College of Engineering
PEKING UNIVERSITY

GLOBEX

暑期项目 Globex Julmester Program

2019 GLOBEX Program at Peking University, China

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The Globex at the College of Engineering, Peking University is a professional mobility program with a worldwide exchange of students from all disciplines of study. To enhance students' global and professional experience, Globex offers courses that focus on: 1) engineering & science, 2) innovation & entrepreneurship, and 3) society & globalization. Engineering and science generate new knowledge and skills for society to advance and prosper. To convert into useful products, the acquired knowledge and skills need to be commercialized through innovation and entrepreneurship. Societies everywhere are being profoundly impacted by China, as it grows to become the world's largest economy. Globex offers students an opportunity to study China and its culture from engineering perspective. Globex students can select 1 or 2 courses (3-6 credits) from the various themes (one in the morning and the other in the afternoon).

Program Start-End Dates

- First & last day of class: Monday, July 1, 2019 & Friday, July 19, 2019.
- Final exams are scheduled on Saturday, July 20, 2019.
- The 3-day Pre-Globex Beijing Tour goes from June 28-30, 2019 and to participate in the program, you need to arrive on June 27, 2019.
- The 5-day Field Trip to the Yellow River Basin goes from July 21-25, 2019.

Online Application Deadline and Tuition & Other Fee Payment Deadline

- Registration must be done online and it requires a compulsory payment of RMB 300
- Online Application Deadline: April 15, 2019
- Tuition and Other Fee Payment Deadline: April 30, 2019

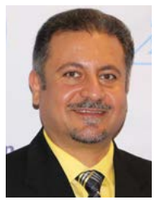
Program Website & Contact Info

- Globex Website: http://globex.coe.pku.edu.cn/
- Email Inquiry: globex@pku.edu.cn

No.	Category	Course	Instructor	Organization	Class Time
1	Engineering & Science	Smart Materials and Adaptive Systems 智能材料与适应性系统	Greg WASHINGTON & Farzad AHMADKHANLOU	University of California Irvine, USA	AM Mon-Fri 8-11
2		The Tissue Engineer's Toolkit: Design and Evaluation of Regenerative Therapies 组织工程实用工具：再生疗法的设计与评价	Ken WEBB & Jeoung Soo LEE	Clemson University, USA	AM
3		Integrated Water Resources Management: International Aspects (2+1 Credits) 综合水资源管理：国际视角	Linus ZHANG	Lund University, Sweden	AM M-F 8-10 Field Trip on July 21-25
4		Simulation Methods for Optimization and Learning 优化和学习的模拟方法	Bernd HEIDERGOTT	Virje University Amsterdam, Netherland	AM
5		Applied Analysis for Engineering Sciences 工程科学应用分析	Shaoqiang TANG	Peking University, China	AM
6		Cardiovascular Biomechanics and Modeling 心血管生物力学与建模	Ethan KUNG	Clemson University, USA	PM Mon-Fri 1-4
7		Artificial Organ Engineering 人造器官工程	Poh Foong LEE	University Tunku Abdul Rahman, Malaysia	PM
8		Robotics: Programming and Practice 机器人入门：编程与实践	Guangming XIE	Peking University, China	PM
9		The Big History of Our Planet: A Scientific Journey Over 14 Billion Years of Evolution 地球大历史：穿梭一百四十亿年的科学之旅	William M.Y. CHEUNG	The University of Hong Kong, China	PM
10		Advanced Laser-based Manufacturing-from nano to macro, additive to subtractive 先进激光制造 – 从纳米到宏观，从增材到减材	Xin ZHAO	Clemson University, USA	PM
11		Model-based design and optimization of solar energy technologies 基于模型的太阳能技术设计与优化	Raymond ADOMAITIS	University of Maryland, USA	PM
12	Innovation & Entrepreneurship	Inter-Cultural Design for a Responsible Business Model (4 credits) 跨文化设计：负责任的商业模式	Marc LUCAS	Mines Paris Tech, France	AM Mon-Fri 8-12
13		Energy Economics and Finance 能源经济与金融	Manuel PINHO	Columbia University, USA	AM
14		Financial Decisions in Engineering Project Management 工程项目管理中的金融决策	Daricha SUTIVONG	Chulalongkorn University, Thailand	PM
15	China-Focused	China Economy: Growth and Global Connections 中国经济：增长与全球联系	Susan MAYS	The University of Texas Austin, USA	PM

All courses are 3 credits unless indicated.

