time or frequency domain. Based on that, it also covers how signals behave after passing through various linear, time-invariant systems. This course consists of following individual yet highly related sessions such as Introduction, time-domain analysis on the linear, time-invariant systems, signal representation in frequency domain (Fourier analysis/Fourier transform), Laplace Transform, Discrete time-domain signals, Z-Transform, Discrete/Fast Fourier transform, the state space analysis of the linear systems, and etc.

(2) **【Course Title】** Case Study on the Design of the Communication Networks

通信网络设计实例研究

【Course Code】 40230952

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 20 Undergraduate Students

【Instructor】 SONG Jian 宋健

【Course Description】

PLC networks and PLC-specific network layers are then defined before modulation schemes and various possibilities for realization of error handling in PLC systems are discussed. The different solutions of multiple-access schemes and various MAC protocols for PLC applications are introduced together with several solutions for traffic control in PLC networks. In the end, comprehensive performance evaluation of reservation MAC protocols, suitable for broadband PLC applications are evaluated by comparing various signaling MAC protocols under different traffic and disturbance conditions. Fundamental concepts are the major focus of this course, and the students are required to do the literature investigation with a group and present their results by the end of the course.

(3) **【Course Title】** Probability Theory and Random Processes

概率论与随机过程 (1)

【Course Code】 30230742-3

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 30 Undergraduate Students

【Instructor】 SHEN yuan 沈渊

【Course Description】

This course will introduce undergraduate students to the modeling, quantification, and analysis of uncertainty. Topics covered include: formulation and solution in sample space, random variables, transform techniques, simple random processes and their probability distributions, limit theorems, and Markov chains. The tools of probability theory are the keys for being able to analyze and make sense of data. These tools underlie important advances in many fields, from the basic sciences to engineering and management. Although this is not a mathematics course, it does rely on the language and some tools from mathematics. It requires a level of comfort with mathematical reasoning, familiarity with sequences, limits, infinite series, and the chain rule, as well as the ability to work with ordinary or multiple integrals.

9. Department of Engineering Physics

- (1) **【Course Title】** Introduction to High Energy Physics
高能物理导论

【Course Code】

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 30 Undergraduate Students

【Instructor】 CHEN Shaomin 陈少敏

【Course Description】

This course provides an up-to-date and comprehensive introduction to modern particle physics, including all the recent developments in elementary particle physics, as well as its connections with cosmology and astrophysics. The balance between experiment and theory is emphasised. The stress is on the phenomenological approach and basic theoretical concepts rather than rigorous mathematical detail. Short descriptions are given of some of the key experiments in the field, and how they have influenced our thinking. Although most of the material is presented in the context of the Standard Model of quarks and leptons, the shortcomings of this model and new physics beyond its compass (such as supersymmetry, neutron mass and oscillations, GUTs and superstrings) are also discussed. This course is suitable for the 3rd and 4th-year undergraduate students.

10. School of Environment

- (1) **【Course Title】** Treatment Technologies for Safe Drinking Water
饮用水水质安全保障工艺

【Course Code】 40050622

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 30 Undergraduate Students (Junior and Senior Students Preferred)

【Instructor】 WANG Xiaomao 王小佺 XIE Yuefeng 解跃峰

【Course Description】

The course is structured with a main line pertaining to drinking water qualities, and is mainly composed of the removal of individual impurities and contaminants in the conventional treatment process and the advanced treatment process, focusing on the principle and applicability of each unit operation. Case studies and invited speech by renowned professors will also be included in the course. By taking this course, students should have the “multiple barrier” concept and would be able to select appropriate treatment processes for particular cases.

- (2) **【Course Title】** Low-carbon Technology and Management
低碳技术与管理

【Course Code】 40050752

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 30 Undergraduate Students

【Instructor】 ZHAO Ming 赵明

【Course Description】

The whole world is currently committed to adaptation against climate change, extreme disasters, environmental pollutions and exhausting fossil energy by means of establishment of a low-carbon society. Such transmission is certainly necessitated in China, the largest carbon emitter and 2nd biggest economy of the world. Development of low-carbon technologies and management system will be the key approach.

This course is aimed to train the undergraduate students of SOE in terms of both technological and management knowledge. It is thus a cross-disciplinary course that encourages students to learn independently and collaboratively with the purpose to address complicated issues in energy, resource, environmental, economy and policy areas under the globalization circumstance.

This course is not merely lecture and also includes quite a number of curriculum projects that require students to learn more after class and collaborate with team members. In course of the project design, students will be enhanced of abilities including but not limited to scientific writing, public speaking, literature hunting and communication skills.

This course will be delivered in pure English environment. Furthermore, the students will be fortunate to stay with world famous experts in low-carbon fields and experience the cutting-edge research. The guest professors may come from Imperial College London, Cambridge, Columbia Uni, Stanford, Ohio State, etc.

Students will also enjoy the impressive industrial field trips. They will experience how low-carbon technologies are implemented in various companies. This will be a perfect compensation to the coursework learning, providing information and ideas for the curriculum project. If lucky, students may also find exciting opportunities for internship in industries.

Low-carbon technology and management is a fast developing field with frequently updated knowledge and information. This course extremely encourages students to challenge the conventional viewpoints and existing database of knowledge. The lecturer has the responsibility to lead students to think and behave in such creative and originative ways.

(3) **【Course Title】** Advanced Environmental Chemistry

高等环境化学

【Course Code】 70050323

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 25 Graduate Students

【Instructor】 HUANG Jun 黄俊 YU Gang 余刚

【Course Description】

By learning Advanced Environmental Chemistry, the students will grasp the methodology of studying the transport, transformation and fate of pollutants using chemical principle and approaches, with the concept of multimedia in their mind. Also they will get good understandings about the environmental problems especially for those current hot issues - case studies will illustrate their chemical mechanism as well as the latest progress. The course mainly contains four parts: (1) Environmental pollution chemistry, which mainly talks about the main environmental problems and their chemical mechanism, and the transport, transformation and fate of pollutants. (2) Environmental analytical chemistry, which mainly talks about the monitoring and analysis methods for priority pollutants with important environmental significance. (3) Environmental toxicological chemistry, which mainly talks about the dose-response relationship, kinetics, and the mechanism for teratogenesis, mutagenesis and carcinogenesis. (4) Environmental Engineering Chemistry, which mainly talks about the technical principles of chemical approaches of pollution control.

