PKU ENGINEERING PRESENTS

The 2018 GLOBEX JULMESTER® PROGRAM

at Peking University, Beijing, China

Classes: July 2-20, 2018

http://globex.coe.pku.edu.cn/

The Globex Julmester at Peking University in Beijing, China 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 the two core elements of our program: engineering & science and China-focused study. Engineering and science generate new knowledge and skills for society to advance and prosper (10 engineering/science courses). 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 peoples (2 China focused courses). **Although students are allowed to select 2 courses (one in the morning and the other in the afternoon), we recommend Globex students to enroll in only 1 course as the program is highly intensive.**

ENGINEERING & SCIENCE					CHINA-FOCUSED	
Smart Materials & Adaptive Systems (3) Dean Greg Washington & Prof. Farzad Ahmadkanlou The University of California Irvine	**The Tissue Engineer's Toolkit: Design and Evaluation of Regenerative Therapies** (3) Prof. Ken Webb Clemson University	**Compliant Robotics: Humanoids to Soft Robots** (3) Prof. Hongbin Liu King's College London	**Inter-Cultural Design for a Responsible Business Model** (4) Prof. Marc Lucas Mines ParisTech	**Financial Decisions in Engineering Project Management** (3) Prof. Daricha Sutivong Chulalongkorn University	**Digital China: Technology, Media and Culture** (3) Prof. Wenhong Chen The University of Texas Austin	8:00-11:00 AM, Mon-Fri
Artificial Organ Engineering (3) Prof. Poh Foong Lee University Tunku Abdul Rahman	**Drug and Gene Delivery in Biomedicine** (3) Prof. Jeoung Soo Lee Clemson University	**The Materials Genome Assessment** (3) Prof. Cedric Weber King's College London	**Robotics: Programming & Practice** (3) Prof. Guangming Xie Peking University	**The Big History of Our Planet: A Scientific Journey over 14 Billion Years of Evolution (3)** Profs. William M.Y. Cheung & Chi-wang Chan The University of Hong Kong	**China Economy: Growth and Global Connections** (3) Prof. Susan Mays The University of Texas Austin	1:00-4:00 PM, Mon-Fri

2018 PKU Globex® Faculty Fellows

Dean Greg WASHINGTON

Professor Farzad AHMADKHANLOU

Department of Mechanical & Aerospace Engineering
The University of California Irvine, USA

Smart Materials and Adaptive Systems (3 Credits)

智能材料与适应性系统

Class: 8-11 AM, M-F, July 2–20, 2018

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

Suitable for Year 3 &4 & graduate students

Professor Ken WEBB
Dept of Bioengineering
Clemson University, USA

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

Class: 8-11 AM, M-F, July 2–20, 2018

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.

Suitable for Year 3 &4 & graduate students

Professor Hongbin LIU
Centre for Robotics Research
Department of Informatics
King's College London, UK

Compliant Robotics: Humanoids to Soft Robots (3 Credits)

柔性化机器人：从类人到软体

Class: 8-11 AM, M-F, July 2–20, 2018

Suitable for Year 3 &4 & graduate students

Traditional industrial robots have been designed to be as rigid as possible to ensure good motion precision; however, because of the massive rigidity, it can make them dangerous when operating in close proximity with humans. Further, as robots expand their domain into healthcare and home service, the issues of safety, adaptability and energy efficiency become a primary concern. To address these challenges, scientists are developing a new generation of compliant robots that are flexible and used soft materials in their construction. The course aims to provide students with an essential knowledge for compliant robotic modeling, perception, interactive control and path planning. The topics covered include compliant robotic systems such as robot hands with compliant fingers and soft fingertips, flexible snake robot and soft octopus robot. It involves a hands-on coding exercise to facilitate the implementation of algorithms for solving real-world problems.

Professor Marc LUCAS
Mines Paris Tech, Paris France

Inter-Cultural Design for a Responsible Business Model (4 Credits)

跨文化设计：负责任的商业模式

Class: 8 AM-4 PM July 2-3, 2018; 8 AM-12 PM July 9-20, 2018; Field Trip: July 4-7, 2018

In this course, you will actively participate in the analysis and design of a responsible business model with the world's leading multinational company for electricity production, Électricité de France (EDF) S.A. You will work with a nuclear safety management and leadership team of a nuclear power plant operated by a Sino-French company. 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.

