2014

SHANGHAI JIAO TONG UNIVERSITY

SUMMER SESSION

June 30th - July 25th

CONTENTS

Welcome to Shanghai Jiao Tong University

Established in 1896 as Nan Yang College, Shanghai Jiao Tong University is one of the first national institutions of higher learning in China. The name "Jiao Tong" comes from the book Yi Jing. Literally, "Jiao" means unite and "Tong" means harmony. In the book it says, when heaven and earth unite in deep harmony, peace and blessing descend upon all living things; when leaders and people unite and combine their influences, the nation enjoys universal flowering and prosperity.

SJTU, as it is fondly called, is a dynamic and comprehensive university for excellent education, cutting-edge scientific research and social service. From the early stage of its development, SJTU took first-class talents education as its principal mission. And today, it has been developed to the talent education idea of knowledge exploration, capacity development and personality nurturing.
Today SJTU has 31 schools (departments), 63 undergraduate programs, 250 masters-degree programs, 203 Ph.D. programs, 28 post-doctorate programs, and 11 state key laboratories and national engineering research centers.

SJTU boasts a large number of famous scientists and professors, including 40 academics of the Academy of Sciences and Academy of Engineering, 95 accredited professors and chair professors of the "Cheung Kong Scholars Program" and more than 2,000 professors and associate professors.
Its total enrollment of students amounts to 37,452, of which over 5,900 are international students. There are 19,632 undergraduates. After more than a century of operation, Jiao Tong University has inherited the old tradition of "high starting points, solid foundation, strict requirements and extensive practice." Students from SJTU have won top prizes in various competitions, including ACM International Collegiate Programming Contest, International Mathematical Contest in Modeling and Electronics Design Contests.

Program Details

Shanghai Jiao Tong University began to offer summer session courses since 2012. In 2014, it will run from June 30th (Monday) to July 25th (Friday).

It offers content courses in the field of Natural Sciences& Engineering as well as Social Sciences &Humanities, furthermore, it also provides Chinese cultural experience courses including Chinese calligraphy, Chinese martial arts, and Chinese language courses to the students with primary Chinese level.

During your stay in Shanghai, we offer all the international students a welcome party, campus tour and also a farewell party so that you will have the chance to know friends from all over the world.

Join us in 2014 summer session, you will have the opportunity to study together with top Chinese students, experience the essence of Chinese culture and enjoy the beauty of Shanghai.

Eligibility

- **Non-Chinese Citizens;**
- **Above 18 years old, in good health condition;**
- **Currently attending colleges;**
- **Proof of proficiency in English (English as second language student required:**
  TOEFL≧ 85 (iBT)
  TOEFL≧550 (PBT)
  IELTS≧6.5;
- **Other required documents if necessary**

Application

- Apply online (http://www.study-shanghai.org/sjtu_en.asp) by filling out all the required information ;

- The application form will be created after submitting the application, please print it with A4 paper and attach a passport-size photo.

Contact Information:

Non-Degree Office, International Students Center, Shanghai Jiao Tong University
Room 301, Old Administration Building
No.800 Dongchuan Road, 200240 Shanghai, China
Tel: 86-21-34203849 E-mail: non-degree@sjtu.edu.cn
http://icae.sjtu.edu.cn

Applicants from Partner Universities

University-wide exchange partners

Based on bilateral agreement of exchange students, we accept SJTU's university-wide exchange partners' nomination of students to join SJTU 2014 International summer session. Students will be waived for tuition fee and application fee. Due to the course load in this program, 2 summers placements will be equivalent to 1 semester placement. Please note we only accept nomination from the International Office of your home institution, please contact them if you are interested in this program.

Self-support students

Self-support students from SJTU's partner universities will get 20% discount for tuition if SJTU is officially notified by partner universities. SJTU needs the International Office of your home institution to notify us by emailing to non-degree@sjtu.edu.cn
If accepted, when you pay the tuition you will find you get 20% discount.

Application Documents

- Completed "Application Form" printed from the online application system with a format photo attached;

- Autographed application form with a formal photo attached;

- Photocopy of passport information page;

- Original copy of academic record or transcript;

- Photocopy of University Diploma or original of University Studying Certificate (a notarized Chinese or English translation should be provided If the proof is not in Chinese or English)

- Original proof of proficiency in English (for students English as second language or studying in non-English-speaking countries)

Application Deadline: April 30th, 2014

Please note:
Application documents can be submitted through the website, email, post or by hand to the office before deadline; the application documents will not be returned.

