PKU ENGINEERING PRESENTS

2014 GLOBEX SUMMER PROGRAM @ PEKING UNIVERSITY, BEIJING, CHINA

Peking University and its Peoples

The Four Seasons of Peking University

2014 Globex Summer Courses

GROUP 1 COURSES Teaching Bldg. No. XX, Rm xx1		GROUP 2 COURSES Teaching Bldg. No. XX, Rm xx2		GROUP 3 COURSES Teaching Bldg. No. XX, Rm xx3		GROUP 4 COURSES Teaching Bldg. No. XX, Rm xx4	
8-10 AM	China's Economy: Engineering, Growth and Global Connections	8-11 AM	Smart Materials and Adaptive Systems	8-11 AM	Biomaterials and Biocompatibility	8-11 AM	Machine Learning in Biomedicine
12-3 PM	Interfaces and Plastic Deformations in Materials: From Theory to Engineering						
3-5 PM	China Today: Tradition and Modernization	1-4 PM	Computational Fluids Dynamics and its Application to Multiphase Flows	1-4 PM	Applied Finite Element Technology	1-4 PM	Basic Concepts and Applications in Nanomedicine

Program Info

- Participation in Globex: you can register for 1 or 2 courses either within a group or across to another group, as long as there is no scheduling conflict. Online registration or obtain Globex application form at: http://en.coe.pku.edu.cn/Globex-Application/index.htm.
- **For queries and/or more info, you can email Globex <pkuglobex@gmail.com>.**

Class Start-End Dates and Flight Route

Classes starts on Monday, July 7, 2014 and ends on Friday, July 25, 2014. Final exams are scheduled for Saturday, July 26, 2014.

- You can arrive in BJ as early as July 1st and stay on until as late as July 31st (1 month stay).
- If you plan to participate in the BJ City tour, you need to arrive before July 3rd. If you are participating in one of the field trips, you will need to stay until July 31st.
- If you would like to visit Shanghai or Guangzhou at the end of your program, you can do so by taking a bullet train that connects BJ with one of these cities. You can depart directly for home from SH or GZ by ensuring that your airticket reflects this flight arrangement at the time of your ticket purchase.

BJ City Tour Info

A 3-day BJ City tour is arranged for July 3-5, 2014.

- Tiananmen Square, Forbidden City, Summer Palace, Great Wall Badaling, Changling Tomb, Bird's Nest, Water Cube, Temple of Heaven, Hutong Tour, 798 Art District.
- Check the Globex website for more info: http://en.coe.pku.edu.cn/globex/index.htm. You can email us for updated travel cost and updated tour itinerary.

Estimated Expense Table

Item	Cost USD (CNY)	Comment For 1-month (Jul 1-31, 2014) stay in Beijing	
Accommodation	608 (3680)	1. CNY 115/day X 32 days; double or triple room occupancy @ Beijing Post & Telecom Conference Center located near PKU. 2. Pro-rate your accommodation if your stay is not 32 days.	
Meals	317 (1920)	3. CNY 60/day X 32 days (meals at PKU cafeterias). 4. Pro-rate your meals if your stay is not 32 days.	
Public Transportation	83 (500)	Taxi, bus and subway	
Miscellaneous	83 (500)	Minor purchases	
SUB-TOTAL	**1091 (6600)**	Comments listed under "TOTAL" (see below) apply.	
Globex Tuition	335 (2000)	ADD	CNY 2000 for each course registered if your university does not have a tuition waiver agreement with PKU.
BJ Tours	198 (1200)	ADD	CNY 1200 if you are participating in the 3-day Beijing city tour scheduled from July 3-5, 2014 inclusive.
Internet Access	20 (120)	ADD	CNY 120 for 1-month PKU on-campus WIFI access. ADD: CNY 330 for 1-month Beijing City-wide 3G access.
TOTAL	**1644 (9920)**	1. All expenses are estimates; your actual cost may be different. 2. Airfare is not included in the estimated total expenses. 3. The hotel accepts Mastercard & Visa credit cards.	

Field Trip Info

Field trips are planned for these 2 humanity and social science courses.

- China Today: Xian (terracotta, Shaanxi museum, city wall) and Luoyang (Shaolin temple, Longmen Grottoes). DEP- evening, July 26th; RET to BJ – afternoon, Jul 30th.
- China's Economy: Shanghai, Wuxi and Suzhou (company & city visits). DEP- evening, July 26th; END – 12 PM, Jul 31st, student can depart directly for home from SH. Please ensure that your airticket is purchased with this flight arrangement.
- Check the Globex website for more info: http://en.coe.pku.edu.cn/globex/index.htm. You can email us for updated travel cost and updated visit itinerary.