Smart Materials and Adaptive Systems (3 Credits)
智能材料与适应性系统

Dean Greg WASHINGTON & Professor Farzad AHMADKHANLOU University of California Irvine, USA

Synopsis

Modeling and control of smart materials to include: piezoceramics, piezopolymers, shape memory alloys, electrorheological and magnetorheological fluids. Applications to real world systems will be emphasized.

Topics

1.Class Organization, Introduction and Overview of Smart Materials
- Mathematical preliminaries (notation)
- Matrix and tensor mathematics
- General constitutive modeling

2.Electrorheological Fluids and Magnetorheological Fluids
- What are ER/MR Fluids
- ER/MR Fluid Dashpot Dampers
- Newtonian shear flow, Bingham plastic shear flow, Rectangular Duct Analysis
- Design with ER/MR Fluids

3.Piezoelectric Materials
- What are piezoelectric materials
- PZT properties and material constants
- Piezoelectric films
- Nonlinear effects
- Hysteresis, creep, depoling
- Incorporating PZT into structural systems
- Electrostrictive materials (PMN)
- Design with piezoelectrics

4.Shape Memory Alloys
- What are shape memory alloys?
- Constitutive Models
- Tanaka Model, Liang and Rogers Model, Brinson Model
- Testing of SMA Wires, SMA applications
- Design with SMA

Grading Format

30% Homework
25% Project
20% Midterm exam
25% Final exam

Suitable for undergraduate Year 3&4 and graduate students.

The Tissue Engineer's Toolkit: Design and Evaluation of Regenerative Therapies (3 Credits)
组织工程实用工具：再生疗法的设计与评价


Professor Ken WEBB & Professor Jeoung Soo LEE Clemson University, USA

Synopsis

Tissue engineering/regenerative medicine requires the capability to regulate cellular behaviors such as proliferation, migration, and differentiation. This course will introduce engineering students to 1) the therapeutic tools we have available for this purpose, including soluble growth factors, insoluble adhesion ligands, scaffold topographic features, and externally applied mechanical forces and 2) the experimental tools to evaluate cellular and tissue responses to therapeutic treatment including high throughput genomic analysis, quantitative real time polymerase chain reaction, ELISA, Western blotting, immunohistochemical staining, and loss of function techniques to confirm therapeutic mechanisms.

Topics

1. Introduction-the motivation and conceptual framework of tissue engineering / regenerative medicine.
2. Soluble cues-growth factor activity, receptors, intracellular signaling, and the promise and challenge of therapeutic application.
3. Substrate cues-adhesion ligands and scaffold structural features
4. Mechanical cues-mechanobiology, substrate stiffness, and external loads
5. Cell therapy-choices, benefits, and challenges
6. High throughput transcriptional profiling
7. Quantitative real time polymerase chain reaction-theory, experimental design, and quantitative analysis.
8. Protein analysis-antibodies, Western blotting, ELISA, immunohistochemistry.
9. Mechanistic tools-function-blocking antibodies, chemical inhibitors, and RNA interference.

Grading Format

20% Four Quizzes
25% Midterm exam
15% Proposal
30% Final exam

Suitable for undergraduate Year 3&4 and graduate students.