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

Note: to be selected for the course, a successful interview with the instructor is required

Professor Daricha SUTIVONG
Chulalongkorn University Thailand

Financial Decisions in Engineering Project Management (3 Credits)

工程项目管理中的金融决策

Class: 8-11 AM, M-F, July 2–20, 2018

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.

Suitable for all students (all majors and all levels)

Professor Wenhong CHEN
Department of Radio-TV-Film /
Department of Sociology
The University of Texas at Austin, USA

Digital China: Technology, Media, and Culture (3 Credits)

数字中国：科技，媒体，文化

Class: 8-11 AM, M-F, July 2–20, 2018

Drawing on media studies, management, and sociology, this course surveys social, political, and economic forces that shape and are shaped by digital media production, distribution, and monetization in China. Highlighting an interdisciplinary, global, and network perspective, attention is paid to disruptive innovations such as social and mobile media, VR, AI, and big data. Cases in legacy and new media industries will be analyzed. The course informs and prepares students for careers within and related to media and tech industries in the private and public sectors. It aims to facilitate students grow as capable, responsible global citizens via a better understanding of digital media from a comparative perspective. It is designed to equip students with a repertoire of skills such as critical thinking, teamwork, project design, and data analysis for concrete learning outcomes.

Suitable for all students (all majors and all levels)

Professor Poh Foong LEE
Dept of Mechanical Engineering
Univ Tunku Abdul Rahman, Malaysia

Artificial Organ Engineering (3 Credits)

人造器官工程

Suitable for Year 3 &4
& Graduate Students

Class: 1-4 PM, M-F, July 2–20, 2018

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.

Professor Jeoung Soo LEE
Dept of Bioengineering
Clemson University, USA

Drug and Gene Delivery in Biomedicine (3 Credits)

生物医学中的药物和基因传递

Suitable for Year 3 &4
& Graduate Students

Class: 1-4 PM, M-F, July 2–20, 2018

This course will introduce drug design, development, and delivery in the context of creating biomaterial-based delivery systems and applying pharmaceutical therapies in regenerative medicine. An interdisciplinary mix of ideas will be introduced that emphasizes the intersection of engineering and chemistry/biochemistry applied to pharmaceuticals and biopharmaceuticals including DNA, RNA, peptides and proteins. The course will cover the relationship between drug physicochemical properties and fate in our body such as absorption, metabolism, distribution and elimination (ADME) and the mechanism of drug action. Methods will be described to improve the therapeutic efficacy and reduce the toxicity of drugs for the efficient treatment of diseases and regeneration of tissue/organs. The course will also provide students with an understanding of the principles, strategies, and biomaterials used in drug delivery systems, gene therapy, RNA interference (RNAi) and tissue engineering.

The Materials Genome Assessment (3 Credits)

材料基因组评估

Suitable for Year 3, 4 & Graduate Students

Professor Cedric WEBER
Physics Dept
King's College London, UK

Class: 1-4 PM, M-F, July 2–20, 2018

This course provides a pedagogical introduction to computational modeling. Computational modelling is used in a wide range of applications, such as material science, bio-medical engineering, finance, etc. In particular, scientific modeling can be used to accelerate the discovery of new materials (The so-called "materials genome" project): nowadays, simple physical equations are implemented in computer software, enabling researchers to carry out "virtual" experiments with predictive capabilities. The course will provide the students with an awareness of the importance of material discovery and its societal impact, and during hands-on sessions we will provide the students with a tutorial for *Materials Studio*, a modern computational tool suite. The course will consist of both lectures and practical sessions in the computer room. We will also have discussion sessions and group work, where material discovery is discussed in the wider context.

Robotics: Programming and Practice (3 Credits)

机器人入门：编程与实践

Professor Guangming XIE
College of Engineering
Peking University, China

Class: 1-4 PM, M-F, July 2–20, 2018

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.

Suitable for All Undergraduate & Year 1 graduate students

The Big History of Our Planet:
A Scientific Journey Over 14 Billion Years of Evolution (3 Credits)

地球大历史：穿梭一百四十亿年的科学之旅

Professor William M.Y. CHEUNG

Professor Chi-wang CHAN

Faculty of Science
The University of Hong Kong, Hong Kong, China

Class: 1-4 PM, M-F, July 2–20, 2018

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.

Suitable for all students (all majors and all levels)

China Economy: Growth and Global Connections (3 Credits)

中国经济：增长与全球联系

Suitable for all students (all majors and all levels)

Professor Susan MAYS
Center for East Asian Studies
The University of Texas at Austin, USA

Class: 1-4 PM, M-F, July 2–20, 2018

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.

