

UBC Vancouver Summer Program

July 16–August 16, 2016 Course Package Offerings

<http://vancouversummerprogram.ubc.ca>

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 in 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 have the minimum number of students will not be offered, but students may transfer to other packages.

For further information, please visit our website or contact us at:

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Applied Science

Applied Science Package A – Civil Engineering

Civil Engineering Materials

The structure and properties of common Civil Engineering materials: Portland cement concrete, asphalt concrete, timber and steel. The emphasis is on the relationship between the structure of these materials and their mechanical properties and durability. Will include field visits to construction sites and presentations from industry personnel.

Project Based Learning in Civil Engineering Materials

Some topical problems will be identified in the performance of civil engineering materials such as Portland cement concrete, asphalt concrete, timber and steel, and students in groups will carry out laboratory and field experiments to study the materials involved. This is a laboratory based course where site-visits and external consultations are an integral requirement.

Applied Science Package B – Electrical and Computer Engineering

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 start off by exploring the key historic technology 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 the students a comprehensive overview of what is on the market.



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Applied Science Package B – continued

Examples include the LTE wireless standard which is common in most cell phone networks, WiFi 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 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.

Architecture and Landscape Architecture

Architecture Package A – Urban Design

Sustainability by Design: The Design of the North American Sustainable City and its Implications for the World

This class will introduce the basic principles of sustainable urban design with 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 be exposed to significant suburban, urban, and downtown developments. Course material is framed and delivered in the form of seven simple and related principles of sustainable urbanism.

Perspectives on the Development of the City of Vancouver

This class will cover the development of the City of Vancouver from the eyes of those who were a part of it. There will be tours and special presentations 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. The course will be taught by Sam Sullivan who served for 15 years as both City Councillor and Mayor and currently serves in the BC Legislature as the representative for Downtown Vancouver.

Architecture Package B – Designing, Fabricating and Building with Wood

Wood has been a primary material in architecture and building since the beginning of recorded time. Vancouver, British Columbia has been a global centre of innovation for cultivation, processing, engineering, manufacturing and design of wood building materials and architecture since the 19th



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Architecture Package B – continued

century. This course package explores the origins, processes and creative applications of wood as a building material in architecture in two different course formats:

Understanding Wood as a Building Material

This course introduces creative and technical knowledge and examples of wood as a building material. It combines classroom based lectures, presentations and exercises with field visits to design firms, construction sites and fabrication plants that illustrate contemporary strategies and techniques of wood design, construction, processing and digital fabrication.

Designing and Making with Wood

This studio-based course applies creative and technical understandings of wood to the design of a small wood building or furniture scaled element that is technically sound, beautifully designed and elegantly crafted. It combines modules on digital modeling and media for design and fabrication in wood with tutorials in design process, detailing, model-making and presentation.

Arts

Arts Package A – The World of Manga and Anime: From Writing to Theory

This package brings together leading expertise from two of the most well- established academic units in the Faculty of Arts: Asian Studies and Creative Writing, offering a unique and hands on educational experience. UBC’s Creative Writing is one of Canada’s oldest and most respected creative writing programs.

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Manga and Anime in the World

(Asian Studies)

This course explores two of Japan’s most important export media, including the way those media circulate in East Asia and around the world. Study the structural and cultural aspects of Japanese manga and anime, and their relationship to similar media such as Korean manhwa and Chinese manhua. The writing skills that students learn in the Writing for Graphic Forms course will also be used in this course to foster understanding of manga and anime’s unique message delivery systems, in order to study the ways these “soft power” forms are transforming international relations.

Writing for Graphic Forms: Manga

(Creative Writing)

This course will explore the practical techniques of creating, developing, and writing for graphic forms with particular emphasis on Japanese manga. The contemporary manga is the result of a creative interaction between Eastern and Western traditions of story telling, so students will study the Western three-act structure and then consider ways in which manga can assimilate, adapt, or differ from that approach. Students will develop a script and then, through the use of story boards, consider panel construction, focusing on the conventions of the genre. While there will be substantial drawing in this class to demonstrate character creation, character arcs, world building, and plot structure, the ability of



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Arts Package A – continued

a student to draw well is not critical. Stick-figures are sufficient as long as a student is willing to explore his/her creativity in graphic novel, manga, and other forms of illustrated writing.