Integrated Water Resources Management: International Aspects
综合水资源管理：国际视角

Credits 2+1

Professor Linus Zhang Lund University, Sweden

Synopsis

The course starts with a quick introduction on water resources and hydrological processes such as precipitation, evaporation, infiltration, soil and groundwater and runoff, and the relations of all these processes with the overall climate. The second part strives to give insight on Integrated Water Resources Management (IWRM) in a global sense with good comprehension of technical and non-technical issues to address the risks of World Water War.

Topics

1.Hydrological system, water circulation, water balance
2.Precipitation, rainfall-runoff relationships and evaporation
3.Runoff calculation with hydrograph analysis
4.Urban hydrology and storm water
5.Lake hydraulics and flooding
6.Soil water and groundwater
7.Hydrological Restoration
8.Climate systems, climate variability and climate change
9.Introduction and fundamentals of IWRM
10.Contents, tools and implementation of IWRM with case examples
11.Sustainable development and value of water

Grading Format

20% Homework assignments
20% Project assignments
20% Midterm exam
40% Final exam

Suitable for all students (all majors and all levels)
Note: At the end of the course, a field trip to the Yellow River Basin and the surrounding areas will be arranged from July 21-25 and all students are welcome to participate. The field trip will account for 1 of the 3 credits of this course and students have the option of participating it (3 credits) or not (2 credits). The field trip will cause an expense of USD 560 per participant and partial subsidy will be provided for the students enrolled in this class.

Simulation Methods for Optimization and Learning
优化和学习的模拟方法

Credits 3

Professor Bernd HEIDERGOTT Vrije Universiteit, Amsterdam,The Netherlands

Synopsis

This course gives a broad treatment of the important aspects of the use of computer simulation for the analysis and optimization of dynamic stochastic models. The emphasis is on modeling the stochastic system as a discrete event dynamic system, and analyzing and improving its performance by means of discrete event simulation. Applications will stem from a wide range of domains: from Social Networks to Computer Networks, and Financial Engineering to Business Processes. The course will introduce students to the use of computer simulation in analyzing dynamic stochastic models through simulation-based methods for optimization and learning. The leading question of the course is how to use simulation to make better and more responsible decisions for real-life problems. The course will also reflect on the technological and mathematical developments we witness in our societies. While actively working on simulation projects, the course will provide space for reflecting on the mathematical/technological paradigm. That is, next to learning the actual techniques, students will be stimulated to reflect on the history of science and the technological developments around them.

Topics

1.Programming language is Python (basic programs will be provided). Other programming languages, such as Matlab, are also fine but are not supported.
2.Basics of Monte Carlo Simulation: random number generation, discrete event simulation, output analysis
3.Standard simulation models: queuing systems, social networks, financial products, inventory systems, news vendor problem
4.Data and simulation: combining simulation with available historical data
5.Estimation of gradients via simulation and their application in learning and optimization: stochastic gradient method, stochastic approximation, supervised learning, non-supervised learning
6.Reflection on the technological developments: history of mathematics, philosophical, ethical and sociological aspects of the mathematical/technological paradigm

Grading Format

30% Presentation and written report
30% Simulation project written report
30% Final exam
10% Attendance and discussion

Suitable for undergraduate Year 3&4 and graduate students.
Note: Students need to bring their own laptops for this course.

Applied Analysis for Engineering Sciences
工程科学应用分析

Credits 3

Professor Shaoqiang TANG
Peking University, China

Synopsis

The objectives of this course include: to show some modern (1900-1990) mathematical methods that are widely used in engineering sciences, nonlinear mechanics and other physical sciences; to help initiating research activities, namely, to boost ideas, to formulate the problem, and to explore the mathematics; to help bridging the gap between the mathematical tools and the physical understandings.