2018 Globex® Course Syllabus – Group A

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Smart Materials and Adaptive Systems (3)

Dean Greg Washington & Professor F. Ahmadkhanlou
The 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

Class Organization, Introduction and Overview of Smart Materials

- Mathematical preliminaries (notation)
- Matrix and tensor mathematics
- General constitutive modeling

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

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

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

Homework	30%
Project	25%
Midterm	20%
Final	25%
Total	**100%**

The Tissue Engineer's Toolkit: Design and Evaluation of Regenerative Therapies (3)

Professor Ken Webb
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

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

Grading Format

Four Quizzes	20%
Midterm Exam	25%
Proposal	15%
Final Exam	30%
Attendance & Participation	10%
Total	**100%**

Artificial Organ Engineering (3)

Professor Poh Foong Lee
University Tunku Abdul Rahman, Malaysia

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

- Introduction to artificial organs engineering
- Basic function of a kidney – principles of haemodialysis
- Performance of mass transfer in artificial kidney
- Operation of dialysis device through kinetic modelling of urea
- Basic function of the lung – principles of cardiopulmonary diversion
- Transportation of gases in blood
- Design of artificial lung – membrane oxygenator
- Implantable membrane oxygenator
- Basic function of the heart – design of artificial heart valves
- Prosthetic heart valves
- Evaluation of prosthetic heart valves
- Heart assist technology
- Neuroprothesis

Grading Format

Homework Assignments	20%
Project Assignment	20%
• *Interim Project Assessment* (10%)	
• *Final Project Assessment* (10%)	
Midterm Exam	20%
Final Exam	40%
Total	**100%**

Drug and Gene Delivery in Biomedicine (3)

Professor Jeoung Soo Lee
Clemson University, USA

Synopsis

This course will introduce drug design, development, and delivery in the context of creating biomaterial-based delivery systems and applying pharmaceutical therapies in regenerative medicine. An interdisciplinary mix of ideas will be introduced that emphasizes the intersection of engineering and chemistry/biochemistry applied to pharmaceuticals and biopharmaceuticals including DNA, RNA, peptides and proteins. The course will cover the relationship between drug physicochemical properties and fate in our body such as absorption, metabolism, distribution and elimination (ADME) and the mechanism of drug action. Methods will be described to improve the therapeutic efficacy and reduce the toxicity of drugs for the efficient treatment of diseases and regeneration of tissue/organs. The course will also provide students with an understanding of the principles, strategies, and biomaterials used in drug delivery systems, gene therapy, RNA interference (RNAi) and tissue engineering.

Topics

- Introduction, core concepts of drug delivery: dose, delivery route, biodistribution
- Biomaterials in drug delivery
- Nanotechnology in drug delivery
- Gene therapy
- RNA interference (RNAi)
- Gene delivery vectors and design (viral and non-viral vectors)
- Controlled drug and gene delivery
- Targeted drug and gene delivery

Grading Format

Midterm exam	30%
Final exam	35%
Journal club/Presentation	20%
Homework/Assignment	10%
Attendance	5%
Total	**100%**

2018 Globex® Course Syllabus – Group B

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Compliant Robotics: Humanoids to Soft Robots (3)

Professor Hongbin Liu
King's College London, UK

Synopsis

Traditional industrial robots have been designed to be as rigid as possible to ensure good motion precision; however, because of the massive rigidity, it can make them dangerous when operating in close proximity with humans. Further, as robots expand their domain into healthcare and home service, the issues of safety, adaptability and energy efficiency become a primary concern. To address these challenges, scientists are developing a new generation of compliant robots by adopting flexible and soft materials in their construction. This course aims to provide students with an essential knowledge for compliant robotic modeling, perception, interactive control and path planning. The topics covered include compliant robotic systems such as robot hands with compliant fingers and soft fingertips, flexible snake robot and soft octopus robot. This course involves a hands-on coding exercise to facilitate the implementation of algorithms for solving real-world problems.

