

## Course Description of Biological Sciences Program

### Foundation Courses

<b>ICMA 100</b>	<b>Foundation Mathematics</b>	<b>0</b>
<b>Prerequisites: Placement test</b>		
Expressions and equations; linear functions; polynomials and nonlinear functions; radical and rational functions; data analysis		
<b>ICME 100</b>	<b>English Resource Skills</b>	<b>0</b>
<b>Prerequisites: Placement test</b>		
A remedial course preparing students to read and write academic English at a level suitable for entering the Intermediate English Communication I		

### General Education Courses

#### English Communication

<b>ICGC 101</b>	<b>Academic Writing and Research I</b>	<b>4</b>
<b>Prerequisites: Placement Writing Test</b>		
An introduction to the academic writing process through the development of the writer's voice through sentenc ing, structure, and rhetorical devices; focus on strategies for using and integrating researched sources; methods to compose well-structured essays based on themes relevant to the world today		
<b>ICGC 102</b>	<b>Academic Writing and Research II</b>	<b>4</b>
<b>Prerequisites: ICGC 101 Academic Writing and Research I</b>		
The integration of skills in academic research and writing to analyze and create persuasive compositions; techniques to identify strengths and weaknesses in argument; development of students' knowledge and preconceptions of global issues through a progressive series of essays and journal assignments		
<b>ICGC 103</b>	<b>Public Speaking</b>	<b>4</b>
<b>Prerequisites: ICGC 102 Academic Writing and Research II</b>		
Fundamentals of key skills for confident and effective public speaking through a series of prepared and unprepared speeches; introduction and application of techniques to inform/persuade audiences; utilization of Academic Writing and Research I and II to create and deliver speeches to a professional standard		
<b>ICGC 111</b>	<b>Academic Writing and Research I (Advanced)</b>	<b>4</b>
<b>Prerequisites: Placement Writing Test</b>		
Theories and practical methods to enhance students' creative and descriptive abilities; emphasis on the development of a writer's voice through sentenc ing, structure, and rhetorical devices; strategies for using and integrating researched sources are introduced by way of explaining theories; concepts and writing conventions		

- ICGC 112 Academic Writing and Research II (Advanced) 4**  
**Prerequisites: ICGC 111 Academic Writing and Research I (Advanced)**  
 A focus on high levels of academic literacy and presentation skills in reading, writing, and public speaking for experts or near-expert users of English; utilization of advanced strategies to exploit secondary research and argumentation; application of advanced skills in critical thinking and rhetorical knowledge through class discussions and written and oral assignments
- ICGC 201 Global Realities 4**  
**Prerequisites: ICGC 103 Public Speaking or ICGC 112 Academic Writing and Research II (Advanced)**  
 An exploration and a critical analysis of key texts on poetry, literature, and legislative documents in order to understand the complexity and challenges of the world we live in; themes encouraging students to consider values, human rights and government; class discussions, journal writing, and presentation activities to demonstrate how students can contribute to the betterment of society
- ICGC 202 Literary Analysis 4**  
**Prerequisites: ICGC 103 Public Speaking or ICGC 112 Academic Writing and Research II (Advanced)**  
 A review of literary works from selected literary genres; an exploration of how literature informs our perceptions of the world by way of analytical and critical thinking; an analysis of short stories, poetry and drama; scaffolding of strategies for students to understand the function of a variety of literary forms
- ICGC 203 Creative Writing 4**  
**Prerequisites: ICGC 103 Public Speaking or ICGC 112 Academic Writing and Research II (Advanced)**  
 An examination of fictions, poetry, drama, and the media production through readings, speeches and films; comparisons of writing in different genres; a creation of the work of publishable quality by means of the consideration of audience and genre
- ICGC 204 Advanced Oral Communication 4**  
**Prerequisites: ICGC 103 Public Speaking or ICGC 112 Academic Writing and Research II (Advanced)**  
 Theories of persuasion, non-verbal techniques, and voice control for advanced presenters; strategies to develop high levels of voice control and expressions; activities including debates, presentations, and occasional speeches; the development of students' abilities to express themselves confidently in a variety of academic and professional environments through impromptu and prepared speeches
- ICGC 206 Literature Into Film 4**  
**Prerequisites: ICGC 103 Public Speaking or ICGC 112 Academic Writing and Research II (Advanced)**  
 An introduction to the technical aspects of translating literature into films; an exploration of the interplay between literature and films through an analysis of short stories, novels, and plays and their film versions; an exploration of the challenges merging both mediums