Arts Package B – Global Journalism, Culture and Communications: Practice and Principles

This package examines the ways in which media shape, and are shaped by, society and technology. Students will learn about the social and cultural context of communications, become familiar with current debates in media and be introduced to journalistic principles and practices. The package brings together the Department of Anthropology and the award-winning UBC Graduate School of Journalism.

Culture and Communication

(Anthropology)

This course will examine the relationship between language and culture by covering key debates in the field including animal vs. human communication, language change and language standardization. Students will explore how language is involved in 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.

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.

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Arts Package C – The English Language: A Deeper Perspective

Students will gain a deep perspective on the internal structure, origins, and many variations of the English language. These courses are modeled after university-level courses for native English-speaking students, and are jointly offered by UBC's globally recognized Departments of Linguistics and English.

Origin and Variation of the English Language

(English)

Beginning with a historical overview of the English language, this course considers the origins and present-day forms of the major varieties of English (e.g. Canadian English, British English, Singapore English) and its relationship to other languages. Topics will include English as a global language, language in computer-mediated discourse (in texts, emails, social media), the effects of gender and other social factors on language forms and use, and ongoing changes in modern-day English. The course will provide students with a deep understanding of English in its many contexts, and where the language is heading in the 21st century.



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Arts Package C – continued

Language Universals and the Structure of English

(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.

Arts Package D – International Trade, Financial Markets and Politics

This package combines the Vancouver School of Economics (VSE), a global centre for research and hands-on learning about pressing economic issues, ranked in the top 20 worldwide and number one in Canada, and UBC's highly regarded Political Science Department. The only two British Columbians to become Prime Minister of Canada – John Turner and Kim Campbell – graduated from this department.

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.

Dynamics of International Politics

(Political Science)

This course challenges students to investigate the powerful, worldwide appeal of democratic government. Genuine democracy is contrasted with symbolic democracy. It also challenges students to analyze why democracy has succeeded in only a minority of cases and failed to take root in many other places. For example, why is India a genuine democracy? Among the factors examined are the characteristics of elites, patterns of economic development and social structure. These complex issues are examined by comparing established democracies (e.g. Canada, Japan and India) with countries that struggle to become democratic (e.g. Egypt, Afghanistan, Turkey and Thailand) and with countries where democracy has not taken root (e.g. Russia, Saudi Arabia and Somalia). The experience of many other countries will be examined with a view to understanding why and where democracy takes root.



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Arts Package E – Environmental Economics & Introduction to Geographic Information System (GIS) for Impact Assessment

This package pairs the Vancouver School of Economics (VSE), a global centre ranked in the top 20 of its peer departments worldwide, and number one in Canada, with the Geography Department, ranked as one of the ten best geography programs in the world and best in Canada, according to the 2014 QS University Rankings.

Introduction to Geographic Information Systems (GIS) for Environmental Impact Assessment ***(Geography)***

In this course, students will gain hands-on experience with GIS through lectures and labs. How do wind energy companies find the best locations for wind towers? How did the Canadian Winter Olympic Committee determine the best location for the cross-country ski event? What is the best place to locate resources to help people impacted by environmental disasters? Scientists and policy-makers use Geographic Information Systems (GIS) to determine answers to questions like these. The development of GIS techniques for real world problems constitutes one of the most exciting areas of geographic research. In this course, you will learn basic GIS skills to produce maps for analysis and decision-making in environmental management. Students will not need previous GIS training or skills, and UBC will provide all the required software and data.

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.

Arts Package F – Asia in the World

This package gives students the opportunity to explore and to debate critical global and international issues from the perspective of Asian states and societies. Courses are taught by professors from UBC's Institute of Asian Research, one of North America's most prominent resource institutes, and co-manager of UBC's new Masters program in Public Policy and Global Affairs. Students working in teams will engage (in and out of the classroom) with guest experts, (diplomats, officials, and policy makers), to explore difficult policy problems and devise options for their resolution.