Fees

- Application fee: 400RMB (Approx. US $ 70)
- Tuition fee: 8,800RMB (Approx. US $ 1500)
- Early-bird tuition fee: 7,040RMB (Approx. US $ 1200) (For applicants who register and pay the tuition before May 30th, 2014)

Account information:

Please transfer the application fee to the following account number, mentioning "SS" and applicant's name on the Remittance Note.

REMITTANCE INFORMATION	SS, applicant's surname, name, online application serial number (e.g. SS, Watson, John, 20140694552)
NAME	SHANGHAI JIAO TONG UNIVERSITY
A/C NUMBER	454659250319
BANK	BANK OF CHINA, SHANGHAI BRANCH,GRAND-GATEWAY SUB-BRANCH
BANK ADD	NO.3,HONGQIAO ROAD, SHANGHAI,CHINA
SWIFT CODE	BKCHCN BJ300
TEL	0086-21-64070906
POST CODE	200030

Please note:

The application fee should be paid when submitting the application form (within one week at latest). It can be transferred to our account or paid in credit/banking card on site. Please DON'T transfer through ATM machine. Please send an email with the title of "surname, name, online application serial number, transfer date (year/month/date), overseas/domestic transfer, amount and an attachment of the copy of the bank transfer invoice to non-degree@sjtu.edu.cn after you transfer the fee. (E.g. Watson, John, 20140694552, 2014/04/22, overseas transfer, $70). The application fee is non-refundable.

Course Selection

- Applicants can choose only one course each from Group A and Group B. For Group C, you may choose one from C01-C03 and one from C04-C07. Chinese language course level will be decided after the placement test on registration day;

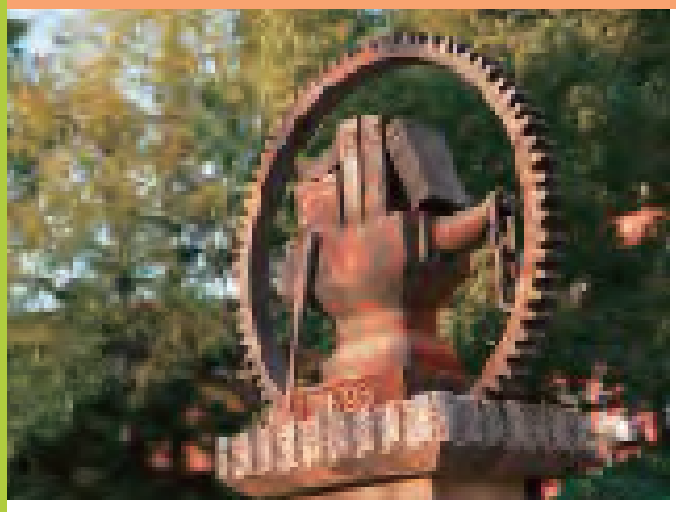
- 1 credit requires 4 teaching hours per week, as for non-credit based courses, we offer each course 1.5hours per week;

- Please email the list of the courses he/she selects to non-degree@sjtu.edu.cn with the subject "Applicant Name + Course list";

- Occasionally the program is forced to cancel courses if its enrollment is less than 10. Should the course be subject to a major change, Applicants will be informed in advance to switch course if there is a time clash.

Please note the course schedule will be available on the website around March 15, 2014.

Admission



- An Admission Notice will be issued within two weeks after the approval of application, no later than May 15th, 2014;

- Applicants should register at SJTU Minhang Campus according to the date on Admission Notice (Jun.29, 2014). Being absent on the registration day (excluding with the permission of the university) will be regarded as a waiver.

Visa Application

- A visa application form (JW202 form) will be provided if the applicant has selected more than 3 credits. Applicant can bring these documents as well as a valid passport to the Chinese embassy or consulate to apply for a short-term student visa (usually the visa type is 'X2'). Those who are already in China need to submit a copy of the visa page together with the other application documents. The JW202 form will not be provided for the applicants who do not require student visa.

Double room: RMB￥50~60/day (Approx. US $10), air-conditioning, telephone, refrigerator, private bathroom Internet access, utilities excluded.

Room reservation should be made online (http://202.120.5.182/res/freshman.asp) from Jun.15 to Jun.20 on receiving the Admission Notice. No reservation will be accepted when the dormitories are full. The accommodation fee should be paid on the registration day (Jun.29, 2014) and is nonrefundable.

If you decide to stay in International Students Apartment, please make advance payment of RMB 1000 Yuan. Once the reservation process is complete, if for personal reasons the student cannot move in on time, the 1000-yuan prepayment is nonrefundable.
Please transfer the application fee to the following account number, mentioning "SS dorm deposit" and applicant's name on the Remittance Note.