- ICGC 208      Language and Culture      4**  
**Prerequisites: ICGC 103 Public Speaking or ICGC 112 Academic Writing and Research II (Advanced)**  
 An examination of the interplay between language and culture; having texts and class discussions to focus on the importance of understanding the link between culture and languages; a completion of a research paper on the topic
- ICGC 210      First and Second Language Acquisition      4**  
**Prerequisites: ICGC 103 Public Speaking or ICGC 112 Academic Writing and Research II (Advanced)**  
 An introduction to how children develop their first language; comparing and contrasting of the second language development; theories of language development from behaviorism to more recent cognitive and functional approaches; the implications of theories
- ICGC 211      Topics in Comparative Literature A: Poetry      4**  
**Prerequisites: ICGC 103 Public Speaking or ICGC 112 Academic Writing and Research II (Advanced)**  
 An in-depth study of poetry, including: metrics, forms, themes, ethnic voices, throughout history; an evaluation of poetry from different genres through a series of discussions, workshops and a term research paper
- ICGC 212      Topics in Comparative Literature B: The Short Story and the Novel      4**  
**Prerequisites: ICGC 103 Public Speaking or ICGC 112 Academic Writing and Research II (Advanced)**  
 A study of elements of fictions in short stories and novels through class workshops on characters, dialogue, plot and atmosphere; class discussions to analyze the effect of historical and social developments on selected themes
- ICGC 213      Topics in Comparative Literature C: Drama      4**  
**Prerequisites: ICGC 103 Public Speaking or ICGC 112 Academic Writing and Research II (Advanced)**  
 An exploration of ways to understand and appreciate drama by reading, watching, and analyzing theatrical performances; staging and enactment of a theatrical production; readings, essays, and theater workshop activities to prepare students for a final stage performance
- ICGC 214      Literary Non-fiction      4**  
**Prerequisites: ICGC 103 Public Speaking or ICGC 112 Academic Writing and Research II (Advanced)**  
 Exploration of creative nonfiction, a flourishing genre of writing a step away from academic work; reading of compelling, informative, and insightful but also entertaining, imaginative, and risky nonfiction work; overview of various techniques utilized within this field of writing and media; analysis and response to a variety of texts
- ICGC 215      Writing for Research      4**  
**Prerequisites: ICGC 103 Public Speaking or ICGC 112 Academic Writing and Research II (Advanced)**

A student-centric approach to developing research writing skills; an overview of the conventions of the world of research with an emphasis on academic honesty and academic style; use of sample papers to provide students with models to prepare effective abstracts, literature reviews, research paper outlines and short academic articles

### Life Appreciation

**ICGH 113      Moving Pictures: A History of Film      4**

**Prerequisites: -**

An investigation of European, American and Asian film as art, philosophy, social commentary, propaganda, self-expression, well-being and social harmony; a focus not only on techniques, style and technological advances but on interpretation, comparison and criticism

**ICGH 117      Drawing as Creative Expression      4**

**Prerequisites: -**

Develop creativity and cognitive learning; utilize visual communication, design and art principles; experience multiple tools, techniques, medium, experimental mark making; research, analysis, observation, gesture, principles and elements of design and composition; examine, analyze, observe and reinterpret the human figure, plant and still life forms; research, interpret, evaluate, analyses contemporary artists; personal evaluation; personal expression

**ICGH 118      Photography Visualizing in the Digital Age      4**

**Prerequisites: -**

Basic skills and aesthetic principles of photography, how the camera works, types of cameras and digital image capture, techniques in taking pictures, in camera editing, specialized forms of photography, simple editing adjustments, the aesthetics of picture taking

**ICGH 119      Listen! Soundscapes, Well-Being and Musical Soul Searching      4**

**Prerequisites: -**

An examination of sound and music as sources of pleasure, aesthetic experience, well-being as well as stress; discussion of music's expressivity and the emotions it induces; cases studies linking music experience to aspects of perceptual training, personal development, public health and the appreciation of nature

**ICGN 105      Ecology, Ecosystems and Socio-Economics in Southeast Asia      4**

**Prerequisites: -**

Human impacts on Southeast Asian ecology; human impacts on Southeast Asian's biodiversity and natural resources; fundamental ecological and resource management principles; current sustainable development issues; sustainable development practices for Southeast Asia