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Arts Package F – continued

Security for Asian States and Peoples

(Institute of Asian Research)

The centre of gravity of the international system has shifted towards Asia, bringing attention to the strategic and policy dilemmas of Asian states confronting a broadening spectrum of traditional and non-traditional security threats that impact the national security interests and the well-being of their societies. Focusing upon the major states of the region, and their relations among each other and with global actors, students will consider the challenges of territorial disputes, rising nationalism, refugees, transnational health crises, and environmental and natural disasters.

China in the World

(Institute of Asian Research/ Department of History)

The centre of gravity in Asia has shifted to China. Yet China has to deal with both a resilient Japan and the weight of India, as well with other Asian neighbours. Understanding China's role in the world and the impact of the wider world in China requires a longer-term view. Students will consider the recent historical experience that shapes the concerns and hopes of both the Chinese state and Chinese citizens in businesses, families, or the professions with an eye to estimating what to expect in the future.

Business

Business Package A – International Business Management and International Marketing

International Business Management

Development of general environmental framework for international business studies by drawing on international and development economics, research into government-business relations and studies in comparative socio-cultural systems and political systems. This course is taught from the perspective of a senior manager. 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

An analysis of the scope and significance of contemporary international business operations with particular reference to the marketing management problems encountered by firms with multinational branches and subsidiaries. Through lecture material and practical assignments, students will explore a broad range of international marketing issues and concepts. With a focus on strategic problem solving, you will learn the use primary and secondary research tools in objectively evaluating international market potential and risk. The marketing process is examined in detail, including strategic market planning, product, pricing and promotional decision-making, and marketing management. The course is taught with a hands-on approach and providing you with abundant time to employ knowledge learned to advance your term project.



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Business Package B – Introduction to Marketing and Management and Organizational Behaviour

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.

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Business Package C – Strategic Management and New Enterprise Development

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 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.



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Dentistry

Dental Caries and Oral Cancer

Oral Cancer: Why Haven't the Clinical Outcomes Improved?

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.

Dental Caries: The Most Common Infectious Disease in Humans

Dental caries affects more than 90% of all humans. The disease requires a combination of bacteria, a sugar and a susceptible mineralized tooth surface. The bacteria metabolize the sugar and a by-product is acid. The acid removes mineral from the surface of the tooth. Extensive destruction of the tooth mineral 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 then into the supporting bones. 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. The loss of teeth 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 dental caries to understand how this disease impacts human populations.

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Education

Education Package A – Educational Psychology and Special Education

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 lecture, discussion and small group activities that provide opportunities to develop skills in the application of these practices. Specific objective of the course include developing student knowledge and skill in: (a) a proactive, preventive approach to classroom management; (b) school-wide positive behaviour support; (c) the design of a positive classroom environment; (d) the development of positive, nurturing relationships with students; (e) the use of positive reinforcement to strengthen prosocial behaviour; and (f) effective ways to respond to problem behaviour.



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Education Package A – continued

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

Education Package B – Language Learning and Teaching in the World

Language Practices in Multilingual Contexts

Successful language learners and teachers need to understand more than just the structure and nature of the language(s) they teach and learn. This introductory course provides a broad overview of diverse language practices across multilingual contexts and explores how this diversity impacts language learning and teaching. Students will have an opportunity to reflect on their own language choices in different contexts and develop critical thinking and collaborative work skills through class discussions and assignments. Topics to be discussed include: language variation according to age, ethnicity, class, race and gender; language attitudes and ideologies; global Englishes; language use and globalization. By the end of the course students will be able to analyze functions of language in society and apply the course content to their own language learning and teaching.

Strategic Language Use in a Globalized World

Developing communicative competence applicable across sociocultural contexts is an important prerequisite for teaching in an increasingly globalized world. This course will provide students with an understanding of the diverse strategies of language use in and beyond the classroom. The aims of this course are to help students strategically adapt their language practices in cross-cultural settings and to be able to analyze the language use of others. Topics of this course broadly introduce diverse approaches to conceptualizing and analyzing language in use. By the end of the course students will: be familiar with key sociolinguistic concepts; develop effective strategies for enhancing their language use; be able to apply course content to their own language use.

Education Package C – Early Childhood Education and Development

Our early childhood courses focus on creating exceptional educational programs for children between the ages of three to eight. The courses are carefully designed to introduce international students to research and theory pertaining to the education of young children. International students will be provided with opportunities to learn how theory is connected to practice by engaging in field study

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Education Package C – continued

activities such as observing early childhood classrooms, participating in organized meetings with local educators, and studying educational materials and resources that are used in Canadian early childhood classrooms.