Applicants who successfully book the reservation can check-in as early as Jun.29, 2014 and check out as late as Jul.28 before 12pm.
For more details about the accommodation, please contact Mrs. Wei at: xwei@sjtu.edu.cn; Tel: 0086-21-34203849

REMITTANCE INFORMATION	SS dorm deposit, applicant's surname, name, online application serial number
NAME	SHANGHAI JIAO TONG UNIVERSITY
A/C NUMBER	454659250319
BANK	BANK OF CHINA, SHANGHAI BRANCH,GRAND-GATEWAY SUB-BRANCH
BANK ADD	NO.3,HONGQIAO ROAD, SHANGHAI,CHINA
SWIFT CODE	BKCHCN BJ300
TEL	0086-21-64070906
POST CODE	200030

Insurance:

- Applicant should buy travel insurance and the insurance purchase should cover the summer session. If applicant won't buy any insurance in the home country, please buy a "Personal Accident Insurance" on the registration day (June 29th) at SJTU.

- In order to guarantee you more indemnity in the unpredictable future, we'd like to recommend a very valuable and suitable insurance policy for this summer session period here by China Life Assurance. It is a Traveler's Accident Insurance, which offers you 60-day –long insurance and costs 100RMB.

With just 100RMB premiums, you can get the essential guarantees in the coming 2 months as following:

1. 100,00RMB indemnity for accidental injury or death;
2. 5000RMB indemnity for accidental medical service;
3. 50RMB/day compensation for accidental in-patient treatment.

Transcript:

The transcript will be send to student's mailbox or post to specified address in September.

2014 SJTU Summer Session Courses Taught in English

NO.	Course Code	Course Title	Course Category	Credits/Hours	Instructor
A01	AR012	The Conservation of World Architectural and Urban Heritage	Arts & Social Science	2/32	Giorgio Gianighian
A02	AV002	Conceptual Design of Air Vehicles for Green Aviation	Natural Science & Engineering	2/32	LIU Hongtao
A03	AV010	Reliability Analysis and Design under Uncertainty	Natural Science & Engineering	2/32	N.H.Kim
A04	BI046	Brain Facts	Natural Science & Engineering	2/32	MING Guoli, Zang-Hee Cho, LI Weidong etc
A05	BI062	DNA Modification, Damage, Repair and Cancer	Natural Science & Engineering	2/32	CAO Jiguo
A06	BI065	Microbial Life in Extreme Environments	Natural Science & Engineering	2/32	Douglas H. Bartlett
A07	BU012	Design and Innovation of Business Model	Arts & Social Science	2/32	ZHANG Pengzhu
A08	CL015	An Introduction to Heritage Sciences - World Art Histories and Heritage in the 21st Century	Arts & Social Science	2/32	Andrea Nanetti
A09	CL909	*Women's Literature and Gender Culture*	Arts & Social Science	2/32	SHI Min
A10	CV004	The Development of Long-span Bridge Building	Natural Science & Engineering	2/32	Tom F. Peters
A11	EN904	Shakespeare: Reading and Discussion	Arts & Social Science	2/32	LI Zheng
A12	EV035	Sustainability Analysis for Green Technology	Natural Science & Engineering	2/32	WU Weimin

