



UBC Vancouver Summer Program

July 13 - August 13, 2019

Course Package Offerings

Enhance your students' learning experiences with study in an international setting in Vancouver, BC Canada! We welcome each university to organize a group of students to study course packages on the beautiful campus of the University of British Columbia.

Many course packages have a minimum and maximum class size, so we encourage you to register your students early. Course packages that do not meet the minimum number of students will not be offered, but students may transfer to other packages.

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Applied Science - Chemical and Biological Engineering

Package A - Introduction to Chemical & Biological Engineering (CHBE A JULY)

Harnessing Chemistry: An Introduction to Matter, Energy, and Chemical Engineering

Matter and energy are the building blocks of our universe. Using their understanding of these concepts, chemical engineers re-organize and transform matter and energy to produce new substances and materials. From the pharmaceuticals we take when we are sick, to the fuel we put in our vehicles, to the plastics, alloys and polymers that we find in our homes, in our phones and virtually everywhere around us, chemical engineers are involved, always keeping economic and environmental sustainability in mind. This course provides an introduction to the chemical engineering discipline, first by providing an overview of the physical processes and laws involved in the conversion of raw materials into refined products, and secondly by applying these concepts into more practical applications and designs. Students will have the opportunity to perform laboratory experiments illustrating some key concepts, as well as establish connections with newly acquired theory by visiting operating industrial facilities. This is an introductory course, and no prior knowledge of chemical engineering is therefore required.

Harnessing Nature: An Introduction to Biological Engineering

Science has advanced to the extent that humankind now asserts its dominion over the very building blocks of life, and engineers are at the forefront of the efforts to harness the power of biological systems to develop new technologies, materials, medical tools and treatments, foods, industrial products and environmental processes to improve the world around us. This course provides an introduction to biological engineering. Subjects covered include introductions to microbiology, cell biology, and genetic engineering, bioprocessing for the production of biofuels, foods and pharmaceuticals, biomaterials, and recent advances in tissue engineering. Given these astounding technological advances, human beings are, as a species, faced with new ethical quandaries, and the ethics and social aspects of bioengineering are therefore also discussed. Participants will have the opportunity to apply theory into practice through lab experiments, and to witness bioprocessing and sustainable design in action through a tour of a local biological waste treatment plant. This is an introductory course, and no prior knowledge of biochemistry or biological engineering is therefore required.

Package B - The Engineering of Beverages (CHBE B JULY)

The Science and Engineering of Coffee Production

For many of us, coffee magically appears every morning at the press of a button or served by a smiling barista at our favourite café. Chemical engineers, however, see coffee as the product of a series of physical and chemical processes through which coffee beans are picked from a plant and are converted into the beverages we all enjoy. This course introduces the fundamentals of chemical engineering, through the study of coffee production. Each step of the production process step will be studied, and the underlying physical and chemical phenomena involved will be explored, from the cultivation of the plants, through the heat and mass transfer involved in roasting, drying and brewing, and through the engineering considerations that go into the design of coffee machines and disposable cups, while taking economics, sustainability, and ethics into consideration. Participants will get hands-



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on experience in process engineering through relevant laboratory experiments, see the process in action by visiting a local coffee roaster, and, of course, sample delicious coffees from all over the world. This course takes a technical look at coffee production, and so familiarity with calculus, chemistry, and physics is suggested.

The Science and Engineering of Beer and Wine Production

We've come a long way since beer was first brewed in Mesopotamia 6000 years ago, and today we can easily purchase beer boasting a boundless diversity of flavours and styles from all over the world. Wine, beer's much younger cousin brewed for the first time a mere 4000 years ago, continues to this day to evoke images of mystery and romance and serve as inspiration for songs and poems. Chemical engineers, however, though many remain romantic at heart, see beer and wine as the result of a series of physical, chemical and biological processes that convert the sugars in fruits and grains into the beverages enjoyed by many. This course presents the fundamentals of chemical and biological engineering through the study of these processes, exploring industrial microbiology, fermentation, filtration, distillation and carbonation. Underlying principles and disciplines, including cell culture, bioprocessing, heat and mass transfer, and phase separation will be studied in detail, both in the classroom and in hands-on laboratory experiments, along with discussions on economics and market analysis, and environmental sustainability. Participants will visit industrial breweries to establish links between theory and practice, and sample beers and wines from all around British Columbia, which is well known the quality and diversity of its products. This course is a technical introduction to bioprocess engineering, and familiarity with calculus, chemistry, and physics is therefore suggested.

All participants must be at least 19 years of age.

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Package C – Computer Aided Design (CHBE C JULY)

Introduction to Numerical Methods and Computer-Assisted Problem-Solving

Computers have come a long way over the last few decades and now impact virtually every aspect of industry, business and society. Engineers have been able to take advantage of advances in computer technology by using them to solve complex problems that were previously impossible or impractical to solve. In this course we will examine how computers solve problems. We will apply various methods and computational tools to engineering problems in chemical and pharmaceutical production, energy generation, and engineering design. This course will focus on how to formulate problems that engineers and others face every day, into language and commands that computers can understand. We will also investigate how to apply numerical analysis techniques to a variety of systems, and introduce tools that make problem-solving efficient, fast, and reliable. Everyone is welcome and no prior experience in computer programming is required.

Introduction to Process Simulation and Design Tools

Engineers use computers to assist them in a variety of complex tasks, from building and operating production facilities to modelling individual pieces of equipment. This course will explore process simulators, such as those made by Aspen, used for assessing technical and economic feasibility of operations in a variety of industries including oil and gas, pulp and paper, and chemical and pharmaceutical production. We will also learn to use other computer design tools such as SolidWorks to analyze and build individual pieces of equipment. With these tools, we can ensure these equipment

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pieces will perform as designed, are structurally sound, and can be serviced in an easy manner. No matter your previous background, this course will introduce you to computer modelling in engineering design. Everyone is welcome and no prior experience in computer programming is required.

Applied Science – Civil Engineering

Package A – Computer Software Applications in Civil Engineering (CIVL A JULY)

Computer Application in Civil Engineering

An introduction to spreadsheets, equation-solving software, and computer-aided graphic design tools used when solving civil engineering problems. Introduction to basic structural analysis, approximate analysis of structures, and calculation of forces, stresses, and displacements using common industrially available computer software. The course focuses on the introductory topics in the civil engineering design processes, graphical visualization of civil infrastructures, and use of computational tools in civil engineering, providing an overview on the applications of computer software tools in civil engineering. The course is a combination of lectures and hands-on lab sessions, and it may include presentations from industry personnel and civil engineering software developers.

Laboratory Projects in Computer Modeling and Analytics

The course runs in a computer laboratory and includes introductory lessons and tutorial sessions, covering some of the commonly used basic civil engineering computer programs in both industrial projects and academic research. These include software for data acquisition, signal processing, numerical analysis, and analytical studies, such as Excel, Mathcad, MATHLAB, RISA, ETABS, SAP2000, and S-FRAME. In addition, the course would introduce some of the basic engineering software for graphical visualization of civil infrastructures, such as Visio, SketchUp, and AutoCAD. The laboratory course aims to demonstrate the implementation of concepts/applications discussed during the lectures and the students will learn the capabilities of the latest computer software for civil engineering analysis. Throughout the course, simple example problems will allow the students to implement the concepts discussed during the lectures. Time will be available during the lab sessions to discuss specific engineering problems that the students may want to model with one of the software packages.

Preferred background in Civil Engineering or related field

Package B - Structural Materials in Civil Engineering (CIVL B JULY)

Civil Engineering Materials

The structure and properties of common Civil Engineering materials: Aggregates, Portland Cement Concrete, Asphalt Concrete, Steel, Wood, and Timber. The emphasis is on the relationship between the structures of these materials and their mechanical properties and durability. The course will include field visits to construction sites and may include presentations from industry personnel.

Laboratory Testing of Structural Materials

Students in groups carry out laboratory & field experiments to study the materials involved. It is a laboratory-based course where site-visits and external consultations are an integral requirement. Some topical problems will be identified in the performance of structural materials such as Portland



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cement concrete, asphalt concrete, geo-polymer, timber, and steel; the students in groups will carry out laboratory and field experiments to study the structural materials involved.

Preferred background in Civil Engineering or related field

Package C - Advanced Topics in Concrete Technology (CIVL C JULY)

Concrete Technology

This course focuses on the advanced topics in concrete technology, addressing the current practices and the associated issues, covering smart materials for new constructions and repair of existing civil infrastructures. The course would introduce specialized concretes such as Fiber Reinforced Concrete (FRC) and High Performance Concrete (HPC), shotcrete, etc. In addition, the topics on advanced mineral and chemical admixtures to be used in modern concrete, as well as understanding the mechanical response of advanced concretes and their durability aspects are discussed. The course will include field visits to construction sites and may include presentations from industry personnel.

Experimental Studies of Structural Concrete Elements

Students in groups carry out experimental work on structural concrete elements: trusses, beams, girders, and columns with different reinforcements or repairs. It includes testing, analysis, and computer modeling; some of the projects run in a design competition format. This is a laboratory-based course where site-visits and external consultations are an integral requirement.

Preferred background in Civil Engineering or related field

Applied Science – Electrical and Computer Engineering

Package A - Introduction to Electrical and Computer Engineering (ELEC A JULY)

Introduction to Digital Technology and Smart Devices

Nowadays, new products (smart-home devices, portable electronics, cars, appliances) are getting more intelligent and more connected. Do you ever wonder what technology lies behind them? This course covers the fundamental ideas behind smart devices and modern electronics. We will study the building blocks of digital electronics systems, like small micro-computers, and how they interface with us. Our exploration will involve the design and implementation of machines that can read signals from the real world and make decisions digitally. This course will introduce the basics of microcontroller programming to perform smart tasks; additionally, it will cover the different peripherals and sensors used to communicate, and how the information they collect is stored. Regardless of your background, if you are interested in the world of modern electronics, this course is for you!

Introduction to Electric Circuits, Sensors, and Power

You need more than a digital system and basic programming to make your electronics work- you have to understand electricity, sensors, and what it takes to bring everything to life. In this course, the basics of electricity and electrical circuits will be covered. You will learn about circuit fundamentals, amplifiers, and filters, which allow us to recover signals from devices such as microphones. Our look into sensors will allow us to detect physical magnitudes (like light, sound, pressure, color, temperature, and speed) and turn them into electrical signals that our microcontroller can understand. Finally, we will explore the circuits that give power to our electronics and bring them to life. Along with an

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introduction to digital electronics, this course will allow you to build simple systems to develop and interface with electronics systems.

Package B - Renewable Energy and Power Conversion (ELEC B JULY)

Introduction to Renewable Energy

Do you want to save the planet with green power? This course covers the fundamentals of renewable energy systems and includes topics on energy storage, power generation, distribution, transportation, and consumption. We will start with an introduction to carbon emissions, climate change, and environmental pollution to emphasize the importance of sustainability. Students will learn about solar, wind and ocean power generation. Grid connection and microgrids will be explained, as well as battery storage and fuel cell systems. Modern loads such as LED lights and electric vehicles will be discussed around the concept of demand side management. Students will gain skills on these emerging and key areas of green power and will have the opportunity to consider several case studies/examples. The course includes tutorials and demonstrations using simulation software and physical equipment. What could be more important? The planet will depend on engineers with a strong background in green power.