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 schedules 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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Forestry

Forestry Package A – Forest Management and the Effects of Carbon

Lectures are interactive and students are encouraged to participate in discussion on topics raised in class. Moreover, past field trips pertaining to this Package have included a tour of environmentally sustainable buildings at UBC, a walk through Pacific Spirit Park as well as a tour of the UBC Botanical Gardens.

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



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Forestry Package A – continued

(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.

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.

Forestry Package B – Forest Products, Trade and Business Management

The classes are interactive consisting of hands-on experience with wood products and relevant computer software. Past participants were taken on a fieldtrip to a local saw mill, tour of the Faculty's wood machine lab as well as a fieldtrips to local lumber yards and stores.

Forest Product Markets and International Trade

Canada's rich forest endowment combined with increasing global demand for forest products for much of the past century has enabled it to become the world's largest exporter of forest products. However, there have been some structural shifts both in global demand, as well as timber supply within Canada and from other countries. At the same time, non-market factors (such as trade barriers) are also playing a greater role in how Canada can access its export markets. In this course, we will examine Canada's changing competitive condition in the context of these different factors. We will also explore the importance of export markets for the Canadian forest industry as well as seek to understand how changes in those markets impact demand for Canadian forest products.

The Wood Industry and Business Management

This course will be an introduction to fundamental business management practices used in the wood industry. Students will be exposed to a wide range of important business management concepts common to the wood industry, most notably marketing, business plan development, strategic planning, finance, customer research, product development and design. To complement the theories and principles introduced in this course, examples from current industrial situations and the media will be offered throughout the course.



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Package C – Urban Forestry

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. There was also a tour of the UBC Botanical Gardens as well as other guided walks through the UBC campus designed to demonstrate the many facets of urban forestry.

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 energy-use for cooling, unless we can establish large scale, healthy urban forest systems.

Green-Space Management in North America

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.

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Kinesiology

Kinesiology Package A – Sport and Exercise Performance

Sport and Exercise Psychology

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 sport and exercise settings. Emphasis will be placed on using psychological concepts and methods in physical activity contexts. Students will have the opportunity to observe athletes and exercisers, participate in group activities, and develop mental skills to demonstrate the application of psychological approaches.



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Kinesiology Package A – continued

Applied Exercise Physiology

This lab-based course will provide a practical overview of fundamental exercise-related human anatomy and physiology and its application in exercise and high performance sport training and conditioning. Diverse class activities, including problem-based case studies, group projects, hands-on lab experiences, and meeting with coaches and strength and conditioning specialists will facilitate active learning. Upon completion of this course, students will have an understanding of how the human body responds and adapts to the physiological demands of exercise and athletic training and have basic skills for performing fitness assessment, data collection and analysis.

Kinesiology Package B – Coaching Science

Principles of Coaching

This course provides the basis of what it takes to be a successful coach. It will enable students to define who they are as coaches and will enhance their training and development skills, including strength and conditioning; nutrition; motor learning development; and performance planning. Upon completion of the course the student will be able to recognize the power inherent in coaching, to create a ‘coaching philosophy’, to recognize common sport injuries, and will learn the basic prophylactic and supportive taping systems.

Sport Psychology for Coaching

The 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 response to injury, athlete motivation, leadership, transition issues and mental skill training.

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Land and Food Systems

Land and Food Systems Package A – Food Science and Safety

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. Students will learn to arrive at an informed position about controversial issues relating to the food that they encounter as consumers in the marketplace, and that they hear about in the media.

Food Safety and Food Safety Management

Learn about food safety within the food processing environments and the regulatory systems in various jurisdictions such as the US, Canada, as well as the Codex Alimentarius. Identify physical, chemical and biological hazards and understand the process of developing a food safety management system.



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Land and Food Systems Package A – continued

Students will learn about the Hazard Analysis and Critical Control Points (HACCP) system and how to proactively apply the food safety concept to any other food safety and quality management systems, such as International Organization for Standardization (ISO) 22000, British Retail Consortium (BRC) and Safe Quality Food (SQF).