NO.	Course Code	Course Title	Course Category	Credits/Hours	Instructor
A13	EV037	Storm Water Management	Natural Science & Engineering	1/16	ZHANG Jianqi
A14	IO012	Performance Evaluation	Natural Science & Engineering	2/32	Vincent Augusto
A15	LA018	International Law and Global Orders	Arts & Social Science	2/32	Dr. Matthias Vanhullebusch
A16	ME065	Robots for Human	Natural Science & Engineering	2/32	LIU Guangjun
A17	MT015	Nanomaterials and Surface Science	Natural Science & Engineering	1/16	WU Yongling
A18	PO020	Wind Energy Fundamentals	Natural Science & Engineering	1/16	Jean Jacques Chattot
A19	PU084	Global Environmental Governance: a Comparison between China and USA	Arts & Social Science	2/32	Robert Percival, Dan Guttman, ZHAO Huiyu
A20	SO904	*An Introductory Course of Ancient Greek Civilization*	Arts & Social Science	2/32	WU Shiyu
A21	SP217	Business Communication and Ethics	Arts & Social Science	2/32	Emmanuel Monod
B01	AR013	Building Archaeology: How to Read and Understand Historical Buildings	Arts & Social Science	2/32	Philip Caston
B02	AV009	Aerospace Visual and Automatic Manufacturing	Natural Science & Engineering	2/32	XIE Wenfang
B03	BI045	Sex, Flowers and Biotechnology	Natural Science & Engineering	1/16	Zoe Wilson
B04	BI061	DNA, RNA, and Protein: Understanding the Molecules of Life	Natural Science & Engineering	2/32	Laura Bridgewater
B05	BI064	Environmental Microbiology	Natural Science & Engineering	2/32	Zach Aanderud
B06	BI907	Genes And Human	Natural Science & Engineering	2/32	LI Dawei
B07	CA043	Polymer Physics: Theoretical Fundamentals and Experimental Techniques	Natural Science & Engineering	2/32	Thomas Seery
B08	CL016	Rousseau and His Thoughts	Arts & Social Science	2/32	Christophe Van Staen
B09	CL915	*An Introduction to European Culture*	Arts & Social Science	2/32	TONG Jianping
B10	EI030	Introduction to Microelectromechanical Systems (MEMS)	Natural Science & Engineering	2/32	ZHU Zhenghong
B11	EN905	*Appreciation of English Classics*	Arts & Social Science	2/32	LI Hongde
B12	EV036	Environmental Hazardous Factors and Health	Natural Science & Engineering	1/16	Paul Heroux
B13	IO010	Production Systems Engineering	Natural Science & Engineering	2/32	LI Jingshan
B14	IO013	Computational Methods for Engineering Design	Natural Science & Engineering	1/16	CHEN Wei
B15	IO104	Healthcare Operations Research and Decision Analytics	Arts & Social Science	2/32	Kong Nan
B16	ME111	Manufacturing Innovation	Natural Science & Engineering	2/32	Richard Liu
B17	PO019	Gas Turbine Combustion	Natural Science & Engineering	1/16	Robert Cheng
B18	PO021	Heat Pumping processes and systems	Natural Science & Engineering	2/32	Trygve Eikevik
B19	PU904	*Contemporary Diplomacy of China*	Arts & Social Science	2/32	ZHENG Hua
B20	SO906	Taiwan Studies	Arts & Social Science	2/32	LIN Gang, Shelley Rigger
C01		Shanghai-Style Culuture & Traditioinal Chinese Culture	Language & Culture	2/32	GUO Liandong, etc

NO.	Course Code	Course Title	Course Category	Credits/Hours	Instructor
C02		Chinese Language(Beginner)	Language & Culture	2/32	
C03		Chinese Language(Elementary)	Language & Culture	2/32	
C04		Chinese Calligraphy	Language & Culture	0/6	
C05		Chinese Handcraft	Language & Culture	0/6	
C06		Chinese Martial Arts	Language & Culture	0/6	
C07		Tai-Chi	Language & Culture	0/6	

* The underlined tiltles are bilingual courses.

Course Introduction

A01. The Conservation of World Architectural and Urban Heritage

Brief Introduction

This course explores the action of UNESCO Worlds Heritage Centre in the field of conservation of monuments and sites of outstanding universal value, in more than 40 years. The course is run by a professor and consultant of the Centre itself, highlighting the positive and problematic results. At its end the students will be able to understand the meaning of restoration in a world-wide context, with all the difficulties of conserving monuments and sites in a globalized world.

A02. Conceptual Design of Air Vehicles for Green Aviation

Brief Introduction

In today's aviation industry, there is a growing demand for environmentally friendly (or green) aviation to address concerns of its environmental impact. A wide range of "new requirements, procedural modifications, concepts, and technologies" are being proposed or developed to support the "environmental and economic sustainability" (source: greenaviation.org). For example, NASA's Green Aviation involves activities to improve aircraft fuel efficiency, develop the next generation of efficient air traffic control, and develop new technologies and systems engineering processes to reach the future of carbon-neutral air transportation across the globe. In Canada, a recently established Green Aviation Research and Development Network (GARDN) set the objectives on "fostering the development of technologies that will reduce aircraft noise and emissions in the vicinity of airports; considering environmental impacts throughout the product life cycle; ... and reducing the production of greenhouse gases by the aviation sector" (source: gardn.org). Whether it is for fuel efficiency, for emission reduction, or for noise control, modern flight control system plays a critical role as one enabling technology that has to fulfill rising requirements for safety, reliability, and environmental and economic sustainability. This course offers a multidisciplinary conceptual design of air vehicles for green aviation.

A03. Reliability Analysis and Design under Uncertainty

Brief Introduction

Uncertainty in system parameters, controllable or uncontrollable, makes design of structural systems a computationally expensive task due to the significant number of structural analyses required by traditional methods. Critical issues for overcoming these difficulties are those related to uncertainty characterization, uncertainty propagation, and efficient optimization algorithms. In this short course, we try to address these technical challenges and present recent research activities in structural design community.