Electricity and Conversion for Renewable Power

How do we generate renewable power? Renewable energy sources such as wind, solar, and ocean are intermittent and fluctuating. Changes in sun irradiance during the day, in wind speed variation, and changing ocean tidal velocity produce fluctuations in power generation. This course covers the fundamental of electricity and power conversion to transform variable/fluctuating energy into high quality power required to supply loads. The principles of power conversion for AC and DC system will be covered. Application examples will include topics such as power converters for battery chargers, solar inverters, wind/ocean power conversion, and traction for electric vehicles. The course will provide a strong theoretical background and enable students to understand renewable power conversion at the system level. A practical/applied component will be included, providing the student with real-world problem-solving scenarios, laboratory experiences and visits to UBC state of the art power facilities.

Pre-requisite: 1st year engineering or equivalent

Package C - Communication and Digital Systems (ELEC C JULY)

Communication Systems: Technology Embedded in Daily Life

Tweets, blogs, emails, videos, texts ... we rely on a myriad of communication systems, but how do these systems really work? This course will explore the key historic technological breakthroughs that have led to modern communication systems. This will be followed by an introduction to how information is represented and why the digital revolution is the underpinning of modern communication. The remainder of the course will analyze current communication systems, technologies and standards selected to give an overview of what is on the market. Examples include the LTE wireless standard which is common in most cell phone networks, Wi-Fi for local wireless communication, and modem technology which enables information to be transmitted and received over fiber optic cables, wires or air. Students will build their knowledge through case studies of current

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communication technologies and systems with an emphasis on understanding and relating performance specifications to the user experience.

Introduction to Digital Systems Design with FPGAs

Digital systems lie at the heart of almost any electronic system including wearable devices, cell-phones, signal processing systems, computers, biomedical devices, etc. In all of these systems, the "intelligence" of the system is implemented in digital logic. This course introduces digital systems, and how to design them. More specifically, you will learn about combinational and sequential logic, synchronous and asynchronous circuits, embedded processors, and other related topics. The course will have a significant laboratory component, where a digital hardware design language (VHDL) will be introduced and employed to bring to life your digital designs on an FPGA (field programmable gate-array) board.

Pre-requisite: 1st year engineering or equivalent

Package D - Engineering the Sound of Music (ELEC D JULY)

Music: An introduction to Electrical & Computer Engineering

Music has become an integral part of our daily life, but so few understand the engineering behind it. This course will give you an overview of Electrical and Computer Engineering (ECE), revolving around music. Several aspects of ECE will be covered, including the basics of acoustics and waves, the technology behind microphones, the electronic circuits behind amplifiers, analog to digital converters (ADCs) and digital to analog converters (DACs), sampling theory, signal processing using analog and digital filters, operation of speakers, encoding and compression techniques used in mp3, etc.

Music Laboratory: Hands on Learning

Have you ever wondered how a DJ machine works? What are all those knobs used on a mixer? How does a noise cancellation headphone work? In this hands-on course, students will learn about the technical details of different equipment used by recording artists and DJs, such as mixers, distortion units, bass pedals, synthesizers, and MIDI. Students will design and test a guitar amplifier as a class project.

Pre-requisite: 1st year engineering or equivalent

Package E - Principles of the Modern Internet (ELEC E JULY)

Algorithms and the World Wide Web

The Internet and the World Wide Web have enabled new methods for communicating and working with data. What is the underlying infrastructure for the Internet? What are the algorithms used to move bits of data around? How is your credit card number kept secure when you buy a book from Amazon or Baidu? How is your location determined using GPS when you use Google Maps? How do some dating web sites match people? We will discuss some of the system building and algorithmics that power the World Wide Web.

Building Modern Web Applications

Do you want to develop your own web-based application? Have you dreamed of making quick and slick looking web applications that are also robust? We will discuss the central abstractions and principles that enable the development of robust web applications. These principles can be applied

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when building applications using technologies such as HTML, CSS, and JavaScript. Pre-requisite: 1st year engineering, computer science or equivalent

Applied Science – Mechanical Engineering

Package A - Green Buildings and Engineering Design (MECH A JULY)

Green Building Design

Climate change is one of this century's grand challenges, and building science and green engineering are an underutilized opportunity to improve environmental and health outcomes. Despite the importance of building design, the difference in performance between the best and worst buildings is far larger than between the best and worst cars, cell phones or aircraft. This course tackles the question: "Why?" UBC has a tremendous variety of buildings, old and new, that are constantly undergoing review improvement. In this course, building design engineers and specialists will provide expert instruction during field trips through some of UBC's best performing buildings, followed by discussions on the key technical and social issues that went into their design.

Introduction to Engineering Design & Decision-making

This course explores engineering technology, engineering practice, trade-offs and decision-making. The course will be structured around specific engineering products/processes and the physical principles behind them, through which we will discuss the practice of engineering. Students will apply their own disciplinary background to the analysis of engineering work, projects, and perception, particularly as pertains to the public realm. Through a mix of in-class group activities, experiments, field trips, and discussions, students will examine a variety of topics, from hip replacements to car engines, from a perspective of solving social challenges through engineering design.

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Package B - Robotics and Challenges from Computational Intelligence (MECH B JULY)

Introduction to Robotics

Introduction to Robotics will provide an overview of common robotic devices and their classifications, and discuss industrial and home robotics applications. Major technical challenges in robotics will be considered, including dynamics related to trajectory and path planning. Through lectures, field trips, group activities, and hands-on lab work, students will explore both how robots sense their surroundings and gather information, and how they can interact with their environment. Although this course is technical in nature and will include a hands-on component, no experience in robotics or programming is required.

Roboethics: Challenges from Computational Intelligence

This seminar-style course will provide students with an awareness of the current state of thinking of the design of robots that are meant to co-exist with people (service, therapy, military, sentry, etc.). The course will provide insight into how sociology, psychology, law, literature and design can contribute knowledge to arrive at a safe and effective co-existence between humans and machines that have some autonomy from their computational intelligence, i.e., robots. The course will examine the taxonomy of collaborative robots, the underpinnings of bioethics applied to technology, and several controversial robot application areas.

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Architecture and Landscape Architecture

Package A - Wood + Architecture (ARCH A JULY)

Wood - Building by Nature (Forestry)

British Columbia has been a global centre of innovation for the cultivation, processing, engineering and manufacture of wood building materials and wood building design for over 100 years. In this course, students will learn about the physical and mechanical properties of wood, one of nature's most abundant and versatile building materials. Focus will be on how wood can be used to inform creative processes of industrial design, engineering and architecture. Course format combines classroom-based lectures, machine laboratory demonstrations and exercises, with field visits to study contemporary places and techniques of wood production, processing and construction.

Designing with Wood (Architecture)

This field-based course connects the technical understandings of wood as a material from Course 1 to their application in the design of innovative wood buildings and structures. Students will learn to see, document, analyze and illustrate the integration of design and technical concepts within a contemporary wood building, and will ultimately be asked to design a small building that is technically sound, critically considered, and beautifully executed using wood as the primary medium. Course format combines classroom-based lectures, presentations, studio projects and lab demonstrations with field visits to innovative buildings and design and engineering firms.

Package B - Urban Landscape Architecture (ARCH B JULY)

Green System Planning

Vancouver is a beautiful and sustainable city in a dramatic natural setting. What role do the natural areas in and around the city play in sustaining a metropolitan area such as Vancouver? This course will introduce how urban natural areas clean air and water, sustain wildlife, and provide psychological and other health benefits to people. Students will learn about the most important environmental services and human benefits provided by the large parks and natural areas in the Vancouver region; and will hike or bike on guided field trips to some of the region's most important and instructive landscapes, open spaces and parks.

Design in the Public Realm

Vancouver is known as a liveable and sustainable international city. An important aspect of the city's liveability is the design of its public realm — publicly owned parks, greenways, waterfronts, streets and squares. A well designed public realm provides places for people to gather, socialize and recreate, encourages active transportation, maintains spaces for the urban forest and vegetation to thrive and contributes other environmental services to the city. In this field-based course students will learn how a well-planned and designed public realm supports liveable neighbourhoods and provides important social and environmental services to the city. Students will learn how to document and assess public spaces in the city and through daily field trips and guest lectures will study the City's best examples of public realm design.



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Package C - Urban Design (ARCH C JULY)

Perspectives on City Making

This class, taught by the former Mayor of Vancouver Sam Sullivan, uses the development of the City of Vancouver to illustrate how many social, political, economic, creative and natural forces combine and interact to make a city. Students learn and experience these forces through the eyes of those who were a part of it. There will be tours and guest lectures from those who played a role in specific development projects. Students will gain an insight into both the practical and theoretical considerations that have led to the city, as we know it.

Sustainability by Design

Using the city of Vancouver as a laboratory, this class introduces the basic principles of sustainable urban design through daily tours of internationally significant local examples. Relevance of these examples to global development is isolated and discussed. A typical day includes a lecture focusing on one principle of sustainable city design, followed by a tour of a place in the region where this principle is obvious. Students will see and experience examples of significant contemporary urban design practice in suburban, urban, and downtown contexts.

Arts

Package A - Global Migration, Local Communities: Asian Canadian Histories (ARTS A JULY)

Is Asia in Vancouver: Academic Perspectives (Asian Studies)

Migrants from Asia have long played a key role in the development of the West Coast of Canada, but have also experienced long histories of marginalization. This course introduces students to Asian migrant communities on the West Coast by drawing on historical, sociological, and cultural perspectives. Students will be introduced to key concepts such as settler colonialism, racial formation, immigration, and community resilience. Guest speakers will introduce students to research that emphasizes community collaboration. Students will gain valuable skills in conducting research, including how to read across a range of academic disciplines, public speaking, and academic writing.

Is Asia in Vancouver: Community-Based Research (Asian Canadian and Asian Migration Studies)

In this course, students will apply their classroom knowledge to undertake original research projects that engage with local Asian communities. Throughout, students will consider the ethical challenges with under-represented communities in a respectful manner. Students will visit historical neighborhoods in the Vancouver area and meet with community workers and elders. They will then be guided in the process of formulating, proposing, and carrying out a short research project. Course work will include workshops in interviewing and basic filmmaking. The course will culminate in a showcase to share research projects with community partners.

Package B - Global Journalism, Culture and Communications: Practice and Principles (ARTS B JULY)

Culture and Communications (Anthropology)

Anthropology is the study of human societies and cultures and their development. A very important area of interest is human language. This course will examine the relationship between language and culture by covering key debates in the field including animal vs. human communication, cross-cultural differences, language policies and language change. Students will explore how language is involved in

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cultural constructions of race, gender, class and ethnicity. They will also analyze how language is understood in relation to power, political economy and language ideologies. Students will gain experience in meeting writing standards for UBC Arts/Anthropology courses and will receive individual feedback on writing assignments.

Global Journalism (Journalism)

This course will examine the development of media technologies, their applications, and their cultural, political and social impacts. Students will also gain hands-on experience in learning how to think and operate like a professional journalist in a simulated multimedia environment. It is designed to introduce students to the grammar and syntax of media across platforms, based on a core journalistic skill set of interviewing, reporting, news writing, and research methods in tandem with the most current technical tools.

Package C - The English Language in a Globalized World (ARTS C JULY)

The History and Future of the English Language (English)

In order to contextualize present-day changes in English, the course will begin with a brief history of the English language. It will then examine issues such as the national dialects of English (e.g. Canadian English, British English, Singapore English), regional and social dialects, the effects of gender on language forms and use, language in computer-mediated discourse (in texts, emails, social media), and ongoing changes in contemporary English. The course will provide students with a better understanding of how English is used in different contexts, and the directions in which the language is heading in the 21st century.