Topics

Modeling of Different Robot Systems
- Rigid-link robot models
- Forward/Inverse Kinematics
- Continuum/flexible robot model
- Mechanics for continuum robots

Robot Controls
- Position control
- Redundancy control
- Force / Impedance control
- Real-time path planning with potential field

Probabilistic Robot perception
- Kalman filtering
- Bayesian filtering

Grading Format

2 Individual Projects @ 15% each	30%
1 Final Teamwork Project (Team Presentation)	30%
Final Exam	40%
Total	**100%**

Inter-Cultural Design for a Responsible Business Model (4)

Associate Dean Marc Lucas
Mines ParisTech, France

Synopsis

In this course, you will actively participate in the analysis and design of a responsible business model with the world's leading multinational company for electricity production, Électricité de France (EDF) S.A. You will work with a nuclear safety management and leadership team of a nuclear power plant operated by a Sino-French company. 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

- **Nuclear Safety for a Nuclear Power Plant**. Required information will be given during the first week of class.
- **Project Management Basis in Process Industries**. Fundamentals of project management, standard methodology and main tools.
- **Intercultural Teamwork Principles**. What are the main principles of a successful collaboration in a multi-cultural environment?
- **Professional Communication** (technical written report and team oral presentation). How to write a professional report addressed to managers and to prepare a successful viva.

Grading Format

Attendance and Participation	10%
Project Assessment	
Individual & Small Group Contributions	40%
Intercultural Team Work Assessment	20%
Final Design & Technical Report	30%
Collective Oral Presentation	**100%**

The Materials Genome Assessment (3)

Professor Cedric Weber
King's College London, UK

Synopsis

This course provides a pedagogical introduction to computational modeling. Computational modelling is used in a wide range of applications, such as material science, bio-medical engineering, finance, etc. In particular, scientific modeling can be used to accelerate the discovery of new materials (The so-called "materials genome" project): nowadays, simple physical equations are implemented in computer software, enabling researchers to carry out "virtual" experiments with predictive capabilities. The course will provide the students with an awareness of the importance of material discovery and its societal impact, and during hands-on sessions we will provide the students with a tutorial for *Materials Studio*, a modern computational tool suite. The course will consist of both lectures and practical sessions in the computer room. We will also have discussion sessions and group work, where material discovery is discussed in the wider context.

Topics

- Materials discovery to meet the challenges of the 21st century
- What is computational modeling, and how can it be used to investigate the "materials genome"
- Monte Carlo
- Hands-on: computing the value of Pi by using game theory
- Solving differential equations with little knowledge of the mathematics
- Hands-on: explaining the breakdown of the Tacoma bridge
- Strategies to guide materials design with software engineering
- Introduction to *Density functional theory* and its application to material discovery
- A tool suite to model materials: *Materials Studio*
- How to predict the structure of a material
- Time evolution with molecular dynamics
- Hands-on: Carbon nanotubes
- Quantum computing and quantum information
- How to predict colors: optical absorption and quantum mechanics
- Superconductors and their applications
- A single atomic sheet of atoms: Graphene

Grading Format

Small Group Project Presentation 1	30%
Small Group Project Presentation 2	30%
Mid-Term Exam	30%
Attendance and Participation	10%
Total	**100%**

Robotics: Programming and Practice (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

- Basic knowledge of robotics
- History of robotics
- Current development of robotics
- Fish-like underwater robot
- Humanoid robot
- Somatosensory control
- Graphic programming in Scratch
- Graphic programming with hardware
- Robot design and construction
- Robot application demonstration

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.

Grading Format

Programming Practice (Individual)		40%
• Project Presentation	20%	
• Project Report	20%	
Final Project Assessment (Team)		50%
• Project Presentation	15%	
• Class Presentation	15%	
• Project Report	20%	
Attendance & Discussion		10%
Total		100%

2018 Globex® Course Syllabus – Group C

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Financial Decisions in Engineering Project Management (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

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

Grading Format

Quiz 1 (Topic 1-3)	25%
Quiz 2 (Topic 4-7)	35%
Group Project Presentation and Report	30%
Attendance and Participation	10%
Total	**100%**

Digital China: Technology, Media, and Culture (3)

Professor Wenhong Chen
The University of Texas @ Austin, USA

Synopsis

Drawing on media studies, management, and sociology, this course surveys social, political, and economic forces that shape and are shaped by digital media production, distribution, and monetization in China. Highlighting an interdisciplinary, global, and network perspective, attention is paid to disruptive innovations such as social and mobile media, VR, AI, and big data. Cases in legacy and new media industries will be analyzed. The course informs and prepares students for careers within and related to media and tech industries in the private and public sectors. It aims to facilitate students grow as capable, responsible global citizens via a better understanding of digital media from a comparative perspective. It is designed to equip students with a repertoire of skills such as critical thinking, teamwork, project design, and data analysis for concrete learning outcomes.