A04. Brain Facts

Brief Introduction

The course will be taught in English by the leading scientists worldwide. The audience also could be the students from all the countries. The mystery of brain and mental health is one of the most attractive issues for the modern humankind. Human is a unique creature since its comprehensive cognition functions comparing to other animals on the earth. Learning and memory are the basic for the cognition. The memory in the brain through the learning process determined what I am and who I am. How do we learn, and how is the memory acquired, stored, consolidated, recalled and forgotten? These questions are the most attractive issues. In the meanwhile, a lot of the neuropsychiatric disorders accompany with the problems of cognition function such as the deficits in learning and memory. The lessons would focus on the advances in the neuroscience and the facts of the brain. The goal of the course will be triggering the curiosity of the students on the Mystery of Brain, training the students to investigate, think, discuss and present their own opinions on the important scientific issues. The course will also facilitate the students to understand and practice the principle of the mental health.

A05. DNA Modification, Damage, Repair and Cancer

Brief Introduction

An introduction to biochemical features of DNA structure, chemical nature of DNA damage, source of mutation, multiple repair mechanisms, DNA modification and de-modification, biochemical principles of epigenetics, and DNA changes and cancer.

A06. Microbial Life in Extreme Environments

Brief Introduction

This course will introduce and highlight the weird and wonderful things microbes do to influence our lives and the characteristics of Earth. Examples will include cloud formation, mineral precipitations, bacteria with rocket fuel in their membranes, giant microbes in fish guts, the viruses of viruses, radiation resistance in the Atacama desert, microbes that live off of the effects of radioactive potassium, how microbes that like high pH got into your laundry detergent, and microbial survival for millions of years in amber, brine inclusions and deep subsurface sediments.

A08. An Introduction to Heritage Sciences - World Art Histories and Heritage in the 21st Century: a Global Challenge

Brief Introduction

This course follows an introductory survey of World Art Histories in relation to Museology and Heritage preservation issues as rose in western culture in the 21st century combining the idea of globalization with that of local considerations. It starts by exploring "the question of how an art history of all cultures could be written or if it is even possible to do so. Examines the political and moral issues raised by the consideration of a multicultural art history" (Carrier 2008). The central section of the course is dedicated to an introductory survey of World Art Histories and Heritage as displayed in major museums around the world.

A10. The Development of Long-span Bridge Building

Brief Introduction

The course traces development of the three main types of bridges: beams, arches and suspension systems on the background of the influence exerted by the choice of materials, culture, and construction methods. The material is defined by problems and problem solving. This includes aspects of the development of structural theory, changes in technology and the evolution of the understanding of construction as system and the impact these fields have on the design and building of bridges. The material is organized chronologically according to building materials and methods.

A13. Storm Water Management

Brief Introduction

Storm Water Management is the hot topic in the United States. Due to urbanized development, cities have suffered storm water issues if proper measures of storm water quality and controls are not implemented. Even China cities have the same storm water management problem in recent years. In this course, the basic knowledge of hydrograph and hydraulics, and the concept of storm water quality and quantity controls are discussed and presented. After finishing this course, students shall learn how to design and control storm water impact to the urbanized environment.

A14. Performance Evaluation

Brief Introduction

The “Performance Evaluation” course intends to provide a panel of mathematical tools to analyze and model an “industrial system” with different point of views (operations, flow of entities, information systems, resource). Such analysis includes flow analysis, bottleneck detection, inconstancies detection, risk analysis. Then, methods to convert theoretical models into simulation models for performance evaluation will be provided. Practical work will allow the audience to understand the construction of simulation scenarios, design of experiments, results analysis and exploitation using two simulation approaches (discrete event simulation and multi-agent simulation).

A15. International Law and Global Orders

Brief Introduction

The "International Law and Global Orders" aims at helping students to appreciate an intellectual and institutional history of international law that has shaped the political, economic and social life in today's globalized world. Its approach is interdisciplinary and is centred around the fundamental values of peace, humanity and accountability that the international legal orders stands for. It also pays further attention to the contribution of regional organizations and jurisdictions as well as to the role of non-state actors in fostering those universal values.

The course constitutes of four parts: Part I "The Interpretation of International Law" provides critical tools to interpret and apply international law. Part II "The Laws of Peace" addresses topics, such as use of force, human rights, fair trade, development and climate change, comparatively, namely from a European, Inter-American, African, Asian and Arab perspective. Part III "The Laws of Humanity" deals with the regulation of armed conflict. Finally, Part IV "The Laws of Post-Conflict" will look at international criminal and transitional justice mechanisms and peacekeeping.