(4) **【Course Title】** Advanced Wastewater Treatment

高级废水处理工程

【Course Code】 80050233

【Credits】 3

【Credit Hours】 48
【Semester】 Spring
【Capacity】 25 Graduate Students
【Instructor】 WEN Xianghua 文湘华
【Course Description】

This course provides various kinds of engineering issues related to water environment in English, which cover fundamental knowledge, the latest technologies, including wastewater reuse & disinfection, anaerobic biological treatment technologies, membrane technology, biological nutrient removal technology, and etc., and regional application examples. These lectures, will also arrange English presentations by students, and discussions to enhance English capability and internationality of students.

(5) **【Course Title】** Restoration Ecology and Applications
恢复生态学及其应用

【Course Code】 80050243
【Credits】 3
【Credit Hours】 48
【Semester】 Spring
【Capacity】 25 Graduate Students
【Instructor】 LIU Xuehua 刘雪华
【Course Description】

Theoretic and practical research of restoring the degraded ecosystems is the hot topic in the modern ecological development. This course mainly contains the following contents: the degraded ecosystems under human disturbance, contents and development of restoration ecology, general introduction of global ecological restoration, restoration of degraded forest ecosystem, restoration of wetland ecosystem, restoration of grassland ecosystem, restoration of ocean and coast zone ecosystems, restoration of abandoned-land ecosystems, restoration of urban ecosystem. Restoration ecology is one of the key courses in Ecology. The students in Ecology, Ecological conservation and Environmental protection are requested to select it for credit.

(6) **【Course Title】** Global Environmental Issues
全球环境问题

【Course Code】 80050253
【Credits】 3
【Credit Hours】 48
【Semester】 Spring
【Capacity】 25 Graduate Students
【Instructor】 WANG Can 王灿
【Course Description】

The course will target to five important global environmental issues, including 1) global climate change, 2) Persistent Organic Pollutants, 3)

curriculum-transboundary movement of hazardous waste and international chemicals management, 4) biodiversity and conservation, and 5) global and regional air pollution. On the global climate change, the following aspects will be introduced: the scientific evidence and courses of global climate change, the impacts of and adaption to climate change, the social economic impacts of mitigation, the UNFCCC and its negotiation progress, the global carbon market, the global energy issues, and so on. Several discussion topics will be identified among the aforementioned issues. Regarding the issue of Persistent Organic Pollutants (POPs), the course will firstly introduce the Origin of POPs as an environmental concern, followed by Properties and global transport of POPs, Process of developing the international treaty, Main POPs included in the Stockholm Convention, Obligations required by the Stockholm Convention, Existing barriers for developing countries to implement the Convention, Obligation of developed countries in financial and technology transfer, Trend and main problems of the Stockholm Convention. The discussion topics will focus on listing new POPs into the Stockholm Convention. The part on curriculum-transboundary movement of hazardous waste and international chemicals management will cover the following issues: International Conventions related to transboundary movement of hazardous waste and international chemicals management will be introduced and discussed in this course. Based on the introduction of hazardous waste, origin, main content and development trend of Basel Convention will be instructed, with an emphasis on hot topics.

(7) **【Course Title】** Hazardous Waste Disposal

危险废物处置技术

【Course Code】 80050263

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 25 Graduate Students

【Instructor】 LI Jinhui 李金惠

【Course Description】

Solid waste pollution control and reclamation is one of the most popular topics in the field of environmental protection. Concerning solid waste, emphasis is laid on the sound environmental management of hazardous wastes and municipal wastes. Many universities abroad have set up courses of hazardous waste management, including management policy, methodology, technology, engineering and practices. Although a different course name is used here, the overall outlook is the same, including contents as follows. 1. Introduction on hazardous waste, including the history, important incidences and future endeavors of the hazardous waste management, and the definition, typology and sources of the hazardous waste. 2. The legal framework of hazardous waste management, including Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, Stockholm Convention on Persistent Organic Pollutants, introduction on

laws and regulations of hazardous waste management in EU, USA and China, and cutting-edge information about hazardous waste management. 3. Hazardous waste minimization and management plan, including hazardous waste minimization, waste exchange, project planning and audits. 4. Hazardous waste treatment methods, including physical chemical processes, biological methods, stabilization and solidification. 5. Hazardous waste facility development and operation, including facility types, facility operations, needs assessment, site selection, public participation, permitting. 6. Hazardous waste thermal treatment methods, including regulations, combustion, liquid injection incinerators, solid waste incineration, storage and feed systems, air pollution control, continuous emission monitors, trial burns, mobile systems. 7. Hazardous waste land disposal methods, including landfill operations, site selection, liner and leachate collection systems, cover systems, contaminant transport through landfill barriers, landfill stability, etc.

(8) **【Course Title】** Social Practice

社会实践

【Course Code】 69990041

【Credits】 1

【Credit Hours】 16

【Semester】 Spring

【Capacity】 30 graduate Students

【Instructor】 DENG Shuo 邓述波

【Course Description】

In this course, the overseas students visit Chinese History Museum, Memorial Museum of Chinese People's Anti-Japanese War, Military Museum, Yuanmingyuan Park to know the Chinese history; visit exhibition such as China grow up to know Chinese culture and achievements in past 30 years; participate in community service to foster service consciousness; participate one of the in-situ social practices such as cycling economy, nationality culture, water environmental problems, teaching in west china to further know China change as well as the related environmental problems. Finally, the results of social practice are submitted in hard copy and orally presented.

(9) **【Course Title】** Environmental Transport Processes

环境传质学

【Course Code】 70050332

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 30 graduate Students

【Instructor】 ZHANG Fang 张芳, Bruce E.LOGAN

【Course Description】

This course covers the fundamentals of mass transport of chemicals between air, water, soil, and biota. Material is divided into three subject areas: mass transfer

theory, transport processes related to engineered reactors, and transport in the natural environment. The focus of the course is on chemical calculations particular to dilute systems, with emphasis on quantifying chemical transport rates and distributions in natural and engineered environments. Special topics of interest to Environmental Engineers include biofilm models, bioreactors, chemical partitioning in thin fluid films, and fate of anthropogenic chemicals from spills and discharges into the environment (rivers, lakes, and groundwater).