Topics

- The Chinese dream and soft power: Policy and politics
- Networked China: the social and cultural implications of the internet and mobile
- Chinawood, Hollywood
- TV: alive and kicking
- The rise of streaming: the rap of China
- China's "four great new inventions": e-commerce and mobile payment (Alibaba)
- China's "four great new inventions": the Chinese sharing economy
- The curious journey of Mark Zuckerberg in China
- The Chinese game industry
- Big data, big brother: China's social credit system
- The US-China AI competition
- Global China, transnational China: past, presence and future

Grading Format

Individual Paper (5-7 pages) and Presentation	30%
Mid-term Exam	30%
Small Group Paper (5-7 pages) and Presentation	30%
Attendance and Participation	10%
Total	**100%**

The Big History of Our Planet: A Scientific Journey Over 14 Billion Years of Evolution (3)

Professors William Cheung & Chi-wang Chan
The University of Hong Kong, HK

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
- What is Big History?
- Big Bang & the Evolution of Early Universe
- Nucleosynthesis & the Formation of Elements
- The Origin of Solar System & the Formation of the Earth

Part II: From the Atom to Life
- The Origin of Life on Earth
- Evolution of Life on Earth

Part III: From Life to Mind to Society
- The Start of Agriculture
- The Early Agrarian Society & Civilization
- The Modern & Industrial Revolutions

Part IV: Looking into the Future
- The Anthropocene
- The History of our Future

Grading Format

Individual Assignments	40%
Group Project & Presentation	30%
Final Exam	20%
Participation	10%
Total	**100%**

China Economy: Growth and Global Connections (3)

Professor Susan Mays
The University of Texas 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

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

Grading Format

3 Weekly Quizzes (multiple choice and one essay)	75%
Group Project	25%
Total	**100%**

Program Website & Contact Info

- Globex Website: http://globex.coe.pku.edu.cn/
- Email Inquiry: Globex Team <pkuglobex@163.com>

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 1st, 2018
- Tuition and Other Fee Payment Deadline: April 15th, 2018

Class Start-End Dates

- First & last day of class: Monday, July 2, 2018 & Friday, July 20, 2018
- Final exams are scheduled on Saturday, July 21, 2018.

Miscellaneous Info: Credit Transfer, Chinese Visa, Globex Handbook, etc

- The 3-day Pre-Globex Beijing Tour goes from June 29-July 1, 2018 and if you intend to participate in the program, you need to arrive in Beijing on June 28, 2018 at the latest.
- The Globex office 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.
- The Globex office will provide the necessary documents for applicants who need to apply for Chinese visas.
- The Globex handbook is available for download at http://globex.coe.pku.edu.cn/.

Item	Cost Assumed Ex Rate: USD 1 ≈ CNY 6.42	Estimated Expenses for 1-Month (in July) Stay in Beijing (pro-rate your expenses if your stay is less than 31 days)
Registration Fee	**USD** 43 (CNY 300)	Compulsory Registration Fee for All Applicants
Accommodation **4 Choices** **Type** **A1, B1, A2, B2**	**31-Day Stay** **A1: USD** 532 (CNY 3410) **B2: USD** 966 (CNY 6200) **A2: USD** 1159 (CNY 7440) **B2: USD** 3287 (CNY 8525)	(1) Beijing Post & Telecom Conference Center • Type A1 - Standard Double Occupancy: CNY 110/day X 31 days • Type B1 - Superior Double Occupancy: CNY 200/day X 31 days (2) Ariva Beijing West Hotel & Serviced Apartment • Type A2 - Superior Double Occupancy: CNY 240/day X 31 days • Type B2 - Loft Double Occupancy: CNY 275/day X 31 days
Meals	**USD** 290 (CNY 1860)	CNY 60/day X 31 days (meals at PKU cafeterias).
Miscellaneous	**USD** 256 (CNY 1642)	Internet, Personal Items, Subway, Taxi, etc.
BASIC TOTAL	**USD 1077-1873** (CNY **6912-12027**)	• **Recommended minimum** • **Expenses are estimates, your actual cost may be different** • **Airfare not included**
Globex Tuition	**USD** 0-1869 (CNY 0-12,000)	• Full Waiver (you may still need to pay tuition to your school) • Partial Subsidy • Full Cost Recovery
3-Day BJ Tour (optional)	**USD** 140 (CNY 900)	• 3-day Pre-Globex Beijing Tour: USD 140 **See updated info at Globex website**

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