A16. Robots for Human

Brief Introduction

Advancements in robotics are continually expanding from industry production lines and taking place in the fields of health care, entertainment, defense, public safety, operation in severe environments, deep space and ocean exploration. Robots will take on more and more significant roles in activities of human beings. The purpose of this course is to introduce you to the fundamentals of robotics concepts, research and design methodology, applications and development history. In essence, the material treated in this course is a brief survey of relevant results from kinematics, dynamics, design and trajectory planning, simulation and programming, and multiple mode robot control for working in unstructured environment. In class discussions on the state of the art and future challenges will be conducted, including applications in industry, health care, service, and space exploration, etc. The course is intended to help students systematically understand techniques of robotic system analysis, design, integration and applications, as well as the foreseeable challenges and advancements, stimulating students' creative thinking in a multiple disciplinary setting.

The course is presented in a standard format of lectures, readings, problem and assignment sets. Lectures will be based mainly, but not exclusively, on material in the provided Lecture Notes. Lectures will follow roughly the same sequence as the material presented in the notes, so it can be read in anticipation of the lectures.

A17. Nanomaterials and Surface Science

Brief Introduction

This course mainly introduces the basic knowledge of the nanomaterials and its application in surface engineering field. Main content includes: the basic concept of nanometer materials, structure and characterization methods, preparation technology, the latest research progress; The formation of surface functional coating materials associated with combining mechanism, synthetic technology and basic principle, surface modification of nanomaterials, etc. The course highlights nanomaterials and surface science's.

A18. Wind Energy Fundamentals

Brief Introduction

The course will review the theories applied to horizontal axis wind turbine (HAWT) design and analysis, with emphasis on the vortex model of Goldstein, which has proved very useful as an engineering tool with the current desktop computer resources, but also has been shown to be a key player in enhancing both the accuracy and efficiency of Navier-Stokes flow simulations by providing a better physical representation of the far-field and wake. Existing and future extensions of the model will be discussed.

A19. Global Environmental Governance: a Comparison between China and USA

Brief Introduction

As the 21st century began, pundits debated whether, like the 20th, it would also be "America's century," whether China's remarkable economic rise would make it "China's century," or, perhaps, one seeing the development of "Chimerica." At the same time, it was also said that environmental limits to development will be the primary shaper of countries and their fortunes—with China (and India), with huge population and rapid development, and the U.S., with high per capita consumption, as keys to the future of the planet.

This course will study China's environmental challenges and governance in the context of America's own environmental challenges and governance system, and in the context of the challenges to the two countries as the primary sources of the world's greenhouse gas emissions. We will consider how developments may shape business, government, and culture, and the ways in which China and America may learn from one another

A21. Business Communication and Ethics

Brief Introduction

This course is based on the methods of group learning (Doh, 2003), experiential learning (Kolb 1984) and conversational learning (Kolb and Kolb ,2005; Baker Jensen and Kolb, 2005).

During the course, the challenge for the students will be to establish the "conditions for legitimacy" (Lave and Wenger, 1991, p.95). Therefore, in each of these business communication situations, they may have to try to build shared meaning through argumentative action (Habermas 1984), establishing conditions of shared meanings (Burrell and Morgan, 1979), dialogic management (Deetz, 1999) or "relational contracting" as opposed to "coercitive bureaucracy" (Adler, 2001).

B01. Building Archaeology: How to Read and Understand Historical Buildings

Brief Introduction

Building Archaeology is a method of looking at historical buildings. Primarily it involves close-up investigations of the physical remains but also requires research in archives and libraries to locate and evaluate written, drawn and/or photographed sources and literature. This work is undertaken by a few scholars around the world using different, but related methods. The result can be anything from a monograph to a typological study. The level of the research can vary, but generally in-depth insights are produced that have required intensive and long periods of investigation and presentation.

Such research cannot be undertaken in the short time available during a summer school, but the results of other investigations can be presented and in such a way that the student can understand how building styles and the actual building process has changed and developed over the centuries.

The course will introduce students to individual structures and their specific architecture and construction as well as also looking at groups of buildings and their collective influence on the world.