**ICGN 108      Essentials of Culinary Science for Food Business      4**

**Prerequisites: -**

Changes during preparation, heating, and storage of raw materials and of finished products, foodservice and commercial packaged food industries; chemical, sensory, and nutritional natures of food, food safety concepts, changing trends and interests, legal requirements of food establishment

<b>ICGN 109</b>	<b>Food for Health</b>	<b>4</b>
<b>Prerequisites: -</b>		
Knowledge of general human nutritional requirements; the health benefits of various foods; quality and safety of the various types of food including processing; health and nutritional value		
<b>ICGN 110</b>	<b>Maker Workshop</b>	
<b>Prerequisites: -</b>		
Mechanical design consideration, 3D drawing, safety in design; motion in 1 and 2 Dimension; sound and oscillation motion, mechanical properties of materials; basic electronics, circuit analysis, soldering; microcontroller, basic programming		
<b>ICGN 112</b>	<b>Stargazer</b>	<b>4</b>
<b>Prerequisites: -</b>		
Basic ideas of astronomy, astrophysics and cosmology; the progress of human understanding of the universe; the impact of scientific method on astronomical observation; the Earth & Moon; the Solar System; the lifecycle of stars; Black Holes; galaxies; and the current understandings about the origins and future of the universe		
<b>ICGN 113</b>	<b>Plants, People and Poisons</b>	<b>4</b>
<b>Prerequisites: -</b>		
The plant world; the way plants grow and reproduce; modern technologies used for improving agricultural methods; the basics of plant biology; the distinctions among major groups of plants; the social implications of plant use and abuse		
<b>ICGN 115</b>	<b>Human Evolution, Diversity and Health</b>	<b>4</b>
<b>Prerequisites: -</b>		
Changing modern society; human ability; human body; human distinctiveness; human diversity; human evolution; human health; human origins; primate diversity; scientific advancements		
<b>ICGN 120</b>	<b>Chemistry of Cosmetics and Dietary Supplements</b>	<b>4</b>
<b>Prerequisites: -</b>		
Chemistry of cosmetic products; basic sciences behind common aesthetic medical procedures; basic biochemistry of human skins; basic functioning of vitamins, minerals, and specialty supplements		
<b>ICGN 124</b>	<b>Climate Change and Human Society</b>	<b>4</b>
<b>Prerequisites: -</b>		
Human activities and the global climate; consequences for human society; consequences for the essential life support systems; perspectives on human health and diseases; adapting to global climate change; mitigating global climate change; an optional field visit included		
<b>ICGN 125</b>	<b>Games and Learning</b>	<b>2</b>
<b>Prerequisites: -</b>		
History of games, combinatorial games, games of chance, game theory		

<b>ICGP 101</b>	<b>American Flag Football</b>	<b>1</b>
<b>Prerequisites: -</b>		
A ball based sport course emphasizing techniques, non-contact game play, including dodging, throwing, and catching and development of teamwork management, communication, and terminology		
<b>ICGP 102</b>	<b>Badminton</b>	<b>1</b>
<b>Prerequisites: -</b>		
A racket based sport course stressing technique, strategies, grip, serving, positioning and movement, game play in both singles and doubles		
<b>ICGP 103</b>	<b>Basketball</b>	<b>1</b>
<b>Prerequisites: -</b>		
A ball based sport course emphasizing attentiveness, dribbling, passing, shooting, rebounding, ball control, game play, and development of game strategies		
<b>ICGP 104</b>	<b>Body Fitness</b>	<b>1</b>
<b>Prerequisites: -</b>		
A comprehensive course in one or more exercise techniques: strength/resistance, cardio, plyometric, stretching, high-intensity interval training, and calisthenics; to maintain health and wellness		
<b>ICGP 105</b>	<b>Cycling</b>	<b>1</b>
<b>Prerequisites: -</b>		
A course designed on cycling instruction for safety, fitness, riding techniques, posture, communication, knowledge of equipment and hazards, for recreational and commuter cycling		
<b>ICGP 106</b>	<b>Discover Dance</b>	<b>1</b>
<b>Prerequisites: -</b>		
A dance based course of current forms and techniques in one or more categories: African/Jazz, Worldwide Dances/Latin Dances, Professional Performance Dance, Modern Dance, Hip-hop/Funk		
<b>ICGP 107</b>	<b>Golf</b>	<b>1</b>
<b>Prerequisites: -</b>		
A club based game course designed on developing correct grip, stance, posture, swing, and knowledge of equipment, rules, regulations, and etiquette		
<b>ICGP 108</b>	<b>Mind and Body</b>	<b>1</b>
<b>Prerequisites: -</b>		
A course stressing meditation postures, techniques, movement, and breathing to achieve positive mental state		
<b>ICGP 109</b>	<b>Selected Topics in Sports</b>	<b>1</b>
<b>Prerequisites: -</b>		
Learning concepts, rules and strategies through planned and structured movements by way of sport or activity to enhance a healthy lifestyle		