GROUP 1 COURSES

Susan Mays
Faculty
University of Texas Austin
TX, USA

China's Economy: Engineering, Growth and Global Connections

This course addresses China's economic and technological development in a global context. The class examines the evolution of key tech and engineering fields in China, as well as China's changing role in global supply chains. The course also considers trade and consumption trends in China and globally, and it provides an overview of China's challenges in healthcare, energy, environment, and infrastructure. These trends and challenges all drive demand for technologies and products. In addition, the course examines China's programs to foster technology and human resources; the urbanization of China's labor force and the resulting increase in Chinese incomes and consumption; and the changing roles of foreign firms in China (i.e., manufacturing for domestic consumption vs exports.) The class also addresses how China's legal system and capital markets support economic growth. In all these topics, the course considers China's unique history and culture and its global connections. The last week is tentatively planned as a study trip to the Shanghai region where students will visit leading technology-related organizations.

PKU Course No: XXXXXXX
(3 Credits)

- Lecture Dates: July 7 – 25, 2014
- Time: 8-10 AM (2 hours), M-F
- Classroom: Teaching Bldg. XX, Rm XX1
- Final Exam: 8-10 AM, July 26, 2014
- Field Trip: July 26-31, 2014
- Audience: All Students, All Years

Louisette Priester
Professor Emerita
Université Paris-Sud
Orsay, France

Interfaces and Plastic Deformations in Materials: From Theory to Engineering

Interfaces are a main feature of crystalline materials. They play a key role in most of their properties, especially in their plastic deformation. The course will first present, in a simple way, the theoretical basis of the study of interfaces. Many practical examples will be given and the issues they raise will be analyzed. The main goal of the course is twofold: to lead the student from the concept of "ideal" to "real" interface and thus, to address the opportunities emerging through "Interface Engineering". The course will be divided into 3 parts: concept of perfect interface at equilibrium, and questions about the maintenance of its crystalline state; faulted interfaces that constitute "real" interfaces, the formation and the behavior of different defects and their role on plastic deformations; and interface networks in polycrystals and the role they play in interface engineering.

PKU Course No: XXXXXXX
(3 Credits)

- Lecture Dates: July 7 – 25, 2014
- Time: 12-3 PM (3 hours), M-F
- Classroom: Teaching Bldg. XX, Rm XX1
- Final Exam: 12-3 PM, July 26, 2014
- Audience: Yr 3 & 4 UG; Yr 1 Gr Students

Jing Luo
Professor & Dept Head
Bloomsburg University of
Pennsylvania, PA, USA

China Today: Tradition and Modernization

The course helps students understand what they see in China today, including rapid urbanization, traffic congestion, pollutions, great foods, etc. that are part of the country's rapid rise to the World's second largest economy. The course will review the processes of the economic reform in light of the Confucian-Daoist tradition and modern history since 1949. The course encourages critical thinking and interaction. Students will read and critique articles selected from the media, conduct group-based research projects, and participate in field trips to Beijing's suburbs, Xian and Luoyang.

PKU Course No: XXXXXXX
(3 Credits)

- Lecture Dates: July 7 – 25, 2014
- Time: 3-5 PM (2 hours), M-F
- Classroom: Teaching Bldg. XX, Rm XX1
- Final Exam: 3-5 PM, July 26, 2014
- Field Trip: July 26-31, 2014
- Audience: All Students, All Years

GROUP 2 COURSES

Greg N. Washington
Professor & Dean
University of California
Irvine, CA, USA

Smart Materials and Adaptive Systems

Imagine a world where aircraft monitor their structural health, twist their wings into optimal aerodynamic shapes, and actively control their own vibration, or a world where automobiles brace themselves for impact or actively adjust the ride and comfort for the passengers. Imagine a world where antennas alter their shapes and actively tune themselves. On a limited basis, often experimental, that is today's world. The technology that will enable many of the previously mentioned advances lies in the field of "Smart Materials". Smart Materials incorporate materials that have the ability to alter their performance in response to their surroundings.

PKU Course No: XXXXXXX
(3 Credits)

- Lecture Dates: July 7 – 25, 2014
- Time: 8-11 AM (3 hours), M-F
- Classroom: Teaching Bldg. XX, Rm XX2
- Final Exam: 8-11 AM, July 26, 2014
- Audience: Yr 3 & 4 UG; Yr 1 Gr Students

Eric Climent
Professor
Institute of Fluid Mechanics
Toulouse, France

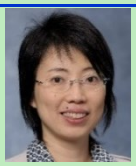
Computational Fluids Dynamics and its Application to Multiphase Flows

Multiphase flows are ubiquitous in the industry (particles, drops and bubbles in petroleum, nuclear engineering and energy transformations). The numerical simulation has proven to be an efficient tool for engineers and researchers to understand and model the complex interplay between the continuous phase and the dispersion of discrete elements. The purpose of the lectures is to introduce numerical simulations of dispersed two-phase flows and advanced topics in computational fluids mechanics, including particle suspensions, bubbly liquids and droplet sprays. Lectures on classical numerical approaches for solving Navier-Stokes equations will be introduced, together with their applications to multiphase flows (dispersion, two-way coupling, modelling of hydrodynamic interactions, etc). Students will be trained to program some classic examples of important phenomena. Students will work on projects using Matlab to simulate particle suspension flows, bubble dispersion and droplet sprays.