B02. Aerospace Visual and Automatic Manufacturing

Brief Introduction

Advanced manufacturing technologies are key to creating significant advances in product manufacturing and in resources in aeronautic and astronautic industries. They enable firms to more rapidly produce higher-quality, less-costly products with enhanced features and competitive edge. The manufacturing plants can become more agile, flexible and efficient. Advanced manufacturing technologies are embodied in computer-controlled machinery, machine vision systems, robotics; automated production and processing systems, instrumentation and control systems; and automated non-destructive testing systems. The purpose of this course is to introduce the students to the state-of-the-art manufacturing technologies. The course is intended to help the students systematically understand the techniques of advanced manufacturing, as well as the foreseeable challenges and advancements, stimulating students' creative thinking in a multiple disciplinary setting.

The course is presented in a standard format of lectures, readings, problem and assignment sets. Lectures will be based mainly, but not exclusively, on material in the provided Lecture Notes. Lectures will follow roughly the same sequence as the material presented in the notes, so it can be read in anticipation of the lectures.

B03. Sex, Flowers and Biotechnology

Brief Introduction

The processes of floral development and reproduction are some of the most critical stages occurring during plant growth and development. They are fundamental for plant breeding, crop productivity and horticulture. This module will focus on recent developments that have been made in the understanding of these critical developmental pathways. The module will therefore provide an understanding of the current goals, methods and achievements in the genetic engineering of crop and horticultural plants. It will also provide an understanding of how such processes may be manipulated to facilitate crop improvement and how the application of biotechnology can be used for commercial exploitation.

B05. Environmental Microbiology

Brief Introduction

We will explore current problems, movements, and solutions to issues in environmental microbiology and learn how to apply the scientific method to biological research. Special attention will be given to developing scientific literacy and the ability to actively participate in environmental topics locally, regionally, and globally.

B07. Polymer Physics: Theoretical Fundamentals and Experimental Techniques

Brief Introduction

This course will provide a four week overview of polymer physical chemistry from single chain properties to concentrated solutions. We will discuss the importance of distributions in understanding polymers. We will develop methods to account for the variation of chain lengths in a single sample and the enormous number of degrees of conformational freedom in each chain. Models of polymer chains from the freely jointed chain to the wormlike chain will be used to develop an understanding of the free energy. Free energy calculations will provide fundamental understanding of polymer behavior under compression or tension. The phase behavior of polymer solutions from good solvents to poor solvents and from theta solutions to semidilute and concentrated solutions will be derived from these free energy calculations. Both scaling theory and a Flory approach will be considered. A specific experimental technique will be presented each week to illustrate the discussion of theory. The first week will include size exclusion chromatography. The second week, we will discuss static light scattering. In week three we will cover osmometry and viscometry. Week four will wrap up with dynamic light scattering.

B08. Rousseau and His Thoughts

Brief Introduction

This course will be an overall introductory lecture on the relations between Jean-Jacques Rousseau, tradition, and modernity. In addition to a general view on his life and work as a philosopher in Eighteenth-Century France, its aim is to provide students of the SJTU with unprecedented information on Rousseau's sources, readings, intellectual evolution and legacy; his major and minor works, with a focus on his less known although vital scientific works, the latest findings in his interpretation, the vast critical literature gravitating around him, and the distinctive features of French sensibility in the Enlightenment, which lead to Modernity.

B09. An Introduction to European Culture

Brief Introduction

This course aims to provide students with an overview of European culture. It takes a historical perspective and helps students, through text reading, relevant documentary watching, picture appreciation, better understand the genesis of European culture, important movements and achievements in the process of its evolvement and their influences upon social life. It is hoped that the course will enhance students' humanistic awareness, broaden their academic view and increase their ability in creative thinking and international exchanges. Furthermore, the course is intended to benefit its takers as far as the use of English language is concerned.

B10. Introduction to Microelectromechanical Systems (MEMS)

Brief Introduction

The course covers the principles and implementations of miniaturised sensors and actuators in a range of physical domains, such as mechanical, optical, thermal, and magnetic systems. Examples include micro-electro-mechanical systems, inertial navigation system, electronic cameras, thermal microsystems and display technologies.

Chapter 1: Introduction to Microsystems Technology
Chapter 2: Micromachining Techniques
Chapter 3: Energy Transformation Effects
Chapter 4: Mechanical Microsystems
Chapter 5: Optical Microsystems
Chapter 6: Thermal Microsystems
Chapter 7: Magnetic Microsystems

B11. Appreciation of English Classics

Brief Introduction

This course intends to help the students to increase their ability of appreciating English classics, improve their logical thinking, their spoken and written English, and most importantly, absorb the inspiring ideas in English classics. The ultimate goal of this course is to help the students to enjoy the process of English learning and make their journey of life enjoyable and meaningful.