<b>ICGP 110</b>	<b>Self Defense (Striking)</b>	<b>1</b>
<b>Prerequisites: -</b>		
External martial arts (striking) course emphasizing hard physical impact and exertion, muscular strength and tension, maximizing speed and power, through body coordination		
<b>ICGP 111</b>	<b>Self Defense (Grappling)</b>	<b>1</b>
<b>Prerequisites: -</b>		
Internal martial arts (grappling) course stressing timing, awareness, precision, and techniques, using body leverage for throws, take downs, pins, and submissions		
<b>ICGP 112</b>	<b>Soccer</b>	<b>1</b>
<b>Prerequisites: -</b>		
A ball based sport course stressing alertness, ball control, including dribbling, passing, trapping, shooting, ball movement, game play, and development of strategies through drills and competitive play		
<b>ICGP 113</b>	<b>Social Dance</b>	<b>1</b>
<b>Prerequisites: -</b>		
A dance based social sport or activity course of choreographed movements, styles and regulations from International Ballroom (Standard) and International Latin dances		
<b>ICGP 114</b>	<b>Swimming</b>	<b>1</b>
<b>Prerequisites: -</b>		
A water based sport course stressing swimming techniques, breathing, and knowledge of buoyancy, propulsion, and water safety		
<b>ICGP 115</b>	<b>Tennis</b>	<b>1</b>
<b>Prerequisites: -</b>		
A racket based sport course of techniques, strategy, grip, serve, game play, ball tracking, timing, shot control, through drills, live ball hitting sessions, and competition		
<b>ICGP 116</b>	<b>Volleyball</b>	<b>1</b>
<b>Prerequisites: -</b>		
A ball sport course emphasizing passing, setting, serving, developing strategies, positions, game play, teamwork management, and communication		
<b>ICGS 102</b>	<b>Business Sustainability and the Global Climate Change</b>	<b>4</b>
<b>Prerequisites: -</b>		
Study on the role of business in the society; the basic concept of sustainability; global governance; sustainable development; social inequalities and social inclusion; environment sustainability; climate change; climate change mitigation; climate change adaptation; green marketing; business sustainability		
<b>ICGS 115</b>	<b>Sociology in the Modern World</b>	<b>4</b>
<b>Prerequisites: -</b>		
Sociology as a principle for understanding the modern world, life appreciation; a field of study explaining social, political, and economic phenomena; social interactions and social		

organizations; sociological perspectives; methodologies and sociological insights; topics relevant to the modern world including culture, socialization process, family, social inequality, gender relations, racism, ageism, modern media, and social change; global social problems; evaluation of societies; influencing and improving life's quality

**ICGS 125 American History, Popular Media and Modern Life 4**

**Prerequisites: -**

Exploring modern American history through the lense of popular media and the state's power projection through hard and soft power; introducing the concept of life in the roaring twenties and the Great Depression, investigating available media sources during the war time from World War I, World War II, and the Cold war; understanding historical events impacting the American life including feminist and LGBT movement, the Vietnam War, African-American civil rights movement; discussing the importance modern digital media platforms and social media

**ICGS 126 Introduction to Psychology 4**

**Prerequisites: -**

Human behaviour and mental functioning; the nervous system; consciousness; sensation and perception; psychogenetics, life-span development; thinking, memory, language, conditioning and learning, motivation, personality, and stress

**ICGS 127 Positive Psychology 4**

**Prerequisites: -**

Concepts of success; societies emphasis on financial wealth and the accumulation of material things versus the importance of having a loving family, developing rewarding relationships with friends and colleagues; career achievement and the respect of others; regularly feeling positive emotions, developing morally and spiritually, engaging in worthwhile activities; staying physically fit; success as a multi-faceted and intensely personal concept; the exploration of well-being from the field of positive psychology; developing understanding of what comprises a successful life with an emphasis on greater self-expression and overall well-being