How Human Language Works (Linguistics)

An introduction to how human languages work, examining the structures that underlie all languages, with special focus on the deep structure of English. The course asks what universal properties are shared by all languages, and how languages as divergent as English and Chinese can be different (or similar!) in terms of their sound systems, word-building, grammar, meaning, written form, and acquisition by children and adult learners. By the end of the course, students from varied language backgrounds should understand how knowledge of the universal properties of languages can deepen their understanding of English, of their own language(s), and of the amazing capacity of the human mind.

Package D - International Finance, Trade and Politics (ARTS D JULY)

International Trade and Financial Markets (Economics)

The modern global economy is intricately tied together through networks of trade and financial interconnections. This course will give students an understanding of the structure and function of international trade and international financial markets. The course will give a basic introduction to the forces driving international trade in goods and financial assets among nations of the world. The major theories of international trade and financial markets will be reviewed. Topics covered will include the determinants of a country's trading pattern, recent trends in international trade such as offshoring and global supply chains, the role of financial markets in international development, the future of the Renminbi as an international currency, the understanding of international financial crises, and sovereign debt crises.

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Dynamics of Democracy and Global Uprisings (Political Science)

We deal with some of the key concepts of political science, matching them with developments around the globe. We consider some of the concepts and controversies in defining democratic and non-democratic systems. How do we tell democratic systems from non-democratic ones? Are all democracies the same, or at least similar? Is citizen satisfaction a distinctive quality of those regimes? We then link these discussions to the rising waves of global discontent around the globe. The seemingly-universal quality of these uprisings give a strong indication that the struggles we are witnessing are no longer over democracy versus other systems; instead, what seems to be at issue are the meanings and practices largely associated with democratic regimes, the expectations of people, and what regimes provide. Finally, we focus on specific uprisings, chosen by the students, in an attempt to contextualize our discussions and make sense of recent global developments in an informed, thoughtful manner.

Package E - Environmental Economics and Geographies of the Global Economy (ARTS E JULY)

Geographies of the Global Economy (Geography)

This course will explore the fast-changing geographies of the global economy from the uniquely grounded perspective of economic geography. The course will examine a range of contemporary issues and debates in the field, including: the development of transnational production and logistics networks; changing patterns of migration and labour mobility; the growth and influence of world cities and financial centres; new models of economic growth and varieties of capitalism; and contrasting perspectives on economic and cultural globalization. Students will acquire an up-to-date understanding of the changing global economy and its principal challenges and opportunities, together with an understanding of their own place in the world.

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Environmental Economics (Economics)

This course provides an introduction to economic aspects of environmental problems and sustainability. It will begin with an overview of selected environmental problems, such as the effects of air and water pollution on human health, threats to biodiversity from habitat destruction, and climate change. Trends and indicators of environmental sustainability, both within and across countries, will be reviewed. The course will focus on questions such as why environmental problems occur, whether or not globalization is increasing the severity of such problems, what types of policies have been successful in improving environmental quality, and whether or not current consumption levels are sustainable. Policies will be analyzed from the perspective of efficiency, effectiveness, political feasibility and fairness, and examples will be drawn from different countries.

Package F - Melodrama in Action: Singing Opera and Learning Language (ARTS F JULY)

Italian for Beginners (French, Hispanic, and Italian Studies)

Our educational program for beginners includes vocabulary, grammar, exercises and dialogues, and places special emphasis on singing. The purpose of the Italian-for-Beginners course is to help students develop basic comprehension, speaking and translation skills, understand and communicate in structured, real-life situations in contemporary Italian. By integrating study and practice of the Italian contemporary language with Italian lyric diction and musical culture, this course makes learning as effortless and as fun as possible. The use of traditional and art songs and arias, as well as of role-plays

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and conversations with Italian speakers, will provide the opportunity to practice diverse language skills, while also learning about the fascinating world of Italy and its culture. By the end of the course students will be able to understand basic phrases, interact with other people and write short messages, all in Italian!

Fundamentals of Opera Singing (Music)

Whether you have some singing experience or not this course will cater to your level and needs, and teach both the basic as well as new and exciting Italian repertoire. The course will focus on group singing classes where the fundamentals of breathing, singing, and moving on stage will be outlined. Group activities will be accompanied by individual lessons with a UBC Voice Faculty Teacher, where students receive immediate and targeted feedback. A final performance of solo and group singing will be the culmination of all of your hard work. If you have ever wondered about pursuing a degree in Voice at UBC, this is the right opportunity to learn about the School of Music and what you need to prepare in advance of your audition. Begin your journey into the study of Italian music and come sing Bocelli's and other charming Italian songs with us!

Package G - Computational Linguistics: From Search Engines to Social Media (ARTS G JULY)

Linguistics for Natural Language Processing (Linguistics)

An introduction to the general linguistic principles and concepts that are relevant for computational linguistics, including: (i) an introduction to phonetics and phonology, (ii) an understanding of syntactic and morphological structure, (iii) descriptive approaches to grammar, (iv) language typology and linguistic universals, including differences and commonalities between different languages, cultures and modes of communication. In each case, special reference will be made to computational applications, and by the end of the course students should understand how knowledge of the universal properties of languages both contributes to and benefits from computational research and applications.

Computation for Natural Language Processing (Linguistics)

This course will take students with little or no background in computing and teach them programming basics and the practical uses of computational linguistics and machine learning. Students will learn how to use a command line interface and create simple programs using Python and NLTK. The course will then take them step-by-step through how programs perform such tasks as tagging speech and analyzing sentence structure or meaning. They will see how these steps can be applied in such useful and ubiquitous applications as error correction, spam filters and author identification among others. Finally, they will see concrete examples of how computation is contributing back to traditional areas of linguistic enquiry.

Package H - From Stage to Screen: How Vancouver 'plays' to a Global Audience (ARTS H JULY)

From Drama to Theatre: How Does a Play Mean? (Theatre)

This course will explore the languages of theatre within Vancouver's rich and lively performance culture. How do individual artists--directors, actors, designers--transform a playwright's ideas into unique and original art? In what ways, for example, will a Shakespeare play produced in Vancouver

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become a Canadian play? These questions and more will be explored in relation to two plays a week in production in Vancouver during the term. We will examine and discuss the play scripts, attend the plays, and meet "backstage" with some of the artists themselves. Plays chosen will span a variety of genres, including Shakespeare (in production at Bard on the Beach Shakespeare Festival), musicals (in production at Theatre Under the Stars and the Arts Club Theatre Company), plus additional dramas and comedies in production.

Documentary & the City (Film)

For the first time in human history a majority of the world live in cities. While there are multiple threats posed by the growth of cities, such as poverty, migration, and social divisions, there are also surprising and innovative practices that emerge. The city of Vancouver is brimming with stories that can tell us many things about the world we live in. Focusing on documentary films and filmmaking, this course introduces students to these often hidden stories of the city through key writings, films, and direct engagement with life in Vancouver. Students will use creative methods to connect critical analysis with their everyday experiences, while authoring basic documentary projects in neighbourhoods throughout the city.

Package I - Understanding Inequality: The Challenges of Diverse Societies (ARTS I JULY)

Inequality and Diversity in Modern Societies (Sociology)

This course explores the concepts and theories surrounding social diversity across a range of modern societies. The aim is to highlight how societies are stratified along different social categories, and engage students to think critically about the organizational structure of multicultural societies. We begin with an overview of the demographic and socioeconomic position of various groups. We then analyze the social inequalities that exist among these groups and the social mechanisms and policies that generate these differences. Drawing from real life examples and research findings, the course will teach students how to think sociologically about specific issues (e.g. labour market participation, health outcomes, civic participation) that are relevant across the globe but also pay attention to those pertinent to multicultural societies such as Canada. Lastly, the course will use assignments to enable students to analyze these issues and think about practical solutions to address them.

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Practice with Marginalized Diverse Populations (Social Work)

Based on a framework that recognizes that inequality is rooted in historical forms of stratification that are often embedded in modern institutions, this course will explore the application of the concepts of diversity in policy and practice with diverse populations. This course will then examine how different forms of diversity individually and intersectionally cause predicaments to and marginalization of individuals, groups and communities. Using Canadian policies as an example, students will learn and critique the strengths and limitations of the human rights and multicultural discourse prevalently embraced by many western countries. Through agency visits and small group discussions, students will examine different ways and approaches of how health and social service practitioners apply the concepts of social diversity in serving and advocating for individuals, groups and communities to overcome these predicaments and marginalization.

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Business

Package A - International Business Management and International Marketing (BUS A JULY)

International Business Management

This course is taught from the perspective of a senior manager at multinational enterprise. It analyzes the decisions made by firms in an international context. To do so it combines material from strategy, international finance, marketing, human resource management, positive trade theory, institutional trade policy, and other areas. It will emphasize the use of analytical tools and the development of oral and written communication skills. By design, the course is integrative, implying that there is some overlap with material taught in international marketing and finance courses.

International Marketing

This course examines the process of entering international markets and in conducting marketing operations on an international scale. Through lectures and practical assignments students will explore a broad range of global marketing issues and concepts.

Specific objectives include understanding the role of marketing in business, analyzing the external issues affecting international marketing activities including the economic, social/cultural, and political/legal environment, identifying and assessing global marketing opportunities in the international marketplace, gaining experience in developing international marketing strategies, and planning to implement and adapt these activities in specific markets.

Package B - Introduction to Marketing & Management and Organizational Behaviour (BUS B JULY)

Introduction to Marketing

This course is designed to provide a broad introduction to the field of marketing and basic considerations affecting the domestic and international marketing of goods and services. Marketing is far more than just selling or advertising within a business setting; it is a major part of everyday life. This course will illustrate the importance of marketing and will help you develop fundamental marketing knowledge and skills applicable to all specializations within business.

Management and Organizational Behaviour

The primary objective of this course is to teach you about the effects of organizational structures and interpersonal processes on the behaviour of individuals in organizations and the wider implications for the effectiveness and success of organizations. This course will expose you to frameworks, approaches and behaviours that can help in effectively participating, leading and managing in organizations. Research has shown that effective people management is an important contributor to organizational success. The emphasis will be on creating effective leaders and team members through a better understanding of motivation, working in teams, power and influence, leadership and navigating organizational culture and change. All this will help participants contribute to the success of themselves and their organizations.

Package C - Strategic Management & New Enterprise Development (BUS C JULY)

Strategic Management

Concepts and processes for the strategic management of private sector, single and multi-business unit enterprises are analyzed using the case method. Methodologies which draw on economic and

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organizational theory are integrated to form the foundations for strategic analyses. This course builds students' ability to analyze and develop business strategies by introducing frameworks and tools to understand the nature of competition in general and to analyze the specific competitive position and strategic options of a given firm. You will learn frameworks for analyzing industry structure, internal capabilities, and competitive interaction, as well as how to use those frameworks to critique a specific firm's competitive position and develop and evaluate strategic alternatives.

New Enterprise Development

This is an introductory course to the field of entrepreneurship. It is also useful to anyone who expects to be interacting with entrepreneurs in their business careers, be it as private investors, venture capitalists, consultants or customers. The course provides an experience-based exposure to the process of starting entrepreneurial ventures as well as examining the challenges facing any would-be entrepreneur in the real world. This includes developing business models and strategies for innovative products or services and strategies for acquiring resources, particularly financing.