11. Department of Hydraulic Engineering

(1) **【Course Title】** Integrated River Management

河流综合管理

【Course Code】 80040103

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 WANG Zhaoyin 王兆印

【Course Description】

12. Department of Industrial Engineering

(1) **【Course Title】** Production Management II

生产管理 II

【Course Code】 70160483

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 50 Graduate Students

【Instructor】 CAO Hui 曹晖

【Course Description】

This graduate course leads students to investigate the organizational and technical impact between enterprise management strategies and information system/technologies, and match up the relationship between the production problems and corresponding IT solution. The course will help students understand various management strategies in an enterprise context, including Enterprise Resource Planning, Supply Chain Management, Customer Relationship Management and Product Lifecycle Management.

The course aims at getting students to think about the overall picture of enterprise information systems, systematically explore the fast expanding field of information systems and their applications in enterprises, and at the same time, understand the methodologies of system analysis and design for enterprise information systems. The methods of system analysis, enterprise modeling and enterprise integration will also be discussed.

(2) **【Course Title】** Enterprise Information Management

企业信息资源管理

【Course Code】 80160033

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 25 Graduate Students

【Instructor】 YU Ming 于明

【Course Description】

This graduate course leads students to systematically explore the fast expanding field of information systems and their applications in enterprises. Students will investigate the organizational and technical impact between enterprise management strategies and information system/technologies.

The course aims at getting students to think about the overall picture of enterprise information systems, match up the relationship between the production problems and corresponding IT solution, and at the same time, understand the methodologies of system analysis and design for enterprise information systems.

The course will help students choose from various information systems and development/integration strategies in an enterprise context. Strategies include

Enterprise Resource Planning, Supply Chain Management, Customer Relationship Management and Product Lifecycle Management will be investigated, and the methods of system analysis, enterprise modeling and enterprise integration will be discussed.

(3) **【Course Title】** Logistics & Supply Chain Management

物流与供应链管理

【Course Code】 80160223

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 40 Graduate Students

【Instructor】 HUANG Simin 黄四民

【Course Description】

Develop a knowledge and understanding of the issues and technologies underlying supply chain management with a focus on analysis and design skills for Logistics systems, including demand management, inventory management, logistics network design, supply chain risk, etc.

(4) **【Course Title】** Global Manufacturing Strategy

全球化制造战略

【Course Code】 80160293

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 40 Graduate Students

【Instructor】 GU Xueyong 顾学雍

【Course Description】

This course will provide an overview to the brief history of manufacturing technologies and related social and political strategies operated by manufacturers and local governments. We will discuss multiple factors that affect manufacturing strategies, including human resources, natural and technical resources, and the management of intellectual properties. We hope that students could learn from an interactive style by running debate sessions, and in-class presentations, so that they can emulate the decision procedures in formulating or articulating global manufacturing strategies. This course will contain a series of systematic discussion covering topics such as: communication and financial engineering tools, logistic management, and the impact of WTO and NAFTA. We will also spend time to observe and relate the latest development in manufacturing technologies, and the special applications of sensor networks and their influence on manufacturing strategies around the world.

(5) **【Course Title】** Manufacturing Engineering

制造工程

【Course Code】 80160303

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 40 Graduate Students

【Instructor】 ZHENG Li 郑力

【Course Description】

This course provides in-depth understanding of the structure and function of modern production systems with emphasis on the roles that techniques and technologies play in production. Topics include basic concepts and models, manufacturing processes, automation and control technologies, manufacturing system analysis and planning, and manufacturing support systems. This course includes three lab experiments on production automation and one project on assembly line design.

13. Institute of Interdisciplinary Information Sciences

(1) **【Course Title】** General Physics (1)

普通物理 (1)

【Course Code】 20470024

【Credits】 4

【Credit Hours】 64

【Semester】 Spring

【Capacity】 40 Undergraduate Students

【Instructor】 Alioscia Hama

【Course Description】

Calculus-based first physics course for physics majors and students with a serious interest in physics. Students are required to actively participate during the lectures, asking questions, and having questions asked. This class will provide you with an enhanced opportunity to acquire a good understanding of fundamental mechanics and thermodynamics and to learn how to apply this understanding to physics and beyond.

(2) **【Course Title】** Mathematics for Computer Science

计算机应用数学

【Course Code】 30470023

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 45 Undergraduate Students

【Instructor】 Steinberger John Paul

【Course Description】

This course aims to introduce the fundamental mathematical techniques useful for computer science undergraduate majors, illustrated with a rich spectrum of applications. Modern computer science education requires the students to be equipped with broad knowledge in mathematics, so that they could cope with current and future technological challenges handily and innovatively. In this course, mathematical techniques from algebra, geometry, probability theory, stochastic modeling, and information theory will be covered. These techniques will be applied to algorithmic and design problems in various topics, including internet, cryptography, distributed systems, wireless sensor network, optimization, etc. Finally, this course introduces the students to deep scientific issues in the foundation of computing such as undecidability, complexity, and quantum computers.

(3) **【Course Title】** Operating System

操作系统

【Course Code】 30470084

【Credits】 4
【Credit Hours】 64
【Semester】 Spring
【Capacity】 55 Undergraduate Students
【Instructor】 XU Wei 徐葳
【Course Description】

In this course, student will learn the design principles of operating systems, and techniques to build a complex software systems. Topics covered in this course include operating systems structure, multi-programming (processes, inter-process communication, and synchronization), memory management (virtual memory, segmentation, and paging), scheduling, file systems, system security, basic computer networking (switching, protocols), and basic concept on database management systems (transaction). In addition to classroom instruction, the students are required to complete a substantial programming project.

(4) **【Course Title】** Computational Biology
计算生物学

【Course Code】 30470093
【Credits】 3
【Credit Hours】 48
【Semester】 Spring
【Capacity】 40 Undergraduate Students
【Instructor】 ZENG Jianyang 曾坚阳
【Course Description】

To introduce various computational problems for analyzing biological data (e.g. DNA, RNA, protein sequences, and biological networks) and the algorithms for solving these problems. Topics covered include: biological sequence analysis, gene identification, regulatory motif discovery, genome assembly, genome duplication and rearrangements, evolutionary theory, clustering algorithms, and scale-free networks.

(5) **【Course Title】** Theory of Computation
计算理论

【Course Code】 30470134
【Credits】 4
【Credit Hours】 64
【Semester】 Spring
【Capacity】 45 Undergraduate Students
【Instructor】 Tzameret Iddo
【Course Description】

This course gives an introduction to the basics of computation theory, including: Finite Automata, Regular language, Pushdown Automata, Context-Free Grammars, Turing machine, undecidability, and computational intractable topics (NP complete, PSPACE, BPP etc).