Topics

1. The qualitative theory of Ordinary Differential Equations (ODE) systems
a) The second order ODE (plane analysis)
b) Stability analysis via the Lyapunov function
c) Chaos in the Lorenz system and the logistic map
2. Reaction-diffusion systems
a) BVP (boundary-value problem) and IBVP (initial boundary-value problem)
b) Traveling wave analysis
c) Burgers' equation and Cole-Hopf transform
d) Evolutionary Duffing equation
3. Hyperbolic equations
a) Linear advection equation
b) Discontinuities in inviscid Burgers' equation
c) Elementary waves in a polytropic gas
d) Soliton and inverse scattering transform

Textbook

Shaoqiang Tang, Applied Analysis for Engineering Sciences, Peking University Press, 2016, http://www.pup.cn/scrp/bookdetail.cfm?iBookNo=92785&sYc=1

Grading Format

40% Homework assignments
60% Exam (open-book)

Suitable for undergraduate Year 3&4 & graduate students.
Prerequisites needed: Calculus (Single variate, and multi-variate), Linear Algebra, Ordinary Differential Equations.

Cardiovascular Biomechanics and Modeling
心血管生物力学与建模

Credits 3

Professor Ethan KUNG
Clemson University, USA

Synopsis

As cardiovascular diseases have become the leading cause of death world-wide, the field of cardiovascular medicine is a critical, growing area of research. This course will equip students with the critical background knowledge to consider important aspects of the human cardiovascular system relevant to computational modeling, medical device design, and surgical treatment planning. Students will be introduced to fundamental concepts of the cardiovascular system, and gain hands-on experiences in building a variety of cardiovascular biomechanical models and performing parameter tuning. Several modeling projects will expose students to scientific computing, 3D medical image processing, optimization, and data visualization. A final debate presentation will enforce critical thinking and provide the opportunity for students to form their own cognitive processes applying the relevant knowledge learned. This course illustrates examples of what the intersection between engineering and medicine looks like, and is suitable for students who are interested in interdisciplinary studies.

Topics

1.Cardiac Physiology and Modeling
2.Vascular Structure and Biomechanics
3.Lumped-parameter Cardiovascular Models
4.Computational Fluid Dynamics and Multi-scale Modeling
5.Blood Properties, Functions, and Behaviours
6.Cardiac Electrophysiology
7.Biomechanics in Cardiovascular Diseases
8.Auto-Regulation and Exercise Conditions
9.In-vitro Experimental Techniques
10.Medical Imaging

Grading Format

20% Homework
30% Modeling projects
20% Debate Presentation
20% Final exam
10% Participation

Suitable for undergraduate Year 3&4 and graduate students in engineering or science fields.

Artificial Organ Engineering
人造器官工程

Credits 3

Professor Poh Foong LEE
University Tunku Abdul Rahman

Synopsis

The impact of artificial organs on human life is overwhelming! Every year, they affect the lives of some 25 million people worldwide. The commonly accepted definition of an artificial organ is that of an engineered tissue, organ or device. It is implanted into or integrated with a living body for a specific function to enable the recipient a return to a normal or enhanced life, or to continue living on either a temporary or permanent basis. Examples of artificial organs being deployed include enhancing a person's ability for self-care (artificial limb), interacting normally with society (glasses – yes, these too), improving physical appearance (cosmetic restoration after cancer surgery), providing life-support (awaiting transplant), increasing competitiveness and/or survivability (exoskeleton), etc. The aims of the course are three folds: distinguish various and current state-of-art technologies for artificial organs, describe the functions of artificial heart valves, artificial heart, cardiac assist devices, pacemaker, artificial kidney and artificial heart, neuroprothesis and discuss design considerations of bio artificial organs that includes a fundamental mathematical modeling of artificial kidney and artificial lung.

