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.

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

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

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

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

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.

Suitable for Year 3 & 4 & graduate students

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
Drug and Gene Delivery in Biomedicine (3 Credits)

生物医学中的药物和基因传递

Class: 1-4 PM, M-F, July 2–20, 2018

Suitable for Year 3 & 4 & Graduate Students

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.

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

Suitable for all students (all majors and all levels)

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.

Financial Decisions in Engineering Project Management (3 Credits)

工程管理中的金融决策

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 evaluate 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.

Artificial Organ Engineering (3 Credits)

人造器官工程

Class: 1-4 PM, M-F, July 2–20, 2018

Suitable for Year 3 & 4 & Graduate Students

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, neuroprosthesis and discuss design considerations of bio artificial organs that includes a fundamental mathematical modeling of artificial kidney and artificial lung.

Professor Daricha SUTIVONG
Chulalongkorn University Thailand

Professor Wenhong CHEN
Dept of Bioengineering
Clemson University, USA

Professor Jeoung Soo LEE
Dept of Bioengineering
Clemson University, USA

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

Professor Jeoung Soo LEE
Dept of Bioengineering
Clemson University, USA
**The Materials Genome Assessment (3 Credits)**  
**材料基因组评估**  
**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**  
**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 carry out 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, sensor 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.

**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**  
**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.

**China Economy: Growth and Global Connections (3 Credits)**  
**中国经济：增长与全球联系**  
**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 course 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.
### 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 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, neuroprosthesis 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
- Neuroprosthesis
- Introduction, core concepts of drug delivery: dose, delivery route, biodistribution
- Biomaterials in drug delivery
- Nanotechnology in drug delivery
- Gene therapy
- DNA interference (RNAi)
- Gene delivery vectors and design (viral and non-viral vectors)
- Controlled drug and gene delivery
- Targeted drug and gene delivery

#### 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 Jeong 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/organ systems. 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%
### 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.
- 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 vita.

**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%
- Total: 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 modeling 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
- Somatosensory control
- Graphic programming in Scratch
- Graphic programming with hardware
- Robot design and construction
- Robot application demonstration

**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%

### 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 carry out 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, sensor 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

**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%
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 evaluate 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 break-even 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
- 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
- Break-even 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, present 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 75%
(multiple choice and one essay)
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/.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost Assumed Ex Rate: USD 1 = CNY 6.42</th>
<th>Estimated Expenses for 1-Month (in July) Stay in Beijing (pro-rate your expenses if your stay is less than 31 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration Fee</td>
<td>USD 43 (CNY 300)</td>
<td>Compulsory Registration Fee for All Applicants</td>
</tr>
<tr>
<td>Accommodation</td>
<td>31-Day Stay</td>
<td>(1) Beijing Post &amp; Telecom Conference Center</td>
</tr>
<tr>
<td>4 Choices Type</td>
<td></td>
<td>Type A1 - Standard Double Occupancy: CNY 110/day X 31 days</td>
</tr>
<tr>
<td></td>
<td>A2: USD 1159 (CNY 7440)</td>
<td>B2: USD 3287 (CNY 8525)</td>
</tr>
<tr>
<td>Meals</td>
<td>USD 290 (CNY 1860)</td>
<td>CNY 60/day X 31 days (meals at PKU cafeterias).</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>USD 256 (CNY 1642)</td>
<td>Internet, Personal Items, Subway, Taxi, etc.</td>
</tr>
</tbody>
</table>

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