(6) **【Course Title】** Game Theory
博弈论

【Course Code】 30470154

【Credits】 4

【Credit Hours】 64

【Semester】 Spring

【Capacity】 45 Undergraduate Students

【Instructor】 TANG Pingzhong 唐平中

【Course Description】

It is preferable that students have studied basic linear algebra, and have basic calculus skills. Although this is not required because we will develop the mathematical skills as we introduce the material. This course will serve as an introduction to game theory. We will begin from the very basics of game theory. We will work on important concepts like Nash equilibria, and end with a taste of more advanced subjects like evolutionary game theory and games on graphs.

(7) **【Course Title】** Modern Physics (1)
近代物理 (1)

【Course Code】 30470204

【Credits】 4

【Credit Hours】 64

【Semester】 Spring

【Capacity】 40 Undergraduate Students

【Instructor】 Kim Kihwan

【Course Description】

This course will cover the basic formalism and modern applications of optics and atomic physics. In the optics part, we will introduce geometric optics, wave optics, and their applications in the current research frontier such as quantum information science. For the atomic physics part, we will present many interesting experiments performed in early 20th century and explain how these results lead to the modern understanding of atomic structure. Modern applications of optics and atomic physics, such as laser and laser cooling of atoms, will also be discussed.

(8) **【Course Title】** Distributed Computing (Fundamentals and Systems)
分布式计算 (基础与系统)

【Course Code】 40470034

【Credits】 4

【Credit Hours】 64

【Semester】 Spring

【Capacity】 40 Undergraduate Students

【Instructor】 CHEN Wei 陈卫

【Course Description】

Through this course, students will learn fundamental algorithms and principles in distributed computing systems, such as logical clocks, consensus problem, failure detection, Byzantine agreement, distributed locking, and gossip protocols. They will also learn how to design and analyze distributed systems using these fundamental algorithms and principles through the study of a number of advanced distributed systems.

(9) **【Course Title】** Network Science

网络科学

【Course Code】 40470104

【Credits】 4

【Credit Hours】 64

【Semester】 Spring

【Capacity】 45 Undergraduate Students

【Instructor】 Moscibroda Thomas

【Course Description】

Network science is a new and emerging scientific discipline that examines the interconnections among diverse physical or engineered networks, information networks, biological networks, cognitive and semantic networks, and social networks. In this course, we examine the many facets of internet from the algorithmic perspective, including for instance the mathematical modeling of large-scale networks, information retrieval algorithms for massive data sets, algorithmic game theory and electronic commerce. Specific topics include small world phenomena, power law distributions, rank aggregation, web crawling, hubs and authorities, clustering large data sets, streaming algorithms, network routing, Nash equilibrium, market clearing, mechanism design, auction theory, social networks, etc.

(10) **【Course Title】** Introduction to Computer Networks

计算机网络基础

【Course Code】 30470223

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 40 Undergraduate Students

【Instructor】 HUANG Longbo 黄隆波

【Course Description】

This course aims at giving a comprehensive introduction to the fundamentals of computer networks and network performance analysis. The course contains two parts. The first part covers various networking topics including network principles, Ethernet, WiFi, routing, inter-networking, transport, WiMax and LTE, QoS, and physical layer knowledge. The second part presents mathematical techniques for modeling, analyzing and designing computer systems, including convex optimization, queueing theory, game theory and stochastic analysis. This

course is intended for junior or senior undergraduate students in computer science or electrical engineering.

(11) **【Course Title】** Advanced Theoretical Computer Science (1)
高等理论计算机科学（上）

【Course Code】 80470014

【Credits】 4

【Credit Hours】 64

【Semester】 Spring

【Capacity】 10 Undergraduate Students, 30 Graduate Students

【Instructor】 LI Jian 李建

【Course Description】

The course will cover the following topics: NP completeness, PSPACE, L Space, IP system, BPP, derandomization, PCP, and quantum circuit, quantum Fourier transform, Shor's algorithm, Grover search algorithm, quantum error-correction, von Neumann entropy etc.

(12) **【Course Title】** Stochastic Network Optimization Theory
随机网络优化理论

【Course Code】 80470084

【Credits】 4

【Credit Hours】 64

【Semester】 Spring

【Capacity】 10 Undergraduate Students, 30 Graduate Students

【Instructor】 HUANG Longbo 黄隆波

【Course Description】

This course will give an in-depth introduction to the recently developed Lyapunov optimization theory for stochastic networks. It aims at introducing to the students various concepts of queue stability, general models for stochastic queueing networks, the minimum-drift algorithm design principle, and the Lyapunov drift analysis technique. It will also present applications of the theory to both networking and operations research problems, and encourage the students to apply the theory to their own problems of interest.

(13) **【Course Title】** Semantic Technologies
语义技术

【Course Code】 80470143

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 Gerard de Melo

【Course Description】

The Web is more than just a collection of Web pages. It contains rich sources of semi-structured and structured data that have enabled new knowledge-driven applications. Such applications are often called “semantic” and “intelligent”, because they have access to large amounts of knowledge and make smart use of it. Examples include industry projects like the Google Knowledge Graph, Linked Data and the Semantic Web. Such semantic knowledge has enabled many new applications, including better Web search results, powerful question answering systems like IBM’s Watson, and Virtual Personal Assistants. It is fairly certain that these technologies will play an ever-increasing role in the next years. Thus, it is important for graduate students to learn about some of the technology that powers these intelligent applications. Students will learn the underlying architecture and models, methods for mining knowledge, and techniques to apply semantic knowledge in applications.

(14) **【Course Title】** Advanced Quantum Statistical Mechanics

高等量子统计力学

【Course Code】 80470154

【Credits】 4

【Credit Hours】 64

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 Aliocia Hama

【Course Description】

Review of statistical mechanics, Information and Statistical Physics, foundations of quantum statistical mechanics, Quantum Master and Kinetic equations, Quantum irreversibility, Non-equilibrium quantum mechanics, Equilibrium limit theorems, quantum measurement and irreversibility, Fluctuation and dissipation theorems Thermodynamic limit for quantum mechanical systems, Quantum Phase transitions, Fidelity and information, Symmetries and order parameters, spontaneous symmetry breaking, quantum spin systems, locality in quantum many body systems, Lieb-Robinson bounds, quantum lattice gauge theory, scaling and universality, entanglement and foundations of quantum statistical mechanics, topological quantum order, anions and fusion, conformal field theory, quantum hard drives, equilibration and quantum quenches. Black hole thermodynamics.