Package D - Operations and Supply Chain Strategy & Business Analytics (BUS D JULY)

Operations and Supply Chain Strategy

Operations is one of the fundamental functions of any organization. Operations and Supply Chain managers are primarily concerned with the efficient execution of an organization's strategy. In doing so, they also help shape a firm's future strategy. Operations is concerned with designing and managing processes that transform inputs to outputs in an organization. This includes important activities such as the production and delivery of goods and services. Operations is also responsible for the systematic planning, designing, operating, controlling and improving the various processes involved from the time a customer places an order to the time the product or service is delivered. The challenge for supply chain managers is to produce goods and deliver services in accordance with the business strategy of their company in most efficient manner. Typically, this involves balancing the needs for lower costs, higher quality, shorter production times and greater operational flexibility, while at the same time getting the customer orders (products or services) out on time. In this course you will learn the fundamentals ideas of good operational principles and Supply chain management. You will understand how an organization's strategy and operations are related to each other. You will also understand the impact of operational decisions on the various other business functions such as marketing, finance and human resources. This will help enhance your managerial insights and intuition and improve your business decisions. The course will feature practices from various companies such as Zara, Alipay, Tencent, Walmart, GE, Toyota and many others.

Business Analytics

Business professionals must have familiarity with and skills in each of descriptive, predictive and prescriptive analytics. Descriptive analytics includes data analysis and data visualization: understanding, manipulating, evaluating and presenting the many complex data and information streams that drive today's businesses and organizations. Predictive analytics includes forecasting, various statistical techniques, data mining, and machine learning. Prescriptive analytics involves the employment of a number of analytical models to aid decision-making. Topics covered in this course include: descriptive statistics, data visualization, descriptive data mining (cluster analysis), linear regression, predictive data mining (classification trees), spreadsheet models, linear optimization and



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Monte Carlo simulation. This course aims to provide essentials on these topics, equipping students with the literacy of business analytics. Each student must bring his/her own laptop computer with Excel.

Community and Regional Planning

Package A - Big Data and New Technologies in Cities (PLAN A JULY)

Urban Big Data Analysis

With the advent of open data movement, knowledge and skills for collecting and analyzing big data become increasingly important for urban planners. This course will teach you how to harness the power of big data by mastering the way they are collected, organized, and analyzed to support better decision making in urban planning context. You will learn the basic tools needed to manipulate large datasets derived from various open-data platforms, from data collection to storage and approaches to analysis. You will capture and build data structures, perform SQL and basic queries in order to extract key metrics and insights. In addition, you will learn how to use open-source programming tools, such as R and Python, to analyze and visualize the data. These statistical tools and methods will be complemented by machine learning and pattern detection techniques, in addition to new technologies for big data.

Spatial Analysis Using Geographic Information Systems

GIS technology sits at the intersection of the world around us and our incredible computing capabilities that allows us to investigate and visualize that world in new and exciting ways. This course will introduce you to key concepts, methods, and tools used to collect, analyze, map, and visualize geospatial data. You will explore what makes spatial data special, some of the ways it is collected, and how it can be used to answer questions about the world around us. You will use geospatial data to help with decision making and to inform policy-making. You will use computer-based geographical methods of data input and analysis to model the world around them, to explore real-world scenarios, and present their findings to others. Practical applications will be investigated in both the natural and human realms through lectures, discussions, group exercises, and a hands-on computer lab component.

Package B - The Evolution of Cities: Past, Present, and Future (PLAN B JULY)

City-X: Urban Transformation in a Globalized World

The rapid rise of cities – from Bogota to Bangkok, Shanghai to Sydney, Vienna to Vancouver, and all urban nodes in-between – imposes global challenges and opportunities for the 21st century and beyond. Today, the modern metropolis functions not only as a financial command-and-control centre in an internationalized economy but also as a testbed for technological innovation and a creative hub that attracts people from near and far. How are these world trends shaping the spatial conditions of cities? In turn, what are the implications of these spatial conditions on urban life? Through a combination of field trips, hands-on workshops, and interactive lectures, this introductory course will provide a novel learning platform to examine current and future scenarios of urban transformation in a globalized world



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Past, Present, and Future: Building from Vancouver's Multicultural Planning History

Vancouver's residents are comprised of different communities made up of different religions, ethnicities and cultural backgrounds. More than 40% of Vancouver residents were born in another country. These communities have shaped and transformed Vancouver's social fabric, the local economy, and the built form of the city. In this course, students will connect issues such as urban development, gentrification, re-zoning, community-action projects, global immigration, and sustainability agendas with the ongoing evolution of intercultural understanding and multicultural cosmopolitanism in Vancouver. Through site visits to key locations throughout the city such as Chinatown, Stanley Park, Olympic Village and the False Creek Flats, students will unpack the diverse and complex history of the communities who contribute to city building processes in Vancouver. This course will include both classroom theory and lectures, as well as site visits with student reflection and discussion in the field.

Package C - Multiculturalism and the City (PLAN C JULY)

Family Recipes and their Business Potential: Designing a Tourism Guide to Family Food Businesses in Vancouver

This course is aimed at stimulating student interest in a range of careers: business/marketing, economic development, community planning, hospitality, photography and media studies, anthropology, history and heritage conservation, computer programming, and social advocacy. By going 'behind the scenes' at restaurants and family food businesses in Vancouver, students will discover how family recipes get handed down over the generations and become a selling point for the city's bespoke food industry. Students will research the city's multicultural history of foods as social enterprise, family histories, photographically document food culture, and identify creative, successful, business practices. The instructor has several years' experience with teaching material cultural analysis to MBA students in business school. Students will collaboratively design the template for a free, web-based HTML guide to Vancouver's family food businesses, in consultation with Tourism Vancouver.

Past, Present, and Future : Building from Vancouver's Multicultural Planning History

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Dentistry

Package A - Implications of Dental Caries and Oral Cancer (DEN A JULY)

Dental Caries

Dental caries is a common human infectious disease affecting more than 90% of all humans. The disease requires a combination of bacteria, a sugar source and a susceptible tooth mineralized surface. Bacteria metabolize sugar producing acid as a by-product that dissolves the tooth surface mineral. Destruction of the tooth leads to the pathology, dental decay. Dental decay is a progressive process and if it is allowed to continue it can progress into the dental pulp and the supporting bone. If a bacterial abscess forms in the bone supporting the tooth, it is often necessary to remove the tooth. Dental caries is the leading cause of tooth loss in the world. Tooth loss affects the ability to eat, alters nutrition and has a dramatic impact on the quality of life. This course will take a comprehensive look at the implications dental caries to understand how this disease impacts human populations.

Oral Cancer

Cancer of the oral tissues is the 6th most common type in the world. In some developing countries oral cancer is much more common due to oral habits and exposure to chemicals that can cause cancer. The five year survival rates for oral cancer remain low with nearly half of all the affected individuals dying from the disease. Early diagnosis of oral cancer is the most effective approach to decrease the mortality and morbidity. Pre-malignant lesions exist that have a much higher chance of becoming oral cancer and the recognition and management of these lesions can prevent cancer development. Oral cancer occurs in an anatomic location that is amenable to early diagnosis. Many techniques have been developed to aid in the recognition and diagnosis of both pre-malignant and malignant oral lesions. In this course the development of oral cancer, the clinical signs of the condition, the clinical and laboratory procedures for diagnosis and the long term consequences of an oral cancer diagnosis will be covered.

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Education

Package A - Teaching and Learning English (EDU A JULY)

Applied Linguistics for Teachers

Successful language teachers need to understand more than just the structure and nature of the language(s) they teach: they also need to develop an understanding of the social, cultural, and ideological implications of language and language education. Language classrooms are diverse, multilingual, multicultural and multimodal places, presenting students and teachers with unique challenges. This course serves as a general introduction to theory and research concerning these issues as they relate to learning and teaching, from the perspective of applied linguistics. Topics to be discussed include: theories of first- and second-language learning; the relationship of theoretical issues in applied linguistics to educational practice; language variation; language attitudes and ideologies; world Englishes; language and globalization; language policy; language and gender; language and race, and more.

Introduction to Teaching and Learning English

This course provides a general theoretical overview of and some practical preparation for English language teaching (ELT). Its scope is diverse as it considers approaches to language teaching, a range

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of teaching techniques and strategies, learner needs, instructional contexts, assessment, and sociocultural concerns, as they pertain to teaching English in a variety of contexts. The course examines ways to teach listening, speaking, reading, writing, grammar, and vocabulary but always with a view to integrating these skills. Students will have the opportunity to contribute to and learn from active engagement in discussions on contemporary ELT issues and topics.

Package B - Early Childhood Education and Development (EDU B JULY)

Designing High Quality Programs in Early Childhood Settings

This course addresses the notion that children are natural learners. Students will learn about, discuss, and clarify important concepts and theories relative to early childhood education, including child development theory and the holistic nature of learning in the early years. The course highlights the idea that young children's innate capacity to learn and teachers' responses to children's inquiries provide the foundation for the development of high-quality early learning experiences for young children and impacts the type of programming that is created. Students will learn about designing appropriate daily routines and implementing teaching strategies for integrating different areas of learning, such as literacy, math, science, and art through inquiry and project-based learning. The course will also include observations in local Early Childhood settings.

Creating Environments to Support Learning in Early Childhood Settings

This course introduces students to the significant role that designing stimulating and nurturing early childhood classroom environments plays in children's learning and in supporting all aspects of their development and growth. Students will learn about creating dynamic indoor and outdoor learning spaces for young children and the importance of providing children with original and natural educational materials and resources. The course will include visits to local state-of-the-art Early Childhood environments for young children.

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Package C - Classroom Management and Behavioural Assessment (EDU C JULY)

Classroom Management

The course is designed to empower educators to develop a positive classroom climate and an effective learning environment, in which teachers and their students engage in meaningful and successful learning experiences together. To achieve this goal, students will be introduced to current, evidence-based practices in school-wide, classroom and individual behaviour support. Classes will include lectures, discussions and small group activities that provide opportunities to develop skills in the application of these practices. Specific objectives of the course include developing student knowledge and skill in: (a) proactive approach to classroom management; (b) school-wide positive behaviour support; (c) design of a positive classroom environment; (d) development of positive, nurturing relationships with students; (e) use of positive reinforcement to strengthen prosocial behaviour; and (f) effective ways to respond to problem behaviour.

Assessment and Positive Behavioural Support in School and Community Settings

The course introduces students to the philosophy and methods of behavioural assessment and positive behaviour support with persons who engage in challenging behaviour in school and community contexts. Specific objectives of the course include developing student knowledge and/or skill in: (a) basic principles of behaviour change; (b) features and values of positive behaviour support;

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(c) ecological assessment of environments and functional assessment of persons with challenging behaviour; (d) completion of summary hypothesis statements and competing behaviour pathway diagrams; (e) design of multi-component behaviour support plans that are logically linked to assessment results; and (f) design of plans that are both technically sound and contextually appropriate.

Package D - Food and Well-being—Learning the Connection (EDU D JULY)

Eating Food – An Everyday Experience

Deciding what to eat is an everyday event that is experienced in every culture and location. Learning about food requires knowing more than just how to be a consumer. This is an introductory course that provides a broad overview of different foods, food safety and preparation techniques and explores how food decisions can support wellbeing. Students will have an opportunity to reflect on their own food choices and develop critical thinking and collaborative work skills through class discussions and assignments. Topics to be discussed include: food supply in the Western context and how this compares to students' experiences; what influences our food choices; and everyday food practices and how these are linked to globalization. By the end of the course students will have participated in a range of activities including visits to farms and markets; experts who will talk about how they prepare and provide food; and teaching about foods from their culture.