B12. Environmental Hazardous Factors and Health

Brief Introduction

This course is to teach the effects of environmental hazardous factors on human health based on the general introduction of toxicology. In addition, the risk assessment method will be introduced. The pollutants in air, water and soil will be discussed in terms of their health effects. The key content will cover the physical hazardous factors (like microwave, electromagnetic radiation, etc.) which will affect human health. The course attempts to improve the understanding of toxicology and environmental hazardous factors.

B13. Production Systems Engineering

Brief Introduction

The purpose of this course is to expose students to novel methods for analysis, design, and continuous improvement of production systems in large volume manufacturing, in other words, a quantitative approach to lean production systems. The aim is to present the material at the same level of rigor as that in other engineering disciplines, such as Electrical Engineering, Mechanical Engineering, etc. The emphasis is the rigorous engineering study of practical issues related to parts flow in production systems with unreliable machines and finite buffers. The course material is based on long time industrial studies and experiences by the instructor and his colleagues in various manufacturing plants. Every problem considered in this course originated on the factory floor and, after appropriate conceptualization and analysis, ended up as an application on the factory floor; the case studies included in this course describe some of these applications. The course will be addressed in the framework of stochastic models of production systems at hand.

B14. Computational Methods for Engineering Design

Brief Introduction

The course is designed to provide students across all engineering disciplines a view of using the state-of-the art computational techniques and the simulation-based design paradigm for engineering design, across a wide spectrum of activities in engineering product development, including those in product design, manufacturing, and life cycle engineering. Students will be given a fundamental introduction to the optimization techniques and an opportunity to learn how to apply them for solving engineering problems.

B15. Healthcare Operations Research and Decision Analytics

Brief Introduction

Healthcare systems in many countries are undertaking significant transformation in recently years. A large amount of operations research approaches have been taken to design and develop better healthcare delivery systems in terms of efficiency, effectiveness, equity, timeliness, etc. In this course, we will discuss these basic OR approaches and their applications in healthcare delivery systems. There will be two types of topics covered in this course: 1) decision analysis and mathematical programming tools that have been used in healthcare operations research; 2) basics of the healthcare systems with emphasis on the United States. This is a lecture based course with regular homework assignments and review/critique reports, as well as two half-semester projects.

B16. Manufacturing Innovation

Brief Introduction

Hierarchical relationships among need, function, geometry, material, process and performance, and their applications for competitive process design through innovation. Concurrent product and process design. Design for Success. Cases for manufacturing innovations. Collaborative work for semi-open-ended problems. Experiences of creative process design, teamwork, leadership, communication, project and team management and self-directed studies. Laboratories and industrial tour.

B17. Gas Turbine Combustion

Brief Introduction

Lean premixed combustion is the technological basis for the "Dry Low NOx" (DLN) method being deployed in advanced gas turbines for emissions control. The basic approach is to lowering the flame temperature through excess air dilution. However, dilution also weakens the flame. Therefore, the means to stabilize lean premixed flames is critical to the design and development of clean and efficient gas turbines. This course will give a background to flame stabilization methods and their underlying mechanisms. The students will learn about the basic processes associated with these mechanisms such as turbulent flame propagation, turbulent flame speed, flame turbulence interaction as well as flame instabilities. Understanding of these processes are the foundations for the development of turbulent combustion theory.

B18. Heat Pumping processes and systems

Brief Introduction

This course deals with heat pumping processes and systems applied in different kinds of refrigeration units, from smaller plants in domestic units and supermarket, to industrial plants in food and process industry, including gas liquefaction. Historic development, and importance of refrigeration technology. Thermodynamic analysis of different refrigeration processes; with special emphasis on thermodynamic losses. Properties of working fluids, including effects on the environment. Natural, environmentally friendly, working fluids. Refrigeration system components, including compressors and heat exchangers. Component design. System solutions for different kinds of applications, both refrigeration and heat pump systems.

B19. Contemporary Diplomacy of China

Brief Introduction

This is an optional course for all of SJTU undergraduates, which intends to: (1) provide an understanding of the historical development of China foreign policies from 1949 to 1972; (2) acquaint you with 10 significant cases in China's diplomatic history; (3) examine the interrelations between international and domestic conditions, and the shaping of China's foreign policy.

B20. Taiwan Studies

Brief Introduction

This core course aims at introducing basic theories and relevant knowledge in the field of Taiwan studies to the students, providing a conceptual framework and research methods to them. Through an introduction of Taiwanese history and culture, process of political development, party politics as well as U.S. policies to the two sides of the Taiwan Strait, students should be able to understand the general picture of Taiwanese politics and cross-strait relations.

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