**ICGS 128 Global Gastronomy and Cuisines 4**

**Prerequisites: -**

Understanding the interconnection between gastronomy, culture, society, and local and global food systems; highlighting the global food production and consumption trends; examining diverse cultures through the food and food preparation; emphasis on multicultural context in cooking practices; understanding the current trend in various healthy diets and cuisines

**ICGS 129 Tea Studies 2**

**Prerequisites: -**

What is tea, main tea varieties, main tea types, climatic conditions for sustainable growth of tea, important tea growing countries and regions, tea processing, tea and health, tea tasting and evaluation, tea utensils and preparation, tea and food pairing

**ICLL 100 Self Development 2**

**Prerequisites: -**

Life skills for 21st century workplace through learning or training activities in various topics including creativity, growth mindset, leadership, and emotional intelligence or other selected



personal development activities approved by the academic advisor and Curriculum Administrative Committee

### **Global Citizenship**

**ICGH 116 World Cinemas 4**

**Prerequisites: -**

An introduction, practice and an application of languages to critical thinking and analysis of key world cinema texts; principal critical methods and theoretical debates of film theory; theoretical perspectives including structuralism, semiology, Marxism, feminism, psychoanalysis, post-structuralism, and cultural studies; questions of narrative and narration, realism, formalism, modernism, postmodernism, postcolonialism, gender, sexuality, and ideology

**ICGH 120 Thai and ASEAN Cinema 4**

**Prerequisites: -**

An introduction, practice and an application of languages to critical thinking and analysis of Thai and ASEAN film texts; examine key film languages and textual examples, including narrative theories; genre, film theories; an analysis of key film texts; the development of skills in research, writing and analytical thinking

**ICGH 121 The End of the World? Development and Environment 4**

**Prerequisites: -**

An integrated and system oriented view on applied ethics with an eye on development, the environment and technology; emphasis on the intersection between the central notions of justice, nature and technology, particularly under consideration of sustainability; critical analysis of current states of affairs in terms of diverse political traditions, the history of colonialism and the dialectic between globalization and segregation; examples and cases studies include issues of public health, education, food technology, global institutionalization, energy management, the international monetary system, trade, labor migration, and violations of human rights

**ICGH 122 Introduction to Asian Philosophy 4**

**Prerequisites: -**

A differentiation between the main schools of Asian philosophy, including Buddhism, Hinduism, Confucianism, Taoism, Jainism, among others; summaries of foundational concepts and themes; the influences of these philosophies on the beliefs and cultures as well as the politics, economics and legal frameworks around the world

**ICGH 123 Faiths, Ecological Justice, and the Tropical Rainforests 2**

**Prerequisites: -**

Biological diversity; ecological justice; environmentally ethical actions; environmental justice; faiths; indigenous peoples; impacts; interconnection; interdependence; religions; religious diversity; social equity; social justice; threats; tropical rainforests

**ICGL 101 Elementary German I 4**

**Prerequisites: Placement test**

Greetings, introducing oneself or others, German alphabet and phonemes, personal information, numbers from 1 – 100 and price quotations, expressing wishes, telling the time and making

appointments, quality of items, measurements; verb forms, pronouns, sentence structure, gender of nouns, accusative case and plural forms, negation

**ICGL 102 Elementary German II 4**

**Prerequisites: Placement test or ICGL 101 Elementary German I**

Ordering and paying for meals in a restaurant, preferences of food and drinks, giving and asking for directions, reading a map, preferences of work conditions, job advertisements; essay writing, yes/no questions, imperative forms, compound verbs, preposition with dative case, modal verbs I, German sentence bracket

**ICGL 103 Elementary German III 4**

**Prerequisites: Placement test or ICGL 102 Elementary German II**

Health advice and problems, healthy and unhealthy lifestyles, events and accidents, travel reports, curriculum vitae (CV); possessive articles in nominative, accusative and dative case, perfect tense, connectors, modal verbs II