Thoughtful Eating in a Globalized World

Developing understanding about how food is produced from farms to production and final places for consumption from across a range of different cultural and geographic contexts is an important prerequisite for sustainability in an increasingly globalized world. The aims of this course are to help students develop understandings about sustainable food production and eating safe food. Topics of this course will introduce differences in food production as a cyclic process rather than one that is linear; food safety and eating for wellbeing. By the end of the course students will: be familiar with sustainability concepts; develop holistic strategies for eating that enhances wellbeing; and be able to apply the learning to their everyday experiences. They will have experienced a range of locations where food is purchased and consumed; maintained a journal that will allow students to think about how people make their food decisions, and considered the implications of different ways of eating that have an impact at local and global levels.

Package E - Culture, Creativity, and Learning Technologies (EDU E JULY)

Digital Media in Arts Education

This course is an introduction to teaching and learning with digital technologies through the creative arts. Beginning with an exploration of curriculum and pedagogy from an arts-based technological perspective, the course examines the multiple opportunities and challenges arising from using digital technologies to approach the creative arts in educational contexts. Using an up-to-date laboratory of computers, iPads and synthesizers, students will work together in exploring digital music, video, photography, and other creative arts apps and software used in educational settings. Participants will take an active role in their learning processes – including setting goals, researching creative digital tools, engaging in peer-evaluation, participating in discussions, doing presentations, writing reflections and seeking out relevant research readings and resources. This course will help students build a foundation for critical thinking about education, digital media and the creative arts.

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Learning Technologies and Creativity in the Digital Age

This course offers students a space to create and a community to explore ideas about integrating learning technologies in primary and secondary classrooms. Students will engage in this course as instructional designers, content creators, and tinkerers working together on personally or pedagogically meaningful projects. Learning involves defining problems and generating solutions, questioning assumptions, exercising ingenuity, prototyping and experimenting with diverse ideas, materials and perspectives. The educational philosophy underlying this course emphasizes project-based learning with digital media and technology. Students will have diverse opportunities to design innovative learning environments and create digital learning artifacts and resources. No background knowledge or experience is required for this package. Students will benefit from creative instructional strategies and technology-supported learning activities.

Forestry

Package A - Forest Management and the Effects of Carbon (FOR A JULY)

An Introduction to the Ecology, Economics and Politics of Carbon

Humans use carbon-based molecules in almost all aspects of daily life – food, shelter, clothing, and power generation are but a few examples. Unfortunately, deforestation, land degradation, and fossil fuel emissions are responsible for the build-up of carbon in the atmosphere. This is causing the atmosphere to heat up which in turn is changing the global climate. To understand why this is a problem and what we can do about it, students will be provided with an introduction to the ecology of carbon (where it is, and how it cycles through the living and non-living world). We will then discuss the challenges of limiting carbon emissions by considering the interaction between economics and politics. This interactive course will include lectures as well as fieldtrips to different sites around campus to demonstrate the concepts learnt in class.

Sustainable Forest Management

This course represents an attempt to integrate knowledge and processes relating to forest management across a wide array of disciplines, but it is centrally concerned with bringing the underlying ecological and management science together. It involves a mix of lectures, group discussions and field visits to increase the understanding of students about problems involved with managing forest ecosystems for a variety of societal goals and objectives. The course is heavily geared towards ecological, economic and policy context of British Columbia; however, international implications and issues of forest management are also covered. The objective of the course is to familiarize the students with a variety of forest ecosystem values and their management issues and to enable meaningful analysis of the current issues in forest sustainability.

Package B - Urban Forestry (FOR B JULY)

An Introduction to Urban Forestry

This course will provide a general introduction to the concept of Urban Forestry and why this is an important topic in today's rapidly urbanizing society. There is a growing need to adapt to multiple impacts of climate change; and increasing demand from the public for the recreational, psychological and health benefits that green-space networks provide. With increased urban populations, global warming, urban heat islands, flooding and pollution, cities may become unlivable or demand massive

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energy-use for cooling, unless we can establish large scale, healthy urban forest systems. This interactive course will be supplemented by a number of field trips around the Greater Vancouver area, visiting a number of local parks and hearing from experienced practitioners in the field.

Urban Forestry and Well-being

Urban forestry is about planning and managing urban green-spaces and ecosystems for human welfare, ecological health, and protection of our cities' support systems. Urban forest networks, parks, wetlands, and other green infrastructures are vital in moderating heat waves and cooling demands, maintaining biodiversity and carbon sinks, controlling forest fires, storm-water flood mitigation, bio-energy production, etc. Urban Forests improve and protect our health, property values, local jobs and businesses, outdoor recreation opportunities, and community character. This course will give the students an introduction to the importance of understanding urban forestry in the face of today's rapid urbanization as forests and green systems compete for space among buildings, roads/transit, storage facilities, and energy infrastructure. Students will be able to experience the concepts learned in class through fieldtrips and class activities. Past participants have been taken on fieldtrips to various locations around the Greater Vancouver area including Surrey, North Vancouver and Stanley Park.

Kinesiology

Package A - Sport and Exercise Performance (KIN A JULY)

Sport and Exercise Psychology

This theory-based course offers a practical overview of core topics and applications in sport and exercise psychology. The course is intended to develop students' understanding of psychological factors that impact participation and performance in physical activity contexts. Students will have the opportunity to participate in group activities, apply knowledge to specific scenarios, and develop mental skills to demonstrate the application of psychological approaches. In particular, students are encouraged to reflect on how they can translate theoretical concepts and models into practice. Past guest lecturer for this class includes Matt Fisher, Head Strength and Conditioning Coach and part of the Integrated Support Team Lead for Canada Snowboard's National Freestyle Program for the 2010 Winter Olympics team.

Clinical Exercise Physiology

This theoretical and lab-based course will provide an overview of clinical exercise physiology. Diverse class activities include problem-based case studies, group projects, hands-on labs to examine cardio respiratory function, muscle function, and metabolism. The course will include visits to labs such as the world-renowned Physical Activity Research Centre (PARC) to facilitate an active learning environment. Upon completion of this course, students will develop an understanding of fundamental approaches to the assessment of physiological responses to exercise; altered responses in various clinical syndromes; and how exercise prescription and exercise monitoring is applied in clinical settings for health promotion. Students will also gain an appreciation of the influence of exercise and lifestyle on the prevention and treatment of chronic diseases.

All participants must be at least 19 years of age.

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Package B - Coaching Science (KIN B JULY)

Foundations of Coaching

This introductory course to coaching provides the foundation to become a successful coach. It will enable students to define who they are as coaches and will enhance their training and development skills with supplemental knowledge in strength and conditioning, nutrition, motor learning development, and performance planning. Practical outdoor sessions are offered in conjunction with the lectures to demonstrate core concepts in coaching. Upon completion of the course, students will be able to recognize the power inherent in coaching by creating their coaching philosophy and apply process to achieve it. They will learn how to recognize common sport injuries and provide a safe training and competition environment, how to use games for learning skills and building physical condition, and how to apply basic prophylactic and supportive taping systems.

Sport Psychology for Coaching

This course provides a broad overview of major topics in Sport Psychology for Coaching. The student will develop an awareness of how sport and exercise psychology knowledge can be applied in coaching and understand the importance of the many mental aspects of coaching including group dynamics, motivation, leadership, coach-athlete relationships, and mental skill training. Complementary activities including outdoor games, tours at sport training centres, sport facilities, and research labs are designed to facilitate interactive learning.

All participants must be at least 19 years of age.

Package C - Clinical Kinesiology (KIN C JULY)

Health and Physical Activity Behaviour

This psychology-based course examines how engagement in health and physical activity behaviours affect health outcomes across the lifespan, and how individual engagement can be changed by intervention and health promotion strategies. Upon completion of the course, students will gain an understanding of models of behavioural change that promote health and physical activity behaviours. Students will also learn to apply these models towards intervention design, development, and evaluation to encourage adoption and maintenance of physical activity amongst special populations.

Clinical Exercise Physiology

This theoretical and lab-based course will provide an overview of clinical exercise physiology. Diverse class activities include problem-based case studies, group projects, and hands-on labs to examine cardio respiratory function, muscle function, and metabolism. The course will include visits to labs such as the world-renowned Physical Activity Research Centre (PARC) to facilitate an active learning environment. Upon completion of this course, students will develop an understanding of fundamental approaches to the assessment of physiological responses to exercise; altered responses in various clinical syndromes; and how exercise prescription and exercise monitoring is applied in clinical settings for health promotion. Students will also gain an appreciation of the influence of exercise and lifestyle on the prevention and treatment of chronic diseases.

All participants must be at least 19 years of age.

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Land and Food Systems

Package A - Food Science and Sensory Evaluation (LFS A JULY)

Introduction to Food Science

An introduction to key concepts related to the science of food: the Canadian food system, chemical and physical properties of foods, government regulations, food additives, food preservation techniques, food safety, and trends in foods for nutrition and health. You will learn to arrive at an informed position about controversial issues relating to the food that you will encounter as consumers in the marketplace, and that you hear about in the media. Come and explore activities of entomophagy (eating insects), molecular gastronomy, and 3-D food printing.

The Science of Sensory Evaluation

The sensory characteristics of a food are critical in the development of new food products and determine their success in the marketplace. Sensory evaluation is a science measuring human responses to food sensory attributes of texture, flavor, smell, and color. There are special challenges in sensory evaluation because people are subject to various environmental, psychological and culture biases, and pose ethical considerations. In this hands-on course, you will explore techniques used to generate and analyze sensory data. You will apply the sensory evaluation theory that you learn, by participating in evaluations as both panelist and sensory analyst.

Package B - Agribusiness Management (LFS B JULY)

Food and Agribusiness Enterprise Management

This course is designed to introduce the principles of financial and business management that are most relevant to agri-food and related firms. The content of the course will provide students with the insights and skills necessary to develop, evaluate and implement financial and management strategies. This will be accomplished through the presentation of management fundamentals, financial principles, decision and project planning frameworks, completion of cases and current article reviews, class discussions and final enterprise management presentation. Emphasis will be placed on the unique considerations of management within the agriculture, food and agribusiness sectors.

Food and Agribusiness Marketing Management

This course is designed to introduce the principles of marketing management and assessment that are most relevant to agri-food and related firms. The content of the course will focus on the macro and micro aspects of marketing management. Specific topics include basic principles and types of marketing such as production, selling and social marketing; marketing frameworks to assess industry and competitive landscape; identification of the ideal customer; market research survey development and assessment, use of excel for market survey and data analysis and secondary research methods and the sources.

Package C - Nutrition and Healthy Eating (LFS C JULY)

Essentials of Nutrition

In this introduction to nutrition, students will learn about nutrients: what they are, why they are important to health, recommended intakes, and common Canadian food sources. Controversial topics in nutrition will be explored. Upon completion of the course, students will be able to sort out fact from fiction by applying their knowledge of nutrition to everyday scenarios and to their personal diets.