(15) **【Course Title】** Advanced Quantum Information Theory

高等量子信息学

【Course Code】 80470163

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 Giulio Chribella, MA Xiongfeng

【Course Description】

This course provides an overview of the latest advancements in quantum information theory and quantum computation. Starting from the foundation of the framework of density matrices and open system dynamics, the course gradually transitions into two main chapters, the first about the quantum theory of information compression and transmission and the second on the topological models of quantum computation. The first chapter will deal with quantum entropies and quantum typicality, providing useful tools also for students interested in quantum thermodynamics. The second chapter will deal with anyons and geometric phases, showing the features of anyonic statistics can be used to perform stable and efficient quantum computations. Students who take this course will develop the mental discipline needed to identify and discuss critically these questions and will be provided with the sharpest theoretical tools to address these questions.

(16) 【Course Title】 Selected Topics in Information Physics

信息物理学

【Course Code】 80470182**【Credits】** 2**【Credit Hours】** 32**【Semester】** Spring**【Capacity】** 30 Graduate Students**【Instructor】** Mile Gu, WENG Wenkang 翁文康**【Course Description】**

This course aims at introducing graduate students to the rapidly developing field of information physics. The course will highlight how the most important concepts in computation and complexity theory are physical, and how some of the most puzzling questions in physics can be answered through information theory. We review classical information theory, and how it must be generalized with the discovery of quantum mechanics. The ramifications of this to information storage, energy extraction and computational complexity are discussed.

14. International Chinese Language and Culture Center (ICLCC)

(1) **【Course Title】** Elementary Chinese

初级汉语

【Course Code】 60610162 (3)

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 15 Undergraduate Students, 15 Graduate Students

【Instructor】 ZHANG Yi 张怡

【Course Description】

For Exchange Students (Beginner).

15. Department of International Relations

- (1) **【Course Title】** Arms Control and Security Studies
军备控制与安全研究
【Course Code】 80615102
【Credits】 2
【Credit Hours】 32
【Semester】 Spring
【Capacity】 35 Graduate Students
【Instructor】 LI Bin 李彬
【Course Description】

- (2) **【Course Title】** Ethics in the Era of Globalization
全球化中的伦理争议
【Course Code】 80700542
【Credits】 2
【Credit Hours】 32
【Semester】 Spring
【Capacity】 35 Graduate Students
【Instructor】 TANG Xiaoyang 唐晓阳
【Course Description】

- (3) **【Course Title】** Democratization and China in Comparative Perspective
比较视野下的民主化与中国
【Course Code】 70613002
【Credits】 2
【Credit Hours】 32
【Semester】 Spring
【Capacity】 35 Graduate Students
【Instructor】 SU Yusong 苏毓淞
【Course Description】

- (4) **【Course Title】** European International Relations and Sino-European Relations
欧洲国际关系与中欧关系研究
【Course Code】 80615592
【Credits】 2
【Credit Hours】 32
【Semester】 Spring
【Capacity】 35 Graduate Students
【Instructor】 SHI Zhiqin 史志钦
【Course Description】

- (5) **【Course Title】** International and Comparative Political Economy
国际和比较政治经济学

【Course Code】 70612722
【Credits】 2
【Credit Hours】 32
【Semester】 Spring
【Capacity】 35 Graduate Students
【Instructor】 CHEN Maoxiu 陈懋修
【Course Description】

(6) **【Course Title】** Public Diplomacy: Global and Comparative Perspectives
公共外交：全球和比较的视角

【Course Code】 80615242
【Credits】 2
【Credit Hours】 32
【Semester】 Spring
【Capacity】 35 Graduate Students
【Instructor】 ZHAO Kejin 赵可金
【Course Description】

(7) **【Course Title】** Political Economy of Development
发展政治经济学

【Course Code】 80700122
【Credits】 2
【Credit Hours】 32
【Semester】 Spring
【Capacity】 35 Graduate Students
【Instructor】 PANG Xun 庞珣
【Course Description】

16. School of Journalism and Communication

(1) **【Course Title】** Media Research Methods

传播学研究方法

【Course Code】 70670112

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 18 Graduate Students

【Instructor】 LU Jia 卢嘉

【Course Description】

The course is designed to equip the students with basic knowledge and research skills on media research. The topics covered cross the course include (but may not limited within) the nature, types and characteristics of media research, the main components of research design, various data collection approaches, data analyses, as well as the presentation and communication of research results. During the process, students are expected to be able to familiarize themselves with several popular media research methods with the primary ability of research practice.

(2) **【Course Title】** Media Management

媒介管理

【Course Code】 80670572

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 45 Graduate Students

【Instructor】 Richard S. Dunham

【Course Description】

(3) **【Course Title】** Feature Writing in English

英语特稿写作

【Course Code】 80670612

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 45 Graduate Students

【Instructor】 ZHOU Qingan 周庆安

【Course Description】

This course aims to integrate reading and writing of feature journalism. By reading the canonic texts of feature writing from British and US newspapers and magazines, the instructor will help students know its notion, genre, and format. The students will practice the different styles of feature writing (political, economic, social and cultural) with the instructor's guidance.

(4) **【Course Title】** Intercultural Communication

跨文化传播

【Course Code】 80670632

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 18 Graduate Students

【Instructor】 SHI Anbin 史安斌

【Course Description】

*to learn the concept and theoretical framework, paradigms and research methodology of intercultural communication at interpersonal/organizational/mass media levels; *to acquire the "backgrounder" of the main patterns of global media/culture and basic skills in intercultural communication; *to apply the coursework to intercultural praxis in journalism, broadcasting, advertising and public relation.

(5) **【Course Title】** News Writing and Multi-media Reporting

新闻写作与多媒体报道

【Course Code】 80670793

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 Richard S. Dunham

【Course Description】

This course contains two main modules: news writing and multi-media reporting. In the news writing module, students are trained with basic knowledge of writing and reporting, with a focus on business news. In the multi-media reporting module, students are trained with basic skill of applying multi-media devices for business report.