Topics

1. Introduction to artificial organs engineering
2. Basic function of a kidney – principles of haemodialysis
3. Performance of mass transfer in artificial kidney
4. Operation of dialysis device through kinetic modelling of urea
5. Basic function of the lung – principles of cardiopulmonary diversion
6. Transportation of gases in blood
7. Design of artificial lung – membrane oxygenator
8. Implantable membrane oxygenator
9. Basic function of the heart – design of artificial heart valves
10. Prosthetic heart valves
11. Evaluation of prosthetic heart valves
12. Heart assist technology
13. Neuroprothesis

Grading Format

20% Homework assignments
20% Project assignments
(Interim 10%, Final 10%)
20% Midterm exam
40% Final exam

Suitable for undergraduate Year 3 & 4 and graduate students.

Robotics: Programming and Practice
机器人入门：编程与实践

Credits 3

Professor Guangming XIE
Peking University, China

Synopsis

This is an introductory course to expose students to the theory and practice of robotics. In the course project, students construct and program a simple robot to interact with its environment and perform basic tasks involving motion, sensory data and decision-making. The course is divided into three parts. The first part is a brief introduction of robotics, including history and current developments. Students carryout experiments with a fish-like robot and a somatosensory control of humanoid robot developed by the in-house team. The second part is concerned with programming practice with various types of hardware for robot, including switch, LED light, buzzer, senor and actuator. The last part is concerned with robotic design and construction, and innovative application demo. Students are required to build a simple robot aimed at solving some real problems.

Topics

1. Basic knowledge of robotics
2. History of robotics
3. Current development of robotics
4. Fish-like underwater robot
5. Humanoid robot
6. Somatosensory control
7. Graphic programming in Scratch
8. Graphic programming with hardware
9. Robot design and construction
10. Robot application demonstration

Grading Format

40% Programming Practice (Individual)
(Project Presentation 20%, Project Report 20%)
50% Final Project Assessment (Team)
(Project Presentation 15%, Class Presentation 15%, Project Report 20%)
10% Attendance & Discussion

Suitable for all undergraduates & Year 1 graduate students.
Note: At the end of the course, a robot competition will be held and all students are welcome to participate. The outcome of the competition will not have any bearing on your final grade.

The Big History of Our Planet: A Scientific Journey Over 14 Billion Years of Evolution
地球大历史：穿梭一百四十亿年的科学之旅

Credits 3

Professor William M.Y. CHEUNG
The University of Hong Kong

Synopsis

History should not be confined to describe human activities only. To understand the origin of many of the features around us, it is actually necessary for us to trace all the way back to the beginning of our universe so as to find a more satisfying answer. In this course we will survey the "Big History" and go through the milestones of the past of our world: the beginning of our universe, the formation of our Earth, the evolution of humans, the development into modern society via practicing agriculture and industrialization, etc. This course will naturally touch upon different academic disciplines, and investigate what are the favorite conditions that urged our world to keep on increasing its complexity. In the end this allows us to reflect upon how humans fit in our world. This course is equivalent to SCNC1113 offered at the University of Hong Kong.

Topics

Part I: From the Cosmos to the Atom
1. What is Big History?
2. Big Bang & the Evolution of Early Universe
3. Nucleosynthesis & the Formation of Elements
4. The Origin of Solar System & the Formation of the Earth

Part II: From the Atom to Life
5. The Origin of Life on Earth
6. The Evolution of Life on Earth

Part III: From Life to Mind to Society
7. The Start of Agriculture
8. The Early Agrarian Society & Civilization
9. The Modern & Industrial Revolutions

Part IV: Looking into the Future
10. The Anthropocene
11. The History of our Future

Grading Format

40% Individual assignments
30% Group Project & Presentation
20% Final exam
10% Participation

Suitable for all students (all majors and all levels)

Advanced Laser-based Manufacturing -from nano to macro, additive to subtractive
先进激光制造 – 从纳米到宏观，从增材到减材

Credits 3

Prof. Xin ZHAO
Clemson University, USA

Synopsis

Laser-based manufacturing and material processing have been widely used in many industry sectors, including energy, automotive, electronics, bioengineering, medicine, aerospace/ aeronautics, etc. Laser-matter interaction is a complicated multi-physics process, involving laser absorption, electron excitation, heat/mass transfer, fluid/solid mechanics, and phase/microstructure change. A good understanding of these fundamental mechanisms is crucial for the improvement of precision, efficiency and product quality in these processes. This course will provide students with a fundamental understanding of lasers, optics, laser-matter interaction mechanisms, and various state-of-the-art laser-based manufacturing and materials processing techniques. The techniques to be introduced include micro/nano-scale manufacturing, 3D printing, 3D structuring in bulk materials, organic tissue processing, shock peening, etc.