PKU Course No: XXXXXXX
(3 Credits)

- Lecture Dates: July 7 – 25, 2014
- Time: 1-4 PM (3 hours), M-F
- Classroom: Teaching Bldg. XX, Rm XX2
- Final Exam: 1-4 PM, July 26, 2014
- Audience: Yr 3 & 4 UG; Yr 1 Gr Students

GROUP 3 COURSES



Tracy Cui, Professor
University of Pittsburgh
Pittsburgh, USA

Biomaterials and Biocompatibility

This course is designed to introduce students to a more advanced understanding of biomaterials. Throughout the course ties are made between the topic of study and clinically relevant biomaterial performance. The course will introduce various biomaterials such as polymers, metals, and ceramics with the focus on their synthesis, characterization, structure-property relationship and surface modification. The biocompatibility issues of biomaterials will be discussed from different aspects such as protein adsorption, foreign body reaction, immune and inflammatory response etc. Finally, examples of clinical applications will be given.

PKU Course No: XXXXXXX
(3 Credits)

- Lecture Dates: July 7 – 25, 2014
- Time: 8-11 AM (3 hours), M-F
- Classroom: Teaching Bldg. XX, Rm XX3
- Final Exam: 8-11 AM, July 26, 2014
- Audience: Yr 3 & 4 UG; Yr 1 Gr Students

Kamran Behdinan
Professor
University of Toronto
Toronto, Canada

Applied Finite Element Technology

The computational aided engineering methods are extensively used in real-life engineering applications and industry. Techniques such as finite element method are very versatile and frequently indispensable part of engineering analysis and design. These methods are now widely used in practically all branches of engineering including the analysis of structures, solids, and fluids. In this introductory course, you will develop an understanding for the basis of the commonly used computational methods in mechanical systems analysis and design. Modeling of mechanical engineering problems using finite element method will be discussed. You will also have an opportunity to use finite element for projects. At the end of the course you will be able to develop finite element models and obtain solutions for linear and some nonlinear practical engineering problems.

PKU Course No: XXXXXXX
(3 Credits)

- Lecture Dates: July 7 – 25, 2014
- Time: 1-4 PM (3 hours), M-F
- Classroom: Teaching Bldg. XX, Rm XX3
- Final Exam: 1-4 PM, July 26, 2014
- Audience: Yr 3 & 4 UG; Yr 1 Gr Students

GROUP 4 COURSES

Hagit Shatkay
Professor
University of Delaware
Newark, DE, USA

Machine Learning in Biomedicine

This course is designed for students interested in biology, biomedicine, computing and their intersection, as well as in biomedical engineering. The course aims to demonstrate how fundamental computational and algorithmic methods form the basis and the core of modern methods in computational biomedicine. It presents hardcore topics in machine learning, probability, statistical modeling and algorithms, while focusing on their practical application as building blocks for computational biology and medicine. The computational topics covered include: dynamic programming; Bayesian methods; Bayesian networks; hidden Markov models and the theory behind them; categorization-classification and clustering; text mining and information retrieval. Examples of the biomedical applications covered include: biological sequence alignment; gene finding; protein subcellular location prediction; cardiovascular data analysis; anomaly detection; biomedical text mining.

PKU Course No: XXXXXXX
(3 Credits)

- Lecture Dates: July 7 – 25, 2014
- Time: 8-11 AM (3 hours), M-F
- Classroom: Teaching Bldg. XX, Rm XX4
- Final Exam: 8-11 AM, July 26, 2014
- Audience: Yr 3 & 4 UG; Yr 1 Gr Students

Jonathan Choi
Professor
Chinese University of HK
Hong Kong, China

Basic Concepts and Applications in Nanomedicine

Most commercially available healthcare products such as detergent, toothpaste and sunscreen, all contain nanoparticles in their formulation. At a fundamental level, the canonical biomolecules, including nucleic acids, sugars and proteins, also assume a size in the nanometer range. Due to enormous improvement in technologies that support the fabrication and manipulation of nanosized objects in the past two decades, increasing research efforts have focused on engineering biomolecules at the nanometer length scale. This emergent class of bionanomaterials forms the basis of numerous “nanomedicine” applications that are now under active investigation, and may provide promising solutions to some of the world’s most severe diseases and other healthcare problems. This course will provide an overview of the field of nanomedicine. We will first articulate how “nano” as a length scale is relevant to biomedical applications. We will then explain the tools for the assembly and characterization of bionanomaterials frequently used in nanomedicine research. Next, we will present the three pillars of nanomedicine research: diagnostics, imaging and therapeutics, and illustrate the materials design considerations for creating nanoparticle-based agents involved in each of the pillar. We will conclude by delineating the process for translating nanomedicine products from laboratory discoveries to clinically relevant therapies.

PKU Course No: XXXXXXX
(3 Credits)

- Lecture Dates: July 7 – 25, 2014
- Time: 1-4 PM (3 hours), M-F
- Classroom: Teaching Bldg. XX, Rm XX4
- Final Exam: 1-4 PM, July 26, 2014
- Audience: All Years

Application form for the 2014 Globex Summer Program can be obtained at http://en.coe.pku.edu.cn/Globex-Application/index.htm

(website will be activated in early March 2014)