(6) **【Course Title】** Business News Data Mining and Analysis

财经新闻数据挖掘与分析

【Course Code】 80670833

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 45 Graduate Students

【Instructor】 Lee J. Miller

【Course Description】

A key asset of the class will be students' use of the Bloomberg Professional Terminal. TSJC has more terminals of any university in the world. Students will have the opportunity to learn data mining on the platform that is used by the

world's leading business journalists, financial analysts, economists and consultants will provide a competitive advantage upon graduation and during their careers.

17. School of Law

- (1) **【Course Title】** Hot Issues of the Contemporary International Legal System
当代国际法热点问题
【Course Code】 30660192
【Credits】 2
【Credit Hours】 32
【Semester】 Spring
【Capacity】 50 Undergraduate Students
【Instructor】 LI Zhaojie 李兆杰
【Course Description】
By identifying and analyzing the hot issues of the contemporary international legal system, this seminar course is designed to broaden students' professional horizon and to promote their English proficiency for reading and communicating, in the field of international law. Ultimately, through their studies in this course, students are expected to familiarize themselves with the dynamic characteristics of the contemporary system of international law and make progress in building up their professional capacity of dealing with international legal transactions.
- (2) **【Course Title】** Legal English
法律英语
【Course Code】 40660072
【Credits】 2
【Credit Hours】 32
【Semester】 Spring
【Capacity】 30 Undergraduate Students
【Instructor】 SANG Guoya 桑国亚
【Course Description】
- (3) **【Course Title】** Chinese Arbitration System and Chinese International Arbitration
中国仲裁制度与中国国际仲裁
【Course Code】 80661822
【Credits】 2
【Credit Hours】 32
【Semester】 Spring
【Capacity】 50 Graduate Students
【Instructor】 TAO Jingzhou 陶景洲, LU Song 卢松
【Course Description】
This course will discuss the trend and problems of developing international commercial arbitration in mainland China.
- (4) **【Course Title】** Preparation and Presentation of Case in International Arbitration
国际仲裁案例研修
【Course Code】 80661803

【Credits】 3
【Credit Hours】 48
【Semester】 Spring
【Capacity】 50 Graduate Students
【Instructor】 ZHENG Ruohua 郑若骅
【Course Description】

(5) **【Course Title】** Enforcement of Arbitral Awards
国际仲裁裁决的执行

【Course Code】 80661812
【Credits】 3
【Credit Hours】 48
【Semester】 Spring
【Capacity】 50 Graduate Students
【Instructor】 Albert Jan
【Course Description】

The New York Convention is the most important treaty in the context of international commercial arbitration. The module will examine the cases on recognition and enforcement of arbitration agreements and arbitral awards under the New York Convention in various jurisdictions. The jurisprudence emanating from the court decisions on the way as to how various jurisdictions interpret this Convention will be studied and discussed.

(6) **【Course Title】** WTO Dispute Resolution
WTO 争端解决机制

【Course Code】 80661933
【Credits】 3
【Credit Hours】 48
【Semester】 Spring
【Capacity】 50 Graduate Students
【Instructor】 ZHANG Yuejiao 张月姣
【Course Description】

The course provides a basic understanding in WTO law and the practice and procedures of the Appellate Body of the WTO. An overview of WTO disputes resolution procedures will also be presented.

18. School of Life Sciences

- (1) **【Course Title】** Topics in Tumor Biology
肿瘤生物学专题讨论课

【Course Code】 90450041

【Credits】 1

【Credit Hours】 16

【Semester】 Spring

【Capacity】 15 Graduate Students

【Instructor】 CHEN Yeguang 陈晔光

【Course Description】

- (2) **【Course Title】** Biochemistry (1)
生物化学（1）

【Course Code】 30450203

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 255 Undergraduate Students, 5 Graduate Students

【Instructor】 LIU Dong 刘栋

【Course Description】

The main purpose of this course is to teach the students the basic concepts in biochemistry, which includes the structures and functions of proteins, nucleic acids, carbohydrates, lipids and biomembranes. We will also put the emphasis on enzyme kinetics and molecular mechanisms of signal transduction of the cells. Besides lectures, we will also discuss the problems and answer the questions to the students through the websites or one-to-one meeting. There are will be some homework assignments to students after each lecture. We will also recommend some original research articles for students to read to further raise their interests in biochemistry.

- (3) **【Course Title】** Genetics
遗传学

【Course Code】 30450303

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 240 Undergraduate Students

【Instructor】 ZHOU Bing 周兵

【Course Description】

This course is designed to introduce genetic principles to students of biology major. It aims to cover comprehensively all fields of classical and modern genetics, but skips most topics that have been taught in biochemistry and microbiology.

- (4) **【Course Title】** Molecular Biology

分子生物学

【Course Code】 30450453

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 248 Undergraduate Students

【Instructor】 DAI Junbiao 戴俊彪

【Course Description】

Molecular Biology is to study the activity and function of genes at molecular level. In this class, I will introduce the key points in molecular biology, focusing on the basic theories and major techniques with current development and emerging discoveries of molecular biology. The main topic in this class includes: 1) the major tools to study genes and their activities, 2) Transcription and transcriptional regulation in prokaryotes, 3) Transcription and transcriptional regulation in eukaryotes, 4) DNA and protein interaction during transcription, 5) Post-transcriptional modification of RNA, 6) DNA recombination and transposition, 7) DNA damage repair, 8) Small RNAs, 9) Omics (genomics, transcriptomics and proteomics).

19. School of Materials Science and Engineering

(1) **【Course Title】** Engineering Materials

工程材料

【Course Code】 20350033

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 30 Undergraduate Students

【Instructor】 WU Yunxin 吴运新

【Course Description】

This course combines the fundamentals of engineering materials with their applications. By means of lectures, discussion, lab exercises and project report, the students are enabled to understand the relationships among the four elements of materials science and engineering, i.e., composition and processing, microstructure, property, and performance.