Topics

1. Fundamentals of lasers (history, principle, and current status)
2. Fast and Ultrafast lasers
3. Laser optics
4. Laser-matter interaction
5. Thermal impact by lasers: sintering, melting, re-crystallization
6. Thermo-mechanical impact by lasers: shock peening, hardening, annealing, and forming
7. Laser additive manufacturing
8. Laser subtractive manufacturing
9. Micro- and nano-scale laser manufacturing
10. Biomedical applications of lasers

Grading Format

40% Midterm project (report)
60% Final project
Report (30%)
Presentation (30%)

Suitable for all students (all majors and all levels)

Model-based design and optimization of solar energy technologies
基于模型的太阳能技术设计与优化

Credits 3

Professor Raymond ADOMAITIS
University of Maryland, USA

Synopsis

The emphasis of this class is on developing a conceptual understanding of the device physics and manufacturing processes of crystalline and thin-film photovoltaic cells, and to develop elementary computational skills necessary to quantify solar cell efficiency. The class material includes detailed, system-level energy balances necessary to understand how solar energy fits into the complete energy generation, conversion, and storage picture. Quantitative comparisons of PV technology to solar chemical conversion processes and biofuels are made.

Topics

1. A review of energy, thermodynamic, and electrical quantities and units.
2. The solar spectrum, blackbody radiation, direct and diffuse insolation, modeling cloud cover, the projection effect, and computing the optimal tilt angle of a solar device.
3. Transient energy balances, an introduction to solar thermal systems, compressed air, and pumped water grid-scale energy storage.
4. PV physics, band structure and Fermi level in semiconductors, pn-junctions, diode models, photon interactions with semiconductors.
5. PC cell architecture and fabrication steps, crystalline Si substrates, thin film deposition, amorphous Si, CIGS, and CdTe thin-film cells.
6. Computing PV cell power, equivalent circuit models, short- and open-circuit properties, fill factor, and parasitic resistances.
7. PV cell external and internal quantum efficiency, and computing the spectral response.
8. Theoretical cell efficiency, multijunction devices, the Shockley-Queisser limit.
9. Antireflection coatings, cell passivation, and cell optical properties.
10. PV cells wired in series and parallel, shaded and faulty cell effects, system integration and inverters.
11. Photoelectrochemical systems, electrochemistry review, p- and n-type cells, quantification of H2 production by PEC cells, and photosynthesis.

Grading Format

30% Two Quizzes
40% Homework
30% Final exam

Suitable for undergraduate Year 3&4 and graduate students.

Inter-Cultural Design for a Responsible Business Model
跨文化设计：负责任的商业模式

Credits 4

Professor Marc LUCAS
Mines ParisTech, France

Synopsis

In this course, you will actively participate in the analysis of the Nuclear Safety model with the world's leading multinational company for electricity production, Électricité de France (EDF). You will work with a nuclear safety management and leadership team of a nuclear power plant operated by a Sino-French company in Taishan (Shandong). You will be invited during 3 days to discover the site and the Safety main issues. Coming back to PKU, you will share a teamwork involving Asian and Western students, working in an inter-cultural environment and on a real industrial case. This course offers you an opportunity to learn how to collect and interpret industrial data in a professional environment, in contrast to the textbook models taught in class. You will visit a nuclear power plant and the fieldtrip expenses covered. At the end of the course you will gain a real life experience in project management, in teamwork and intercultural management.