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Healthy Cooking and Eating in Canada's Multicultural Context

This course will focus on applying the nutrition concepts learned from Essentials of Nutrition. You will be enriched with hands-on cooking experience, tasting and discussions about food choices. You will learn fundamental cooking skills and how to modify recipes for better health. Students will work in small groups to prepare a wide variety of foods from the many cultures making up Canada's cultural mosaic. The instructor, a Registered Dietitian and Chef, will guide students in their cooking, help them explore the nuances of tasty foods they have prepared and lead discussions on how to ensure food is both delicious and healthy. Upon completion of the course, students should be able to demonstrate an understanding of fundamental knowledge and skills of food safety, the practical outcomes of recipe modification, an understanding of the role and interactions of ingredients in food preparation, and a variety of preparation techniques and their nutritional attributes.

Medicine

Package A - Clinical Research and Clinical Medicine (MED A JULY)

Introduction to Clinical Research in the Sciences (Pediatrics)

This course provides a window into how clinical research is conducted in the medical sciences. Research methodologies, research process, ethical considerations and practical tips for conducting high-yield, evidence-driven research with patients will all be presented and discussed. The course includes lectures, workshops and a hands-on mentored individual research project by students that will be presented at the end of the course. A wide variety of health care providers and medical educators will participate in the course and provide examples of research conducted at UBC and other academic institutions. Engaging speakers, visits to clinical research facilities and effective mentorship techniques will provide students with a once-in-a-lifetime opportunity to take part in the most advanced learning in basic clinical research.

Introduction to Clinical Medicine at the Bedside (Pediatrics)

This course will bring medical and science students close to the real life of medicine in the 21st century. Students will be able to meet up close with practicing clinicians who manage complex patients every day as part of their work in the hospital and clinic setting. Using advanced teaching tools such as medical simulation, and together with experienced physicians from multiple disciplines of medicine, students will learn how to approach patients with medical history taking, physical examination, development of a medical differential diagnosis, and will gain knowledge in determining the need for investigations in order to reach a diagnosis and develop a treatment plan. A combination of lectures, simulation labs, case-based workshops and visits to laboratory and clinical areas, will enhance the hands-on experience and understanding of the medical and other sciences.

All participants must be at least 19 years of age.

Package B - Pharmacology and Critical Analysis of Literature (MED B JULY)

Pharmacology through Case Studies (Anesthesiology, Pharmacology & Therapeutics)

You will experience an integrated approach to learning pharmacology through the use of simulated clinical cases specifically designed to highlight the fundamental principles. Knowledge acquisition from both the scientific and clinical perspectives will be supported through complementary lectures and small group exercises. You will have the chance to design and present your very own case study,

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incorporating the newly learned pharmacological concepts with your creativity and analytical skills. Through this educational model, you will explore the basic science and clinical applications of cardiovascular, respiratory, gastrointestinal, reproductive, endocrine and autonomic pharmacology, and their integration across multiple related disciplines.

Primary Literature Analysis in Science & Medicine (Anesthesiology, Pharmacology & Therapeutics)

This course will empower you with an understanding of the scientific method and the important decisions that must be carefully considered in designing, conducting and communicating experimental studies, providing the foundation needed to adequately review and appraise primary literature in any clinical or basic science discipline. The resulting downstream consequences of poor experimental design and interpretation of results in informing (or formulating) evidence-based medicine and public opinion will also be explored. You will learn about the different types of studies that can be used to answer a research question, the major elements of an experiment, and the overall publication process. Through lectures, small group exercises and discussions, you will develop the skills necessary to critically evaluate study research questions, strategies of subject selection and randomization, and proper use of controls. You will learn to identify confounding factors such as inadequate study design, bias, and poor statistical analysis – intentional or not – and describe how they may impact the quality of the study and its conclusions. Finally, you will have the opportunity to practically apply this knowledge through a group critical analysis of literature presentation at the end of the course.

All participants must be at least 19 years of age.

Package C - Anatomy and Radiology: Interactive Learning to Enhance Understanding (MED C JULY)

Introduction to Anatomy Using a Hands-on Approach (Cellular and Physiological Sciences)

In this course students will cover foundational functional anatomy and how this relates to 2D and 3D perspectives in diagnostic imaging. Students will learn how systems of the human body are functionally and structurally related to each other. Thoracic anatomy will focus on the cardiovascular and pulmonary systems, abdominal anatomy on the digestive and renal system and pelvic anatomy on the reproductive systems. The musculoskeletal system will put an emphasis on functional aspects such as gait and use of the hand. This course will give a basic foundation in functional anatomy as well as a spatial understanding that will correlate with approaches used in imaging.

Introduction to Medical Imaging: Understanding Radiologic Normal Anatomy and Disease Using Cutting-Edge Technology (Radiology)

This course will provide an introductory understanding of the imaging modalities (plain radiographs, ultrasound, CT and MRI, plus some limited discussion of interventional radiology) used to solve common clinical problems in all body systems. Considerable time will be spent reviewing imaging of normal anatomy, using gross anatomy-cross sectional imaging correlation, and this will be followed by demonstration of the critical role that modern imaging plays in Cardiac, Pulmonary, GI, Neurologic and Musculoskeletal disorders. Students will gain an understanding of the indications and contraindications for specific imaging tests, and the advantages and disadvantages of each modality in common clinical scenarios. Case-based learning, interactive sessions, image reconstruction workshop, demo/use of an Anatomy Visualization Table (giant I-Pad) and hands-on ultrasound will augment

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didactic lectures, which will be given by subspecialty Radiologists, Fellows, and Residents. The course will conclude with a presentation entitled: 'Top ten don't miss cases in Radiology'.

All participants must be at least 19 years of age.

Package D - Biochemistry and Molecular Biology in Human Health, Disease, and the Environment (MED D JULY)

Molecular Mechanisms of Disease (Biochemistry and Molecular Biology)

This course will provide an introduction to the molecular basis of disease and the concepts behind novel molecular therapies. Students will gain an understanding of fundamental human biochemical pathways and learn how molecular perturbations in these pathways can lead to disease. Several case-based topics will present research from world-renowned UBC faculty. The course will be taught through a combination of lectures, student presentations and problem-based learning all led by UBC experts. Course content will vary but may include topics such as the role of gut microbiota in health, cancer, diabetes, epigenetics, cardiovascular disease and significant global pathogens. Several novel therapeutic strategies will be discussed and may include genetically engineered gene/cell based therapies, stem cell cures, siRNA based expression control, and nanoparticle delivery systems.

Biochemistry and Society: Current Issues (Biochemistry and Molecular Biology)

Environmental Biochemistry will critically examine biochemical processes within the world at large and their impact on human health. The course will provide students with the scientific principles and concepts required to understand key interrelationships of the natural world and tackle the most daunting challenges of the 21st century. The course will be taught through a combination of lectures, student presentations and problem-based learning all led by UBC experts. Course content will vary but may include topics such as climate change, xenobiotics, endocrine disruptors, pollution by antibiotics and antibiotic resistance genes, and genetically modified organisms. Students will learn to appreciate the natural world from a molecular perspective and understand how biochemical perturbations within our environment impact human health.

Students are expected to have a strong background in biology and chemistry at a level equivalent to typical 1st year North American undergraduate courses. Students lacking a basic biochemistry background can expect a higher workload compared to students with previous biochemistry knowledge.

All participants must be at least 19 years of age.

Package E - The Science Behind the Mind and Pharmacology in Psychiatry (MED E JULY)

The Science Behind the Mind (Psychiatry)

This course will offer you an introduction to the mind and basic neuroanatomy emphasizing which brain structures play a role in the generation of normal and abnormal mental states. You will learn about the neurological basis of mental illness and the mental status examination. In addition to the main instructors, you will learn from guest lecturers who will share their knowledge and expertise in specialized fields of study. Past guest lecturers included experts in neuroimaging, neurostimulation and EEG, genetics and family history, and neuropsychology. Classes are lecture-based with a fieldtrip and labs.

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Psychiatric Disorders and their Pharmacological Treatments (Psychiatry)

This course will cover the major psychiatric disorders that include schizophrenia, major depressive disorder and bipolar disorder. Over the duration of the course, you will learn the symptoms and neurobiology of these disorders, and how pharmacological therapies work to treat target symptoms. You will study the pharmacology of these drugs at the molecular level which will provide you with the foundation for understanding their clinical application. Finally, you will learn about treatment strategies using the most up-to-date evidence-based treatment guidelines. Classes are lecture-based with group discussions.

Recommendation: Courses are at a level suitable for students who have completed 2 years of undergraduate medical education.

All participants must be at least 19 years of age.

Package F - Major Mental Illnesses and Psychotherapy (MED F JULY)

Mood Disorders and Psychosis (Psychiatry)

This course will provide you with a broad overview of mood disorders (such as clinical depression and bipolar disorder) and psychosis (where reality testing is impaired, such as in schizophrenia). Mood disorders and psychosis are among the most disabling psychiatric conditions worldwide, due to significant symptoms and functional impairments that can lead to both personal distress and substantial economic burden on society. A major focus of this course will be identification and assessment, and accurate differential diagnosis. Additional topics will include epidemiology, neurobiology, psychosocial factors, and a variety of evidence-based interventions and therapies. Classes are lecture-based with group work and discussions.

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Introduction to Psychotherapy (Psychiatry)

This course will provide you with an introduction to the theory and practice of psychotherapy, focusing on core principles and skills that can be applied across a range of clinical and practice contexts. The course will orient you to the evolution of psychotherapy as an evidence-based intervention for common mental health disorders. You will learn about the common elements of major models of psychotherapy. The course will also cover practical skills such as interviewing, assessment, and building and maintaining therapeutic alliance – skills that can benefit all helping professionals. Lectures will include video demonstrations of psychotherapy, and role-playing exercises to develop practice skills.

Recommendation: This package will be at a level suitable for students who have completed Year 1 of undergraduate studies in Medicine or have equivalent or related coursework in Health Sciences and/or Psychology.

All participants must be at least 19 years of age.

Package G - Introduction to Population and Public Health (MED G JULY)

Social Determinants of Health (Population and Public Health)

In this course you will broaden your understanding of how social factors, such as skin colour and income, affect population and public health. We will explore the meaning of health and its

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measurement, and examine what influences the health, well-being and quality of life of individuals, families, communities and nations. You will gain an understanding of the complex pathways through which social circumstances affect health and well-being, and hands-on experience thinking through real world problems. Lectures in class are followed by interactive group activities and trips outside of the classroom to explore health promotion services in Vancouver. This class will bring a new light to your understanding of the factors that affect health, and challenge you to think differently about what we can do as a society to decrease health inequities.

Introduction to Population and Public Health Practice (Population and Public Health)

This course addresses the question of how we can respond to population and public health concerns. It introduces the student to key perspectives and frameworks that are used to inform activities that can improve the health of individuals, families, communities and nations. Potential approaches to preventing disease and improving health, such as a focus on the prevention of disease, screening for disease, the implementation of monitoring and surveillance systems, and the treatment of disease will be covered. Key frameworks such as types of prevention (i.e. primary, secondary, tertiary), and evaluating the cost and effectiveness of activities will also be considered.

All participants must be at least 19 years of age..