The course will introduce to students real life processing study cases and teach them how to identify the hazards in raw materials, packaging and processing aids, as well as how to eliminate food safety risks in processing, storage, transportation and distribution of final products. Students will be involved in “hands-on” case studies learning how to apply management systems to monitor and control hazards as well how to comply with regulatory requirements related to food safety.

Land and Food Systems Package B – Agribusiness Management

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.

Land and Food Systems Package C – Nutritional Sciences

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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Land and Food Systems Package C – continued

Healthy Eating – The Canadian Way

This course will focus on the life applications of nutrition concepts learned from the Essentials of Nutrition, from a Canadian perspective. Students will also learn principles of food preparation based on the physical and chemical properties of food. The objective of this course is to give students practical, hands-on experience with various aspects of food choice, food preparation, and fundamental skills and knowledge in recipe modification and sensory evaluation of food.

Students will expand their knowledge of food and nutrition through exposure to a wide variety of foods from the many cultures making up Canada's cultural mosaic, working in small groups to prepare recipes that illustrate key concepts. Upon completion of the course, students should be able to demonstrate understanding of fundamental knowledge and skills including the practice of kitchen and food safety, practical outcomes of recipe modification and measurement techniques; apply knowledge and principles of food preparation to a wide variety of foods; understand the role and interactions of ingredients in food preparation; be familiar with the wide variety of foods available to consumers, their preparation techniques, and their nutritional attributes.

Land and Food Systems Package D – The Science and Art of Fermentation

Fermentation combines science with art to create foods that we enjoy daily in our lives.

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Introduction to Non-Alcoholic Fermentation I

Students will learn the science behind bread making, and dairy and vegetable fermentation. Students will apply knowledge learned in hands-on sessions to make their own fermentation products (e.g., cheese and yoghurt, etc.) and conduct sensory evaluation of their fermentation products.

Introduction to Alcoholic Fermentation II

Students will learn the science behind beer and wine making. Students will apply their knowledge learned in hands-on sessions to make their own beer and wine, and conduct sensory evaluation of their fermentation products.

Upon completion of this package, students should be able to demonstrate a fundamental understanding of the science behind fermentation. Students will also develop an appreciation for how fermentation conditions influence the characteristics of fermented products and be familiar with the basic techniques used for sensory evaluation.



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Law

International Business and the Common Law Lab

The Law and Practice of International Business

Stakeholders face unique challenges when their activities cross international borders. This course introduces students to the legal and practical aspects of international business regulation. It familiarizes students with the analytical tools used by lawyers who advise on international business deals. Through guest lectures from international business practitioners and in-depth study of actual business case studies, the course addresses the complex economic, social, political, cultural, and legal factors which shape international business. Of note, the 2015 guest lecturers were Kar Cheong Miu, an international banking lawyer with a large Canadian law firm (who provided each student with a copy of “A Concise English-Chinese Law Dictionary” authored by H.C. Miu, a noted Hong Kong Lawyer), and Ali Davar, an Allard Law alumni who founded a tech company that was subsequently sold to CNN. Students will experience the adrenalin of deal-making and business negotiations through exercises and document-drafting. In addition, online forums will be used to expand upon classroom discussions of current and newsworthy international business matters.

The Common Law Lab

For lawyers and business practitioners working in a globalized world, knowledge of the common law is an essential skill. This lively and interactive course introduces students to the rights and responsibilities which underlie the Canadian common law system – focusing on the relationship between Canadian constitutional law and the nature of the judicial process and legal practice in Canada. Students take a rich journey from principle to practice learning about administrative, tort, contract, criminal and constitutional law. This class involves field trips to see how the Canadian courts work and allows students to participate in an array of animated group discussions and exercises, including a mock referendum, a research project and an in-class presentation, to develop a deeper understanding of the many concepts explored.

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Medicine

Medicine Package A – Clinical Research and Clinical Medicine

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



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Medicine Package A – continued

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 Bed Side

(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 a 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.