Topics

1. Nuclear Safety for a Nuclear Power Plant. Required information will be given during the first week of class (fieldtrip on site).
2. Project Management Basis in Process Industries. Fundamentals of project management, standard methodology and main tools.
3. Intercultural Teamwork Principles. What are the main principles of a successful collaboration in a multi-cultural environment?
4. Professional Communication (team oral presentation).

Grading Format

10% Attendance and Participation
40% Project Assessment- Individual & Small Group Contributions
20% Intercultural Team Work Assessment - Final Proposals & Conclusions
30% Collective Oral Presentation

Suitable for Year 2,3 undergraduates (open to Engineering & Science but other major welcome)

Note:
1. To be selected for the course, a successful interview with the instructor is required;
2. The course is scheduled as: Introduction: 8 AM-4 PM July 1-2, 2019; Field Trip: July 3-6, 2019; Class: 8 AM-12 PM July 8-19, 2019;
3. Students taking this course should not register for a second Globex course as the fieldtrip requires an off-campus travel.

Energy Economics and Finance
能源经济学与金融学

Credits 3

Professor Manuel PINHO
Columbia University, USA

Synopsis

The course is an objective introduction to the energy transition. Energy units and conversions, discount rate, energy balances. The energy transition as one of the forces that are driving global change. Energy markets. It includes 4 computer- based cases: levelized costs of electricity generation, peak CO_2 emissions in China, China sustainability 2050, Paris COP 21 simulation. Although the course has a "global approach", several topics specific to China will be introduced, including the following: energy and climate targets, organization of the power system, peak emissions, creation of quantitative energy and emissions scenarios. Friday class will be held by a guest speaker.

Topics

1.Energy units
2.The discount rate in energy and climate economics
3.The driving forces that are changing the world
4.Energy transition
5.Energy balance
6.Oil markets
7.Natural gas markets
8.Power systems
9.Levelized costs of electricity
10.The challenge of renewable energies integration
11.Power system challenges in China
12.Climate science 101
13.International climate negotiations
14.Peak CO_2 emissions in China
15.China 2050 simulation
16.Paris COP 21 simulation

Grading Format

20% Class attendance and participation
20% Group pages essay on China sustainability 2050
20% Paper and class presentation
20% Midterm exam
20% Final exam

Suitable for all students (all majors and all levels)

Note: Students will have the option to attend with no charges Beijing Energy Week, an annual event held since 2015 that attracts students from all over the world. Participants will have to create a business project to be presented to a mock panel of investors. The event will be held in July 15- 17.

Financial Decisions in Engineering Project Management
工程项目管理中的金融决策

Credits 3

Professor Daricha SUTIVONG
Chulalongkorn University, Thailand

Synopsis

The course introduces widely-used financial techniques for project evaluation. Based on the time value of money concept, the course examines how to analyze and valuate various cash flow patterns and provides popular economic measures for project assessment and selection, including the net present value and the rate of return, along with the application criteria for single and multiple project decisions. The course also addresses decision under uncertainties using techniques such as breakeven analysis, sensitivity analysis, decision tree, etc. Students will have an opportunity to perform a financial analysis of their interested problem in a group project and create management report and presentation.

Topics

1. Time Value of Money, Interest Rate, Economic Equivalence, Simple and Compound Interests
2. Cash Flow Analysis and Valuation: Single Cash Flows, Cash Flow Series
3. Nominal and Effective Interest Rates: Discrete Time Period, Continuous Compounding
4. Present Value Analysis: Equal-life Alternatives, Different-life Alternatives, Capitalized Cost, Payback Period
5. Annual Value Analysis: Capital Recovery, Equivalent Annual Value
6. Rate of Return Analysis: Single Alternative
7. Rate of Return Analysis: Multiple Alternatives
8. Breakeven Analysis: Single and Multiple Alternatives
9. Decision under Uncertainties: Sensitivity Analysis, Three Estimates, Expected Value Decision, Decision Tree
10. Financial Analysis Modeling
11. Creating Report and Presentation for Management