The lectures consist of the following three parts: (1) The first part briefs the atomic-level structures of engineering materials, covering the interatomic bonding, crystalline and noncrystalline structures, crystal defects, crystallization, and atomic diffusion. (2) In the second part, the basic relationship between structure and mechanical property is described. The stress-strain behaviors of metallic, ceramic and polymeric materials, as well as their strengthening mechanisms and fracture failure are correlated with the structures. In addition, the development of equilibrium microstructures in binary alloys (including Fe-C alloys) and ceramics is analyzed with reference to the phase diagrams. Furthermore, the heat treatments of steels and nonferrous alloys are introduced, and the resultant metastable microstructures with improved mechanical properties are analyzed. (3) The third part introduces the typical compositions, processing, microstructures, properties and applications of various engineering materials. Metal alloys, ceramics and glasses, polymers, and composites are described, with an emphasis on their mechanical properties and applications as the structural materials. The necessity of corrosion and wear control is also included. In addition, the physical properties of functional materials are briefed, focusing on their applications in thermal, semiconducting, dielectric, piezoelectric, magnetic, superconductive, and optical devices.

(2) **【Course Title】** Introduction to Metallic Functional Materials

金属功能材料导论

【Course Code】 20350102

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 20 Undergraduate Students

【Instructor】 Andy Godfrey

【Course Description】

This is an introductory level course aimed at giving a basic introduction to the key relationship between structure and properties in material science, and on a wider level to encourage students to think about the role of materials in modern society. The course content will focus predominantly on metallic materials, but for completeness will also cover other classes of material (including ceramics, composites and semi-conductors). The first half of the course will cover the atomic structure of materials and then review different meanings of the mechanical “strength” of a material. Following this some key functional properties will be covered, including electrical conduction, semi- and super-conduction, and magnetism. The final lecture will give students an insight into the materials science of carbon-based materials. This is a Freshman Seminar course – where all students will be expected to participate in class discussions on topics raised during the lecture periods, and where the emphasis is not on learning technical details, but on developing an awareness of key concepts. The course is open to students from all backgrounds – in the past students with study majors as diverse as economics and medicine have taken part, and actively contributed to the course. Course assessment will be based on a combination of a group presentation (groups of 3-4 students depending on class size), a final written paper (4 pages typically), and class participation. Note that the class will be conducted entirely in English, so students should be comfortable with this. The final written paper will however not be graded based on the quality of the written language (as long as the key points presented are clear). There is no textbook for the course – lecture handouts in PDF format and additional reading materials will be provided as required

20. Department of Mechanical Engineering

- (1) **【Course Title】** Welding Technology I: Welding and Cutting Technologies

焊接技术 I: 焊接与切割方法

【Course Code】 80120253

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 ZHAO Haiyan 赵海燕

【Course Description】

- (2) **【Course Title】** Numerical Simulation of Manufacturing Processes

制造过程数值模拟技术

【Course Code】 80120692

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 20 Graduate Students

【Instructor】 RONG Yiming 融亦鸣

【Course Description】

The course is designed by Professor Yiming Rong. The course has been designed to focus on fundamentals and numerical modelling technology for manufacturing processes. The newest commercial CAE software packages have been provided for projects and exercises. The content of this course includes the fundamentals, complete procedure and state-of-art on applications of numerical simulation technology in modern manufacturing engineering. The goal of this course is to help students to grasp basic concepts and main steps in numerical simulation for manufacturing processes systematically, to connect the manufacturing theory with modelling technology, to understand the state of art and tendency of the technology, to extend the capability of analyzing and solving problems. It will be foundation of digitalization of manufacturing processes that has been developing rapidly.

- (3) **【Course Title】** Manufacturing Technology II

制造技术 (2)

【Course Code】 80120723

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 15 Graduate Students

【Instructor】 SHI Wei 石伟

【Course Description】

Manufacturing Technology II is one of courses belonging to the joint master degree program of RWTH Aachen in Germany and Tsinghua University, and open

of international students. The main purpose of this course is to teach postgraduate students materials forming mechanism, and production procedure, productivity and cost about material forming techniques which consist of casting, sintering, and metal forming technology. Besides metallurgy and the processing method knowledge, the course also teaches students how to analyze and compare different manufacturing methods by considering dimension accuracy, production efficiency and costing of these methods, and using methods of technology planning. Forming technology is the main part of this course, which includes metallurgical basics in plastic deformation, bulk forming, blanking, and forming tools and tribology. The course is given in English and offered to international students whose majority is Production Engineering, Industrial Engineering, or Mechanical Engineering. The course is given in every week, 3 units per week.

(4) **【Course Title】** Tribology

摩擦学

【Course Code】 70120253

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 20 Graduate Students

【Instructor】 WANG JiaDao 汪家道 TIAN Yu 田煜 SHAO TianMin 邵天敏

【Course Description】

The course is a systematic presentation of tribology fundamentals, and the current state and development trend in tribology research. It mainly consists of three parts including lubrication, friction and wear. Besides the classical tribology contents, it also covers scopes of surface forces, contact mechanics and other current attractive topics in tribology. Additionally, typical tribological instruments and experiments will be introduced to enhance the concepts of the tribology.

(5) **【Course Title】** Laser Application 激光及其应用

【Course Code】 80120882

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 40 Graduate Students

【Instructor】 Wenpeng 温鹏, Reinhart Poprawe

【Course Description】

Starting from a brief overview over today's applications of laser technology, the Fraunhofer ILT and Chair for Lasertechnology LLT at RWTH Aachen University are introduced. The differences between thermal light and laser light are illustrated and discussed in terms of mode occupation and coherence. Furthermore, it is shown how a selection of longitudinal and transverse modes is performed inside a laser resonator and which basic physical principles are needed for the description of the light and material interaction. We introduce the laser rate equations and the corresponding

energy levels of the active media. The students know the fundamental characteristics of laser radiation with respect to laser material processing. They are able to calculate beam parameters and process parameters including the basic properties of the Gaussian beam and the ability to calculate its changes with propagation in simple optical systems. They know the setup of gas, solid state and diode lasers in principle and understand the function of their components. Furthermore, the students are familiar with the relevant interactions of light and matter, as well as diffusion processes inside the work piece and know the industrial applications of laser materials processing and measurements with lasers. Based on this, the students calculate system parameters of basic applications which are relevant to daily practice. They know the physical mechanisms and typical parameters of the relevant industrial laser applications and are able to compare results to the common state of technology.

21. School of Medicine

(1) **【Course Title】** Management on Public Health Services

卫生事业管理

【Course Code】 74000283

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 10 Undergraduate Students, 50 Graduate Students

【Instructor】 LIU Tingfang 刘庭芳

【Course Description】

Management on Public Health Services is a subject that explores the development rule of health service, the allocating mechanism of health resource, health policy in step with the situation of China, organization management or work method, and the experiences from other countries based on the theory, method and technology of modern management science to improve the people's health status. This course covers the framework of the health organization, health resource management, health policy analysis, health insurance system and all kinds of health affairs.