Medicine Package B – Pharmacology and Critical Analysis in Medicine and Science

Pharmacology through Case Studies

(Anesthesiology, Pharmacology & Therapeutics)

An integrated approach to learning pharmacology through the use of simulated clinical cases specifically designed to highlight the fundamental principles. Knowledge acquisition will be supported through complementary lectures and small group exercises. Through this educational model, students will explore the basic science and clinical applications of cardiovascular, respiratory, gastrointestinal, reproductive and endocrine pharmacology, and their integration with other core areas of study within the curriculum.

Primary Literature Analysis in Science and Medicine

(Anesthesiology, Pharmacology & Therapeutics)

This course will empower students from both clinical and basic science programs with an understanding of the scientific method, providing the foundation needed to adequately review and assess primary literature in any biomedical discipline. Through small group exercises, discussions and critical analysis of published literature, students will develop valuable skills in recognizing how confounding factors such as bias, inadequate study design and poor statistical analysis may (intentionally or not) impact the underlying science. The resulting downstream consequences of poor experimental design and interpretation of results in informing (or formulating) evidence-based medicine will also be explored.



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Medicine Package C – Medical Imaging and Anesthesiology

Introduction to Medical Imaging

(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 contra-indications for specific imaging tests, and the advantages and disadvantages of each modality in common clinical scenarios. Case-based learning, interactive sessions, and possible hands-on ultrasound will augment didactic lectures, which will be given by subspecialty Radiologists, Fellows, and Residents. A tour of a modern tertiary care hospital imaging department will form part of the course. The course will conclude with a presentation entitled: 'Top ten don't miss cases in Radiology'.

Anesthesiology

(Anesthesiology, Pharmacology & Therapeutics)

This course will explore applied pharmacology and physiology as it pertains to the practice of anesthesiology. Students will gain an appreciation of the role of analgesia and anesthesia throughout history and in present-day society. Classes will be a mix of academic and clinical instructors, providing perspectives on general and regional anesthesia, as well as pain management – acute and chronic. Course objectives will be met through a combination of lectures, small group discussions and tutorial sessions, as well as utilization of high fidelity computer-simulation, task trainers and ultrasound to demonstrate how modern anesthesia is provided and how emergencies in the operating room are practiced.

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Medicine Package D – Biochemistry and Molecular Biology in Human Health, Disease, and the Environment

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 via genetics, environmental insults and pathogens can lead to disease. Several case-based topics will be presented featuring work from world-renowned UBC faculty. The course will be taught through a combination of lectures, student presentations and small group 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 and cardiovascular disease. Several novel molecular 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. This course is intended for students in medical programs or life science related fields.



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Medicine Package D – continued

Environmental Biochemistry

(Biochemistry and Molecular Biology)

Environmental Biochemistry will critically examine biochemical and chemical processes in the world at large and the 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. We will explore and debate key processes in a case-based approach. Topics discussed may include life & water (quantity and quality), pH and ocean acidification, UV-B radiation, sustainable vs. unsustainable energy flows, cycles of carbon & nitrogen, chemicals in the environment (e.g. glyphosate, neonicotinoids, heavy metals, crude oil, SO₂, pesticides, dioxins and PCBs, environmental estrogens), food security (synthetic fertilizers, genetically modified organisms, pesticides, herbicides,), smog & others. Students will incorporate current issues into their work featuring small group discussions, learn to evaluate the relative risks of many present-day problems and gain the tools to further explore these topics.

Pre-requisites: 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.

Note: Courses in Packages E and F will have the format of lecture or seminar-based teaching, followed by presentation and discussion of specific clinical cases.

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Medicine Package E: Neuropsychopharmacology and Neuropsychiatry

Introductory Neuropsychopharmacology

(Psychiatry)

This course will cover drugs used in the treatment of the major psychiatric disorders. Over the duration of the course, we will briefly review the symptoms and neurobiology of psychiatric disorders, and then explain in detail how drug therapies work to improve mental health. The pharmacology of these drugs will be studied at both the molecular level and from a clinical perspective. Practical approaches to the pharmacological treatment of the major mental illnesses including schizophrenia, mood disorders (depression and bipolar disorder), and substance abuse disorders. Prof. Ric Procyshyn from the Department of Psychiatry will be a lecturer along with Dr. Alasdair Barr from the Department of Anesthesia, Pharmacology and Therapeutics.