**ICGL 111 Elementary Japanese I 4**

**Prerequisites: Placement test**

Hiragana and Katakana characters; fundamentals of basic Japanese grammar (noun-ending sentences, particles, demonstratives, verb-ending sentences, non-past and past tenses); scaffolding of basic vocabulary; basic communication about personal topics (self and others); description of Japan; designing written products in the target language; expressing existence, preferences, and agreement; comparing cultures

**ICGL 112 Elementary Japanese II 4**

**Prerequisites: Placement test or ICGL 111 Elementary Japanese I**

Kanji characters (approximately 50); fundamentals of basic Japanese grammar concepts (particles, verbs of giving and receiving, na-adjective-ending sentences, i-adjectives-ending sentences, non-past and past tenses, and classifiers); scaffolding of basic vocabulary; basic communication about daily life topics; designing written products in the target language; expressing simply points of view, describing people and daily life activities; comparing cultures

**ICGL 113 Elementary Japanese III 4**

**Prerequisites: Placement test or ICGL 112 Elementary Japanese II**

Kanji characters (approximately 50); fundamentals of basic Japanese grammar concepts (verb conjugation (masu-form, te-form, nai-form, and dictionary form), and related sentence patterns; polite style of speech, and plain style of speech, particles); scaffolding of basic vocabulary; basic communication about various topics; designing written products in the target language; expressing points of view, describing people and various activities; comparing cultures

**ICGL 121 Elementary French I 4**

**Prerequisites: Placement test**

Fundamentals of basic French grammar (pronouns, present tense conjugation, gender/number, adjectives, prepositions); scaffolding of basic vocabulary; basic communication about personal topics (self and others); identifying and describing French speaking countries; designing written products in the target language; expressing existence, preferences and agreement; comparing cultures

- ICGL 122 Elementary French II 4**  
**Prerequisites: Placement test or ICGL 121 Elementary French I**  
 Fundamentals of basic French grammar (present and future tense, adjective gender, place & agreement, more complex prepositions, more complex questions); scaffolding of simple vocabulary; simple communication about daily life topics (in France and in their country); designing written products in the target language; expressing simply point of view, describing people and daily life activities; comparing cultures
- ICGL 123 Elementary French III 4**  
**Prerequisites: Placement test or ICGL 122 Elementary French II**  
 Fundamentals of more complex French grammar (present and future tense, adjective gender, place & agreement, more complex prepositions, questions and past tense notions); scaffolding of more complex vocabulary; longer communication about daily life topics (in France and in their country); designing written products in the target language; expressing point of view, describing people and daily life activities; comparing cultures
- ICGL 131 Elementary Chinese I 4**  
**Prerequisites: Placement test**  
 The Chinese phonetic system (Pinyin); the Chinese basic writing system (Stroke order); Chinese characters (approximately 100); fundamentals of basic Chinese grammar (interrogative pronouns, the 的 particle, yes/no questions with 吗, demonstrative pronouns, classifiers, adverbs 也, 都); scaffolding of basic vocabulary; basic communication about personal topics (self and others); describing China; designing written products in the target language; expressing existence, preferences and agreement; comparing cultures
- ICGL 132 Elementary Chinese II 4**  
**Prerequisites: Placement test or ICGL 131 Elementary Chinese I**  
 The Chinese phonetic system (Pinyin); the Chinese writing system; Chinese characters (approximately 100); fundamental Chinese grammar concepts (interrogative pronouns, classifiers, the “的” particle, “的” phrases, adverbials, continuous action sentence structures and reduplication of verbs); scaffolding of basic vocabulary; basic communication about daily life topics; designing written products in the target language; expressing simply points of view, describing people and daily life activities; comparing cultures
- ICGL 133 Elementary Chinese III 4**  
**Prerequisites: Placement test or ICGL 132 Elementary Chinese II**  
 The Chinese phonetics (Pinyin); Chinese characters (approximately 150) ; Fundamentals of basic Chinese grammar concepts (interrogative pronouns, modal verbs, complex sentences, the modal particle “了” (了), complements of state, complements of result, complements of duration); scaffolding of basic vocabulary; basic communication about various topics; designing written products in the target language; expressing points of view; telling directions; describing oneself and other people’s abilities; comparing cultures
- ICGL 141 Elementary Spanish I 4**  
**Prerequisites: Placement test**  
 Fundamentals of basic Spanish grammar (pronouns, present tense conjugation, gender/number, adjectives, prepositions); scaffolding of basic vocabulary; basic communication about personal

topics (self and others); identifying and describing Spanish speaking countries; designing written products in the target language; expressing existence, preferences and agreement; comparing cultures