Package H - Understanding the Recovery and Treatment from Injury and Chronic Disease (MED H JULY)

Exercise is Medicine (Physical Therapy)

This course will provide an exploration of exercise and physical activity in the treatment of chronic health conditions. Through an exploration of chronic conditions such as arthritis, cancer, cognitive impairment and cardiovascular disease, you will gain an appreciation of the effects of exercise on brain function, bone and muscle health, and cardiovascular function. Topics will also include the epidemiology of physical inactivity across the world, measurement of physical activity in chronic disease, strategies to get a nation more active, role of health professionals in physical activity prevention and treatment, and mobile technology to motivate physical activity in chronic disease. Students will use a variety of interactive methods to understand the content, including case studies, small group tutorials, and problem-based learning. Students will have hands-on labs in a state-of-art fitness and exercise research facility designed to enable access for people with chronic disease and disability, interact with new mobile technology to motivate physical activity and measure the impact of exercise on physical function and cognition.

Recovery from Injury (Physical Therapy)

This course will introduce students to the science of rehabilitation and recovery from injury and disease. Through this approach, students will understand how severe injuries and chronic diseases can impact the patient and family, both physically and emotionally. Conditions such as spinal cord injury, concussion, stroke, arthritis, and chronic obstructive pulmonary disease will be used to illustrate the journey through rehabilitation, the road to recovery and adjustment to disability. Along this journey, students will be introduced to concepts about the musculoskeletal, cardiovascular, pulmonary and neurological systems, as well as coping mechanisms and quality of life. In addition, cutting-edge research on novel rehabilitation treatments will be introduced, including a visit to a world famous

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spinal cord injury research centre to view the latest treatments, including robotic suits to permit walking after spinal cord injury and e-Health applications (e.g., tele-medicine, video games, wearable sensors) to improve function. Students will use a variety of interactive methods to understand the content, including, small group tutorials, and problem-based learning.

All participants must be at least 19 years of age..

Package I - Medical Laboratory Science (MED I JULY)

Introduction to Medical Laboratory Science (Pathology and Laboratory Medicine)

You will explore normal and abnormal biochemistry and physiology of blood and organ systems including the liver, gastrointestinal tract, and kidneys. You will solve medical case studies and diagnose diseases by interpreting patient history information, physical findings, and results of selected clinical laboratory tests. You will participate in case-based learning, team presentations, interactive lectures, and a hands-on blood cell morphology laboratory session in which you prepare and stain blood smears, then distinguish different cells under the microscope. You will also take guided tours of clinical research lab facilities and the David Hardwick Pathology Learning Centre which houses tissue specimens representing a range of pathological conditions. Past students stated they "learned a lot-not only knowledge, but the way to get knowledge...and had lots of fun in this class". They valued team-work and interacting with instructors who were "very knowledgeable, approachable and kind".

Fundamental Techniques for Clinical and Medical Research Laboratories (Pathology and Laboratory Medicine)

The focus of this course will be to perform methods that are commonly used in hospital and biomedical research laboratories. You will learn through hands-on laboratory sessions and will focus on the following disciplines: molecular biology, cell culture and histochemistry. Experiments you will conduct include DNA finger printing and culturing a mammalian cell line. You will also conduct a series of experiments using different staining techniques and microscopically determine the composition of unknown tissues. Your learning will be supported through demonstrations, discussions of experimental design, data analysis activities and interactive lecture sessions. Past students stated that they "enjoyed extracting and analyzing their own DNA" and that the cell culture labs were "very unique and interesting - something we cannot do in our home country." They were also "excited to analyze their slides and share with others during their histochemistry presentations".

All participants must be at least 19 years of age.

Package J - Anatomical Sciences (MED J JULY)

Principles of Body Structure and Function (Cellular and Physiological Sciences)

This course will cover foundational functional anatomy including all major organ systems as well as the musculoskeletal system. Students will learn how the human body develops through the embryonic period to give rise to these systems and how they are functionally and structurally related to each other. Thoracic anatomy will focus on the cardiovascular and pulmonary systems, abdominal anatomy on the digestive and renal system and pelvic anatomy on the reproductive systems. The musculoskeletal system will be covered from a conceptual point of view focusing on the major functions of the upper and lower limbs and the importance of the musculoskeletal system for human

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form and structure. This course will give a basic foundation in functional anatomy that will help students as they prepare for life and health sciences programs.

Applied Neuroanatomy (Cellular and Physiological Sciences)

This course will take students through the fundamental principles of how our nervous system works. Students will learn about both the peripheral and central nervous systems and how they interact to allow us to experience and interact with the world around us. Higher order systems in the cerebral cortex will be explored and include both primary areas of the cortex and association areas that process information and put it into context. The control of cortical output through intricate systems will be discussed as well as the importance of areas involved in emotional processing. At the end of the course students will have gained a basic understanding of CNS pathways and functions that will give them a solid foundation for many life sciences programs, in particular health sciences or neuroscience.

All participants must be at least 19 years of age.

Package K - Systems Pathophysiology and Principles of Data Science in the Life Sciences (MED K JULY)

Data Science Applications in the Medical Sciences (Cellular and Physiological Sciences)

Presenting clear and reproducible data analysis is important for the integrity of scientific research from bench science to clinical trials. Students will be introduced to coding principles with the coding language R which has many popular tools available for analyzing biological data. Working in small groups, students will collaborate on small and large projects using publicly available data, compare how data is portrayed in the media versus scientific literature, and develop coding and debugging skills. The first half of the course will focus on basic coding foundation, with the second half exploring clinical data in mini-projects and a final group project. By the end of the class students will have a working knowledge of R which will allow them to explore and tackle the many types of life sciences data they may encounter in their future research in a systematic and reproducible manner. It is expected that students will have a laptop to follow along with the coding in class. No previous coding experience required.

Systems Pathophysiology (Cellular and Physiological Sciences)

By the end of this course, students will be able to appreciate the complexity of human physiology. In each disease theme, we will start with how the body functions normally and then explore the changes that make up abnormalities and how these changes lead to physiological diseases. Students will work in small groups throughout the course to collect data that they will then have a chance to analyze in the accompanying data science course. By the end of this course students will have a concrete understanding of how to use equipment commonly used to evaluate physiological diseases, complete case studies based on current research, and interact with guest speakers.

All participants must be at least 19 years of age.

Package L - Aging (MED L JULY)

Biological Aspects of Aging (Physical Therapy)

This course will provide an exploration of the biological underpinnings of aging and their individual and societal implications. It will give an introduction to the influence of normal aging on a diverse set of

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factors such as the mechanobiology of tissue decline, hormonal deficiency, morphological changes in the brain, and telomere dysfunction, as well as discuss how these mechanisms influence activities of daily living. The impact of universal age-related pathologies, such as increased risk for osteoporosis, Alzheimer's disease, and cardiovascular disease, will be discussed as they pertain to the global burden on healthcare systems. Students will use a variety of interactive methods to understand the content, including small group lectures, group presentations, and case studies. The group presentation component will provide students with the opportunity to practice critical appraisal of biological aging research through both an oral presentation as well as through peer-evaluation. Students will also visit several state-of-art research laboratories at the Center for Hip Health and Mobility, where they will be provided with hands-on experience.

Clinical Aspects of Aging (Physical Therapy)

This course will provide an introduction to clinical aspects of aging as well as factors that promote healthy aging, such as reducing the epidemic of cognitive impairment and falls. It will present an overview of age-related peripheral and central nervous system changes that contribute to cognitive and mobility impairment. It will also outline various preventative strategies to mitigate the effects of aging and age-related diseases, such as exercise, stress reduction, sleep promotion, and cognitive enrichment. Students will gain an understanding of how to implement these preventative strategies using novel knowledge translation interventions such as telehealth approaches. Students will use a variety of interactive methods to understand the content, including small group lectures, group presentations, and case studies. The group presentation component will provide students with the opportunity to practice critical appraisal of clinical aging research through both an oral presentation as well as through peer-evaluation. Students will also visit several state-of-art research laboratories at the Center for Hip Health and Mobility, where they are provided with hands-on opportunities.

All participants must be at least 19 years of age.

Package M – From Conception to Life Saving Surgery Across the Life Span (MED M JULY)

Introduction to Women's Health (Obstetrics and Gynaecology)

Students will be introduced to the subject of human reproduction and women's reproductive health over the life span. Embedded problem based learning cases will provide insight into the biology and physiology of reproduction from embryonic development and conception, pediatric gynecology, to menopause and cancer. Teaching will be provided by scientists as well as clinicians.

This interactive course will highlight the many advances made from the improved survival rates of preterm infants to cancer prevention, challenges from maternal sepsis to how technology has improved our ability to deliver care. A tour of the medical library along with a tutorial on how to use technology to access the most relevant literature to solve a problem will be presented.

Exposure to common challenges in the field will be achieved through didactic lectures with case presentations, simulated patient history taking engaging UBC medical students followed, by exercises in defining a differential diagnosis and treatment plan. At the beginning of the course, teams of students will be tasked with a clinical scenario to research and present to their fellow students in the final week.

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Exploring the Specialty of Obstetrics and Gynaecology (Obstetrics and Gynaecology)

A day in the life of a medical student/resident will be experienced through a video documentary and an in person hospital tour, led by one of the residents in the UBC OBGYN program. Students will learn the demands that residents face on clinical rotations, highlighting how successful patient outcomes require working well together with providers from all levels of expertise.

An overview of assisted reproductive technologies will be presented followed by a fertility clinic laboratory tour. The 5 day journey of human embryos in vitro will be shared via didactic lectures, videos and live demonstration.

Students will gain knowledge and exposure to operative OBGYN through didactic lectures and case presentations provided by practicing OBGYNs. Simulated normal and operative deliveries will be taught in addition to a hands-on tutorial in suturing techniques.

Hands-on experience at the Centre of Excellence for Simulation Education and Innovation (CESEI) will offer laparoscopic surgical exposure. Students will be taught simple steps on how to use simulators as a method of education.

All participants must be at least 19 years of age.

Nursing

Package A - Seniors Health and Home Care (NURS A JULY)

Introduction to Seniors' Health

Field excursions to innovative seniors' care centres and effective mentorship techniques will provide students with a once-in-a-lifetime opportunity to take part in the most advanced learning in healthy aging and common health concerns among seniors. A broad range of guests will engage with students, including older adults, healthcare providers, and educators, and will provide content expertise. This course provides a window into normal aging processes and introduces students to some of the main health challenges experienced by seniors, including dementia. Best practices for supporting seniors' health and wellbeing will be discussed, guided by ethical considerations and principles of personhood. The course includes lectures, workshops and mentored individual projects by students that will be presented at the end of the course.

Introduction to Caring for Seniors at Home and in the Community

Students will gain hands-on experience in developing skills to effectively engage with and support Seniors in their homes and communities. A wide variety of guests will engage with students, including Seniors, family caregivers, and health and social service providers. Students will engage with Seniors to consider practical tips to create supportive home environments. This course provides an overview of the key components of supporting the health and well-being of Seniors in their home environment. Students will be introduced to issues associated with aging in place, including environmental, policy, and systemic factors. The course will be led by expert faculty in the field of aging. Course content will be delivered through lectures, case studies, small and large discussion groups, and field excursions.

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Package B - Health Research Methods (NURS B JULY)

Introduction to Research Methods in the Health Sciences

Highly relevant for anyone planning to do a research project in their undergraduate program, has plans for graduate studies or is seeking employment as a research assistant. Students in the health or social sciences will benefit from learning about the diverse methods and strategies used in research. Students enrolled in the course will have the opportunity to learn through simulated practice how to conduct surveys and qualitative interviews in face-to-face situations. We will also cover how to obtain consent for research participation. Students will learn introductory skills in data analysis methods and how to generate reports of their findings. This course introduces different types of research that health researchers use to tackle problems relevant for health promotion. This course focuses on quantitative and qualitative designs.