Introductory Neuropsychiatry

(Psychiatry)

This course will cover the anatomical and physiological basis of major mental disorders, focusing upon organic mental illnesses. A neuropsychiatric perspective will include the key features in the history, physical examination, and mental status examination related to the diagnosis of mental disorders in general and organic mental disorders in particular. Prof. Trevor Hurwitz, a psychiatrist and neurologist, from the Department of Psychiatry will be the central lecturer.



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Medicine Package F: Major Mental Illness and Psychotherapy

Mood Disorders and Psychosis: Assessment and Diagnosis

(Psychiatry)

Disorders of mood such as major depression and bipolar disorder, and of impaired reality testing (psychosis) such as schizophrenia and schizoaffective disorder will be the topic of this course. These illnesses cause significant, and growing disability in all countries. Detection and assessment of mood disorders and psychosis, and accurate differential diagnosis will be the focus of this course. The epidemiology and mechanisms of illness will also be covered. Prof. Raymond Lam, Dr. Fidel Vila-Rodriguez and other faculty members will be the lecturers for this course.

Introduction to Psychotherapy

(Psychiatry)

This course will provide an introduction to the foundations of psychotherapy. Topics will include assessment of readiness for therapy, and a description of psychotherapy models and modalities including cognitive-behavioural, mindfulness-based, and supportive psychotherapies. Prof. John Ogrodniczuk, Head, Division of Psychotherapy in the Department of Psychiatry, and other faculty members will be the lecturers for this course.

Medicine Package G: (This package has been reorganized into Packages E and F)

Medicine Package H – Introduction to Population and Public Health

What is Population and Public Health? Population and public health focus on the health of populations and communities, asking questions like ‘why are some people healthy and others not?’ and developing preventative approaches to improve health. These are important topics for those interested in careers in medicine or health sciences. UBC is recognized as a world leader in this area. Through presentations, problem-based learning, group assignments, class discussions and field trips, students will expand their understanding of health and consider how to apply these ideas in their home countries and elsewhere.

Social Determinants of Health

(Population and Public Health)

The first course addresses the question of understanding what affects population and public health. It is generally accepted that a variety of factors (e.g. social, economic and physical environments, personal health practices, individual capacity and coping skills, human biology, early childhood development, culture, gender and health services) influence health. What are the most important influences? By what

Medicine Package H – continued

mechanisms is health damaged or promoted? How are these factors influenced by public policy? This course focuses on the meaning of health and its measurement, and examines what influences the health, well-being and quality of life of individuals, families, communities and nations.

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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 evaluation of the cost and effectiveness of activities will also be considered.

Medicine Package I – Understanding the Recovery and Treatment from Injury and Chronic Disease

Exercise is Medicine

(Physical Therapy)

This course will provide an exploration of exercise and physical activity in the treatment of chronic conditions. Through an exploration of chronic conditions such as arthritis, cancer, cognitive impairment and cardiovascular disease, students 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 also complete hands-on labs in a state-of-art fitness and exercise research facility designed to enable access for people with chronic disease and disability.

Recovery from Injury

(Physical Therapy)

This course will introduce students to the science of rehabilitation within the World Health Organization framework. Through this approach, students will understand how severe injuries and chronic diseases



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Medicine Package I – continued

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. 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 robotic suits to permit walking after spinal cord injury and e-Health (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.

Medicine Package J – Medical Laboratory Science

Introduction to Medical Laboratory Science

(Pathology and Laboratory Medicine)

Students will learn to interpret the results of selected clinical laboratory tests in the context of medical cases. Course content will focus on the normal and abnormal biochemistry and physiology of blood and of organ systems including the liver, gastrointestinal tract, and kidneys. Students will apply this course content to solve case studies and diagnose disease by interpreting patient history information, physical findings, and results of clinical laboratory tests. In addition to interactive lectures, discussions and case-based learning in groups, there will be a hands-on blood cell morphology laboratory session in which students prepare and stain blood smears and learn to distinguish different blood cells under the microscope. Students will also take guided tours of clinical or clinical research lab facilities and of the David Hardwick Pathology Learning Centre which houses tissue specimens representing a wide range of pathological conditions.