**ICGL 142 Elementary Spanish II 4**

**Prerequisites: Placement test or ICGL 141 Elementary Spanish I**

Fundamentals of basic Spanish grammar (pronouns, present tense conjugation, reflexive verbs, gender/number, adjectives, prepositions); scaffolding of basic vocabulary; basic communication about personal topics (self and others); identifying and describing Spanish speaking countries; designing written products in the target language; expressing existence, preferences and agreement; talking about daily habits

**ICGL 143 Elementary Spanish III 4**

**Prerequisites: Placement test or ICGL 142 Elementary Spanish II**

Towns, quarters and cities; directions; past experiences; present perfect tense, past tense indefinido; verbs ser, estar and hay; vocabulary of places; time markers for past tense; verbs empezar a+ infinitive; verbs ir / irse

**ICGL 160 Introduction to Thai Language and Culture 4**

**Prerequisites: -**

Fundamental vocabularies and structures for various communicative situations in everyday use and introduce basic aspects of Thai culture

**ICGL 161 Elementary Thai I 4**

**Prerequisites: Placement test**

Listening and speaking skills on the following topics: introducing oneself one's friend and family, basic food and drink ordering, places, directions, transportation, buying tickets, clothing items, colours, and sizes, bargaining, counting and using classifiers, reading and writing Thai consonants, vowels placed after, before, above, and below the consonants, Thai numbers, live and dead syllables

**ICGL 162 Elementary Thai II 4**

**Prerequisites: Placement test or ICGL 161 Elementary Thai I**

Listening and speaking skills on the following topics: one's schedule, making appointments, favorite leisure activities, ordering food, drinks and desserts with special requests, presentation of one's plan for activities during school break, continuation of Elementary Thai I in reading and writing skills, consonant clusters, tone marks, words with special spelling rules, reading short paragraphs

**ICGL 163 Elementary Thai III 4**

**Prerequisites: Placement test or ICGL 162 Elementary Thai II**

Listening and speaking skills on the following topics: going to see the doctor, looking for a house for rent, seasons, travel and festivals

**ICGL 170 Diversities in Multilingual Societies 2**

**Prerequisites: -**

Multilingual societies; cultural diversities; cross-cultural communication; Chinese-, German-, French-, Japanese, and Spanish-speaking cultures; Chinese-, German-, French-, Japanese, and Spanish languages; cultural conflicts; cultural gaps; cultural shocks; cultural discoveries; cultural awareness; cultural harmonies; foreign visitors to Thailand; working with Thai people

**ICGL 201      Pre-intermediate German I      4**

**Prerequisites: ICGL 103 Elementary German III or Placement Test**

Clothing and accessory, appearance, shopping for clothes and accessory family members, present and past families, statistics, festivities and culture, dates, presents; comparative forms of adjectives, modal verbs past tense, dependent clauses (cause and condition), personal pronouns, accusative and dative cases

**ICGL 202      Pre-intermediate German II      4**

**Prerequisites: ICGL 201 Pre-Intermediate German I or Placement Test**

Media usage and Internet-shopping, advertisement, expressing surprise, meeting someone for the first time, country and city life, cultural capitals in Europe; direct and indirect questions, adjective without article, relative clause and pronoun, modal verb in simple past, sub-clause with als

**ICGL 203      Pre-intermediate German III      4**

**Prerequisites: ICGL 202 Pre-Intermediate German II or Placement Test**

Professional biographies, job announcements, festivities and customs, emotions, movie synopsis, products and inventions; reasons with weil and denn, nominalization, preposition with dative, sub-clause with wenn and um zu, passive voice

**ICGL 211      Pre-intermediate Japanese I      4**

**Prerequisites: ICGL 113 Elementary Japanese III or Placement Test**

Kanji characters (approximately 50); fundamentals of basic Japanese grammar concepts (verb conjugation (masu-form, te-form, nai-form, and dictionary form), and related sentence patterns; polite style of speech, and plain style of speech, particles); scaffolding of basic vocabulary; basic communication about various topics; design of written products in the target language; expressing points of view, describing people and various activities; comparing cultures