Introduction to Visual Methods in Health Research

Engaging speakers, visits to multi-media and research facilities and effective mentorship techniques will provide students with an once-in-a-lifetime opportunity to take part in the most advanced learning in visual methods health research. A wide variety of health researchers specializing in arts based, photographic, video and social media will participate in the course and provide examples of research conducted at UBC and other academic institutions. This course provides a window into how visual methods can be used in health research. Visual research methodologies, research process, ethical considerations and practical tips for conducting high-yield, evidence-driven visual research with patients and/or health care providers will all be presented and discussed. The course includes lectures, workshops and a hands-on mentored individual research project by students that will be presented at the end of the course.

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Pharmaceutical Sciences

Package A - Making Better Medicines (PHAR A JULY)

The Discovery of New Medicines

What does it take to find a new drug? The objective of the course will be to answer this question by introducing the participants to the drug discovery and development process. Specifically, the role of the Pharmaceutical Sciences in the discovery of new medicines will be described. Case studies will be presented by experienced scientists that illustrate challenges that interdisciplinary drug discovery teams must overcome. In addition, participants will have an opportunity to visit the laboratories of a local research organization involved in supporting drug discovery efforts. By taking this course, participants will gain an appreciation of the collaborative work that is required in the search for new therapies.

Personalizing Medicines with Genomics and Biotechnology

For millennia, we have sought to understand how to treat disease using potions, teas, pills and most recently, genetically engineered cells. Today's pharmaceuticals are remarkable in their ability to target specific cancers, infectious agents and other ailments such as diabetes and heart disease. Yet despite their effectiveness, these medicines tend to treat all patients as members of one homogeneous population. Recently, next generation DNA sequencing is making the possibility of medicine tailored to an individual a reality. Cancer treatments can now be designed to match your specific DNA, eliminating the trial-and-error approach to treatment. Similarly, DNA sequencing can match your

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prescriptions to your genome. The integration of DNA sequencing with drug therapy has been a disruptive innovation, bringing the science of “big data” to medicine and pharmacy. In this course we will use interactive lecture and a laboratory experience (see below) to explore how these and other innovations are revolutionizing healthcare and wellness.

Laboratory Component: The first human genome cost almost \$3BillionUSD and took several years to complete, yet today we can sequence a genome for less than \$1000 in a few days. One of the most exciting insights from DNA technology is the field of pharmacogenomics, which can help determine how your genome affects how you will respond to dozens of medications. In the laboratory we will isolate our DNA and decode the sequence of these ‘pharmacogenes’. We will then analyze these data to predict how we will respond to commonly prescribed medications.

Science - Chemistry

Package A - Chemistry: Global Challenges and the Environment (CHEM A JULY)

The Chemical Enterprise and Global Challenges

Sustainability. Inexpensive energy. Clean water. Food security. Antibiotic resistance. This course explores upcoming challenges in modern society – and presents the impacts, analysis and potential solutions that modern investigators in the field of chemistry are actively studying. Students will be presented with a set of case studies to explore the important problems facing our society. Knowledge of introductory level University chemistry is an important asset for students interested in this course.

Environmental Chemistry of the Oceans and Atmosphere

Picture Earth from Space—the Earth is a blue and white speckled gem. The blue of the sea. The white of the clouds in the Air. The environmental chemistry of the oceans and/or the atmosphere will be presented to help students understand the chemical composition and reaction processes of the air and the seas. Case studies may involve the chemical processes associated with atmospheric interactions with solar radiation, the stratospheric ozone layer, photochemical smog and/or complexation analysis, corrosion treatment and microbial transformations within natural waters. Knowledge of introductory level University chemistry is an important asset for students interested in this course.

Pre-requisite: University 1st year Chemistry

Science - Earth, Ocean and Atmospheric Sciences

Package A - The Dynamic Earth and its Beautiful Treasures (EOAS A JULY)

The Dynamic Planet

This course considers how an active and evolving Earth system has created the planet we know today, one that supports diverse life and is rich in natural resources. Using international and Canadian examples, we will examine the origin of our planet and its composition and structure. From mountains to glaciers, earthquakes to volcanoes, ancient rocks and mighty dinosaurs, Canada is a wonderful natural laboratory that we will use to investigate our active and dynamic planet.

Earth Treasures

Canada is also known for its spectacular precious metals and gems, some of them housed in our departmental museum, The Pacific Museum of the Earth. This course investigates the formation,

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exploration, mining and aspects of marketing of gemstones and precious metals. We touch on topics such as fundamental scientific concepts, natural and synthetic gems and explore the world of fine jewelry. The origin, valuation and exploration strategies for gems such as diamonds and precious metals such as gold and platinum will be investigated here and placed into a fascinating international and Canadian geological context. Our emphasis is on active learning teaching methods where students are inspired to explore the subject matter through field trips, labs, discussions and in class activities.

Package B - The Earth's Oceans, Atmosphere and Climate (EOAS B JULY)

Ocean and Atmosphere Systems

In this course you will assess and quantify the principal components of the global energy balance, how the energy balance affects the structure of the ocean and atmosphere and produces the winds and currents that control weather, air pollution and the biosphere. You will examine ocean productivity and the important geochemical cycles of carbon, nitrogen and phosphorous, and how over geologic time, ocean and atmospheric processes coupled with the evolution of the life to regulate climate and climate change.

Marine Biodiversity

Students will explore the incredible diversity of marine ecosystems, and identify the factors that regulate ocean habitats and how marine ecosystems develop in response. Ecosystems' properties, including diversity, resilience (or lack of resilience) to environmental change and its impact on neighboring ecosystems will be considered. The fascinating marine ecosystems and habitats to be studied include hydrothermal vents, intertidal zone, coral reefs, estuaries, deep sea, and polar ecosystems. A particular emphasis will be placed on our beautiful and diverse local marine ecosystems. Examine the responses of ecosystems disturbances, the evolution of ocean plankton, invasive species, climate change and pollution. Our emphasis is on active learning teaching methods where students are inspired to explore the subject matter through field trips, labs, discussions and in class activities.

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Science – Institute for Resources, Environment and Sustainability

Package A - Climate Change, Energy and Society (IRES A JULY)

Climate Change: Causes, Consequences and Adaptation

Climate change resulting from the use of fossil fuels in the global energy system is perhaps the single greatest collective challenge facing society in the 21st century. This course will explain the science behind human induced climate change, and examine possible consequences and impacts across the world. We will study how experts make predictions of future climate change and its impacts, and how societies will need to re-organize their economies and institutions to adapt to new climate realities. This course will include field trips and presentations by industry guest speakers, as well as speakers from non-governmental organizations and the public sector.

Energy for Sustainable Development

Climate change is only one of many challenges we face, and large-scale innovation in energy systems will be needed to meet multiple objectives including reducing greenhouse gas emissions. Technological and business innovations have begun to transform the global energy system. From the development of renewables such as solar and wind, to the deployment of complex networked

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technologies (such as Electric vehicles), or the diffusion of novel 'mundane' technologies (such as improved cook stoves in the developing world), technological innovation holds the key to our energy future. This course will examine what is driving these innovations, how might their promise be reached and their benefits be maximized, and what social and policy efforts are needed to sustain them. This course will include field trips and presentations by industry guest speakers, as well as speakers from non-governmental organizations and the public sector.

Package B - Sustainable Futures (IRES B JULY)

Nature Matters - Ecology, the Environment and You

Ecosystems and the benefits they provide to people lie at the heart of many sustainability issues (such as food security, energy production, corporate environmental responsibility, and resource management), in ways not often reflected by management and policy approaches. This course will explore human impacts on ecosystems, the processes by which ecosystems render benefits for people (ecosystem services), methods for analyzing impacts and benefits, and the ways that individuals and organizations incorporate such information into their decision-making. Through field trips to a range of ecosystem types, lectures, and exposure to innovative organizations in the public and private sector, this course will consider the opportunity for innovative progress towards sustainability from stronger and deeper ecological grounding, and how students can support this type of progress in their careers and day-to-day lives.

Oceans in the 21st Century

This course provides an overview into ocean conservation issues, including the integrated and often conflicting role of oceans in economic development, food provisioning, climate change, transport, and recreation. The course includes lectures and field trips that highlight diversity of ocean issues, as well as guest lectures and visits to organizations that are tackling components of the above challenges in a variety of ways. Simulations and workshops will help students consider the variety of stakeholders involved in decision making. Content, discussion, and exposure to experts and innovative research and strategies will equip and empower students to better understand and become more engaged in ocean issues, no matter how close they are to a coast.

Science - Integrated Sciences

Package A - Game Theory and Symmetry (ISCI A JULY)

Game Theory

Game theory is the study of mathematical models of conflict and cooperation between intelligent rational decision-makers. As such it is applicable to a wide range of behavioral relations, and is now an umbrella term for the science of logical decision making in computers and organisms. Game theory has been widely recognized as an important tool in many fields including computer science, biology, economics, political science and psychology. By the end of this course, students learn how to describe real world interactions in terms of game theory; recognize and solve various game types (cooperative/non-cooperative, symmetric/asymmetric, zero-sum/non zero-sum, simultaneous/sequential, etc.); and learn to apply game theoretic models to dynamics problems in evolutionary biology.

The most current information on course packages is on vancouversummerprogram.ubc.ca



UBC Vancouver Summer Program

July 13 – August 13, 2019 Course Package Offerings

Symmetry

When we talk about the symmetry of an object, we are talking about a transformation that can be applied to the object that leaves it looking unchanged. This relatively simple idea provides a powerful tool for looking at the world. Symmetry is present all around us—in the forms of plants and animals, in patterns and shapes of art and architecture, and in the structures of materials from simple molecules to complex proteins and minerals. The principles of symmetry play important roles in biology, chemistry, physics, mineralogy, mathematics, astronomy, and many other sciences. In this course, we will discuss basic principles of symmetry such as: mirror reflections, rotations, and repetition; how different symmetries combine into symmetry groups in two and three dimensions; and how we can recognize different kinds of symmetry in shapes and patterns. Students will use their understanding of symmetry to discover how it appears in different parts of science and art.

Package B – Exploring Vancouver: Systems and Sustainability (ISCI B JULY)

The Vancouver Environment

Scientists agree that solutions to complex global challenges such as environmental sustainability require “systems thinking” or the process of understanding how components influence one another within a whole. In these courses, which are modeled on successful field courses we teach in Iceland and Hawaii, we approach the Vancouver region as a system, and consider the effects of inputs such as climate change on that system. In Course A we study the geosphere, hydrosphere, atmosphere, and biosphere of the Vancouver System through lectures by experts in their fields and numerous field trips around the Lower Mainland. By the end of this course the students will know more about the Vancouver System than many residents and will be able to identify systems where they reside and travel.

The Vancouver Anthrosphere

Scientists agree that solutions to complex global challenges such as environmental sustainability require “systems thinking” or the process of understanding how components influence one another within a whole. In these courses, which are modeled on successful field courses we teach in Iceland and Hawaii, we approach the Vancouver region as a system, and consider the effects of inputs such as climate change on that system. In Course B we study the anthrosphere of the Vancouver region, that part of the environment that is made or modified by humans for use in human activities and human habitats, through lectures by experts in their fields and numerous field trips around the Lower Mainland. By the end of this course the students will know more about the Vancouver System than many residents and will be able to identify systems where they reside and travel.