Fundamental Techniques for Clinical and Medical Research Laboratories

(Pathology and Laboratory Medicine)

Course content will focus on methods that are commonly used in hospital and bio-medical research laboratories. Hands-on laboratory sessions, conducted in the UBC Hospital, will be the predominant learning experience and will promote the development and advancement of students' technical laboratory skills. The learning focus will be on three disciplines. In the molecular biology section, students will extract and analyze their own DNA. In the histochemistry section, students will conduct a series of experiments using different staining techniques to microscopically determine the composition of unknown tissues. In the cell culture section, students will culture a mammalian cell line using aseptic techniques and identify sources of contamination. Demonstrations, discussions of experimental design, data analysis activities, and interactive lecture sessions will also be used to support students as they achieve the course learning objectives.



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Medicine Package K – Anatomical Sciences

The courses will build the foundation for entrance into a postsecondary program in life sciences and build interest in health sciences. Learning will be achieved through a blended learning approach incorporating online learning with lectures tailored to the students, and small group learning. Students will be able to understand the basic principles of anatomy and learn to apply their knowledge and express their ideas in class discussions.

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 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.

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Pharmaceutical Sciences

Making Better Medicines

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.



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Making Better Medicines – continued

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. Indeed, the use of cutting-edge technology in drug discovery is not new – for example, the most powerful anti-malaria drug was re-discovered in the writings of Ge Hong, a physician who practiced 1700 years ago. Today when one thinks of drug discovery and development, large multibillion dollar pharmaceutical companies come to mind, with their remarkable medications for infections, heart disease and cancer. Despite their effectiveness, these medicines tend to treat all patients as members of one homogeneous population. Obviously every patient is unique and the best medicine for you is one that is tailored to you. Recently, next generation DNA sequencing is making this possibility 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 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 explore how these and other innovations are revolutionizing healthcare and wellness. Students will have the opportunity to explore these innovations first hand in the laboratory.

Science

Science Package A – The Dynamic Earth and its Beautiful Treasures

This package is designed to examine the origin and formation of our planet, from its early beginnings and dynamic plate movements, to the formation of, and exploration for, precious metals and gems. Students will discover how active our planet really is through learning about the rock cycle and its connections to plate tectonic movements and linkages to the formation of economic mineral deposits. No background knowledge of geology is required for this package. 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.

Our 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: Gold and Gems

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, exploration, mining and aspects of marketing of gemstones and precious metals. We touch on topics



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Science Package A – continued

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.

Science Package B – The Earth's Oceans, Atmosphere and Climate

In this package the dominant processes that control the atmosphere and the oceans, and the ecosystems that they support will be explored. Students will discover how energy flows through these systems, how energy flow controls winds and ocean currents and the effect winds and currents have on the ocean biosphere, marine ecosystems, pollution and climate. Both courses emphasize experiential learning where concepts are discovered through active learning in the classroom, innovative laboratory experiments and field trips to collect and interpret observations in the diverse ocean and atmospheric environments near Vancouver. Escape the classroom and discover with us!

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

Learn how biological, physical and chemical processes in the ocean interact to produce amazingly diverse and wonderful ecosystems. 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. 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.

No background knowledge of oceanography is required for Science Package B.

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Science Package C – The Geometry of Nature

The Size of Things

This multi-disciplinary course on scaling will use the unifying theme of size to examine a wide range of physical and biological systems. In each case we will see that "size matters". This will be shown true in the most basic sense, that of spatial size, shape, area and volume. In a more general sense this truism holds in that the geometry, kinematics, and dynamics of phenomena are largely determined by the relative size of underlying factors and processes. We will identify a set of general scaling laws that reflect these facts, and learn a set of conceptual, graphical, and mathematical tools for working with them. Both the laws and the tools transcend traditional disciplinary boundaries within science and beyond science.

Symmetry

This course examines elements of symmetry through an interdisciplinary perspective. In geometry, symmetry is the property by which the sides of a figure or object reflect each other across a line or surface. In biology, symmetry is the orderly repetition of parts of an animal or plant. Symmetry is important to chemistry because it explains observations in spectroscopy, quantum chemistry and crystallography. In physics symmetry is a concept of balance illustrated by such fundamental laws as the third of Newton's laws of motion. These many important aspects of symmetry will be explored.

First year university science and math are recommended for these courses.