Grading Format

25% Quiz 1 (Topic 1-3)
35% Quiz 2 (Topic 4-7)
30% Group Project Presentation and Report
10% Attendance and Participation

Suitable for all students (all majors and all levels)

China Economy: Growth and Global Connections
中国经济 : 增长与全球联系

Credits 3

Professor Susan MAYS
The University of Texas at Austin, USA

Synopsis

This course addresses economic development in China, in global context. The course examines trends in trade, foreign investment, ownership (i.e., public vs. private), finance, the workforce, and consumption, as well as key business sectors. The class also considers challenges and opportunities in China in the areas of environment, energy, education, and healthcare. Taught by an economic historian, the course considers China's unique history, culture, and business context, as well as global partnerships and influences. The reading and course materials are by scholars, leaders in business, economics and policy, as well as journalists.

Topics

1. China's Reform and Opening from 1978 and Chinese Governance
2. Rural-to-Urban Labor Migration, Export-led Development, and Foreign Trade
3. Business Ownership (private, state-owned, Sino-foreign joint ventures, foreign owned)
4. Financial Services and the Legal System
5. High Tech Sectors and Entrepreneurship
6. The Education System and China's Talent Pool
7. Energy and Environmental Challenges
8. Family Economics and the Healthcare Industry
9. The Foreign Sector in China and Chinese Investments Abroad
10. Infrastructure Initiatives

Grading Format

25% Group Project
75% 3 Weekly Quizzes (multiple choice and one essay)

Suitable for all students (all majors and all levels)

Program Expenses

Item	Cost USD (CNY) Assumed Ex Rate: USD 1=CNY 7	Estimated Expenses for a 1-Month (in July) Stay in Beijing (pro-rate your expenses if your stay is less than 31 days)
Registration Fee	43 (300)	Compulsory Registration Fee for All Applicants
Accommodation 4 Choices Type A, B, C, D	31-Day Stay 487 (3410) 974 (6820) 1040 (7285) 1218 (8525)	(1) Beijing Post & Telecom Conference Center Type A - Standard Double Occupancy: CNY 110/day X 31 days (2) Beijing Yanshan Hotel Type B - Apartment Triple Occupancy: CNY 220/day X 31 days Type C –Superior Double Occupancy: CNY 235/day X 31 days (3) Ariva Beijing West Hotel & Serviced Apartment Type D - Loft Double Occupancy: CNY 275/day X 31 days
Meals	221 (1550)	CNY 50/day X 31 days (meals at PKU cafeterias).
Miscellaneous	221 (1550)	Personal Items, Subway, Taxi, etc.
BASIC TOTAL	970-1700 (6810-11925)	Recommended minimum Expenses are estimates, your actual cost may be different Airfare not included
Globex Tuition	0-1714 (0-12,000)	Full Waiver (you may still need to pay tuition to your school) Partial Subsidy Full Cost Recovery
Field Trip & Tour	USD 140 (980)	3-day Pre-Globex Beijing Tour: (including the Great Wall, Forbidden City, Summer Palace etc.)
	USD 560 (3920)	5-day Field Trip to the Yellow River Basin (visiting the Xiaolangdi Dam Project of the Yellow River, ShaoLin Temple, Longmen Grottoes etc) See updated info at Globex website

Miscellaneous Info: Credit Transfer, Chinese Visa, Health Insurance, etc

- Globex will provide course syllabi and PKU transcript to facilitate course credit transfer, it does not however, guarantee that the credits will be acceptable by the student's home university.
- Globex will provide the necessary documents for applicants to apply for their Chinese visas.
- It is mandatory for all Globex students to process a valid medical insurance during their stay in China.
- More detailed information is available at http://globex.coe.pku.edu.cn.

College of Engineering

PEKING UNIVERSITY