(2) **【Course Title】** Epidemiology

流行病学

【Course Code】 74000293

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 10 Undergraduate Students, 50 Graduate Students

【Instructor】 ZHANG Linqi 张林琦

【Course Description】

Epidemiology is a population level research on diseases and health science. Course content includes general and special theory. Its general theory describes the basic concepts, basic knowledge and general theory of the Epidemiology. The special part aims to the introduction on the application of epidemiology in disease prevention and control, mainly involving large current human health hazard of infectious diseases and chronic non-infectious diseases, such as cardiovascular diseases, cancer, the respiratory system and the digestive system diseases, sexually transmitted diseases, AIDS, injuries etc.

22. Department of Microelectronics and Nanoelectronics

(1) **【Course Title】** PLL Design and Clock/Frequency Generations

PLL 设计与时钟/频率产生

【Course Code】 80260042

【Credits】 2

【Credit Hours】 32

【Semester】 Spring

【Capacity】 40 Graduate Students

【Instructor】 LI Yugen 李宇根

【Course Description】

This course gives insights into phase-locked clock generation as well as the ability of gaining system perspectives and circuit design aspects of phase-locked loop (PLL) for wireless and wireline communications. In the first half of the course, basic theoretical analysis of the PLL and system/circuit design considerations will be discussed. The second half of the course consists of extensive lectures covering practical design aspects in various PLL applications and more advanced topics; frequency synthesis, clock-and-data recovery, delay-locked loops, on-chip testability and compensation, coupling in SoC design, and future challenges.

23. Department of Physics

- (1) **【Course Title】** Physics (1)
大学物理 (1)
【Course Code】 10430344
【Credits】 4
【Credit Hours】 64
【Semester】 Spring
【Capacity】 150 Undergraduate Students
【Instructor】 BI Kaijie 毕楷杰
【Course Description】
- (2) **【Course Title】** Physics (2)
大学物理 (2)
【Course Code】 10430345
【Credits】 4
【Credit Hours】 64
【Semester】 Spring
【Capacity】 150 Undergraduate Students
【Instructor】 BI Kaijie 毕楷杰
【Course Description】

24. School of Public Policy and Management

- (1) **【Course Title】** Economic Development and Policy in China
中国经济发展与政策

【Course Code】 70590603

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 HU Angang 胡鞍钢

【Course Description】

This course focuses on the hot topics on China's transition and development including economic growth, industrial policies, environment, employment, government finance, public service and so on. It is designed for master-level students in public policy and economics. The course is based on the theory of development economics and providing the basic analysis framework for China studies. There will be both historical and contemporary perspective for teaching and give overall picture of China's development record. Both quantitative and qualitative analysis will be applied in the course to enhance the students' capacity on conceptive and empirical research. Besides lectures, the course will also get students involved in the discussions and researches. The evaluation method is multi-dimensional to examine students' knowledge and analytical capacity through research essays, group presentations and discussions, as well as course involvement.

- (2) **【Course Title】** Comparative Development
世界各国发展模式

【Course Code】 70590613

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 Richard A. Boyd

【Course Description】

The course will present a survey of 'stylised accounts' of developmental models noted for their particularity, and their status as benchmarks of success and failure. In addition, the course will address questions regarding the prerequisites of different development models, how far developmental experiences can be replicated and problems of transferability. The course will touch upon the cost to the past, and to the future, and consider more fully, a range of issues which might include such topics as political order as both a public good and as ideology, economic growth and gender discrimination, the market and civil society, and the nature and limitations of the Washington Consensus. Furthermore, students will choose, in consultation with the course instructor and no later than week 8 on

completion of the survey of country models of development, a single model to explore in relation to their own country of origin.

(3) **【Course Title】** Science & Art of Leadership
领导科学与艺术

【Course Code】 80590213

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 40 Graduate Students

【Instructor】 WANG Youqiang 王有强

【Course Description】

(4) **【Course Title】** China's Foreign strategy and Policy
中国外交战略和政策

【Course Code】 80590323

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 CHU Shulong 楚树龙

【Course Description】

(5) **【Course Title】** Chinese Constitutional and Administrative Law
中国宪法与行政法

【Course Code】 80590773

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 30 Graduate Students

【Instructor】 YU An 于安

【Course Description】

This course introduces the jurisprudential framework of Chinese constitutional law and administrative law which provide primary legal foundation for Chinese government. The constitutional law, as the first part of this course, involves the following topics: (1) General principle of Chinese constitutional law; (2) the fundamental institution of the state and basic principles of economy and society; (3) the system and structure of central and local government, which are based on the doctrines of democratic centralism and the unitary state; (4) human rights, citizen's basic rights and obligations. The key theme of this part is relationship between the state and citizens in terms of constitutionalism. The administrative law is the larger part of this course. It studies a number of subjects on the executive body's establishments and functions. The topics will be divided into four groups: (1) General principle of Chinese administrative law; (2) the organization of the

executive body : formation and legal competence, the range of its functions, and the system of civil servant; (3) the act of the executive body: form and process to make decision with legal effect, means to implement decision; (4) supervision over the executive body and legal remedies to the aggrieved individuals, focusing on the administrative review ,the judicial review and the state liability. The Chinese model of administrative law, namely the development-orientated administrative law will be explored in-depth, based on the fact that the development dominates operation of Chinese government at all levels and on full scale.

25. School of Social Sciences

(1) **【Course Title】** Fundamentals in International Political Economics

国际政治经济学基础

【Course Code】 40700573

【Credits】 3

【Credit Hours】 48

【Semester】 Spring

【Capacity】 30 Undergraduate Students

【Instructor】 CHEN Maoxiu 陈懋修

【Course Description】

This introductory undergraduate course provides an overview of the field of international political economy (IPE) to students who have little to no previous background knowledge. The main aim is to help students to understand the interaction between international political and economic systems, forces and actors. The course asks two main questions: first, how do states, social forces and various kinds of institutions affect the flow of economic resources across national boundaries? Second, how do economic forces constrain the behavior of political actors at the international level? The course will also emphasize the importance of economic and political ideas in understanding both international and domestic political and economic systems.