**ICGL 212      Pre-intermediate Japanese II      4**

**Prerequisites: ICGL 211 Pre-Intermediate Japanese I or Placement Test**

50 Kanji characters; explaining the state of things; describing necessary things to do in advance as preparations for the future; expressing own intentions, plans, and schedule; expressing own guess and inference; asking someone to take a message or conveying a message; stating standards or norms, when one explains the manner of doing a certain action or work; explaining a condition in which a certain action is performed; stating everyday habitual actions

**ICGL 213      Pre-intermediate Japanese III      4**

**Prerequisites: ICGL 212 Pre-Intermediate Japanese II or Placement Test**

50 Kanji characters; expressing judgments under certain conditions; stating a purpose or an aim; describing changes in human ability and conditions; describing an action performed by a third person, or an action when one feels annoyed or troubled, using passive verbs; expressing something with the most important information emphasized; describing natural phenomena,

happenings, and events, together with their causes; clearly telling what speakers consider as questions, by using a question with an interrogative as a component of a sentence; using appropriate expressions for giving and receiving of things and actions, depending on the relationship between the giver and the receiver, in terms of social status; telling usage, evaluation, necessary time, expense, etc.

**ICGL 221      Pre-intermediate French I      4**

**Prerequisites: ICGL 123 Elementary French III or Placement Test**

Developing further knowledge of French grammar at the pre-intermediate level (present, past and future, more complex interrogative sentence, negative sentence, comparative and pronouns); scaffolding of more complex vocabulary; more complex and longer communication about personal needs, solving simple problems; interacting in predictable context topics in French; designing written products in the target language; expressing points of view, giving simple advices and interacting in daily life activities; comparing cultures

**ICGL 222      Pre-intermediate French II      4**

**Prerequisites: ICGL 221 Pre-Intermediate French I or Placement Test**

Extending further knowledge of French grammar at the pre-intermediate level (hypotheses and conditions, future, conditional, pronouns, direct and indirect speech, imperative and gerundive); scaffolding of more complex vocabulary; longer communication about solving problems and expressing feelings; commenting on attitudes and justifying actions in predictable context topics in French; comparing cultures

**ICGL 223      Pre-intermediate French III      4**

**Prerequisites: ICGL 222 Pre-Intermediate French II or Placement Test**

Developing further knowledge of French grammar at the pre-intermediate level (comparative, complex interrogative sentence, gerundive, subjunctive present in regular and irregular forms, passive voice); scaffolding of more complex vocabulary; longer communication about personal feelings, wishes and hopes; complaining and talking about difficulties, suggesting solutions; comparing cultures

**ICGL 231      Pre-intermediate Chinese I      4**

**Prerequisites: ICGL 133 Elementary Chinese III or Placement Test**

Chinese characters (approximately 300); identifying pre-intermediate level Chinese grammar concepts (complements of duration, expressing approximate numbers, comparative sentences, complements of quantity, exclamatory sentences); developing listening, speaking, reading and writing skills through an integrated approach; communication about various topics; comparing two cities in various aspects; comparing the seasons in China and Thailand; activities and festivals in each season; organizing a trip

**ICGL 232      Pre-intermediate Chinese II      4**

**Prerequisites: ICGL 231 Pre-intermediate Chinese I or Placement Test**

Chinese characters (approximately 300); identifying pre-intermediate level Chinese grammar concepts (past experiences, complements of frequency, the structure of 是.....的, reduplication of adjectives, S-P phrases, complements of result II, simple passive sentences); developing listening, speaking, reading and writing skills through an integrated approach communication

about various topics; sports or entertainment; expressing unlucky stories; describing appearance and clothes; Chinese style weddings (1)

**ICGL 233 Pre-intermediate Chinese III 4**

**Prerequisites: ICGL 232 Pre-intermediate Chinese II or Placement Test**

Chinese characters (approximately 300); identifying pre-intermediate level Chinese grammar concepts (continuous actions or states, Chinese style weddings, Chinese construction quadrangles, existence emergence sentences, “把” sentence I, “把” sentence II, “被” sentence, adverb “又”); developing listening, speaking, reading and writing skills through an integrated approach; communication about various topics; travelling by airplane; Beijing Opera performances; outdoor activities; reunions with old friends

**ICGL 241 Pre-intermediate Spanish I 4**

**Prerequisites: ICGL 143 Elementary Spanish III or Placement Test**

Habits; pronominal verbs; porque/para; furniture and parts of the house; appearance; family, irregular verbs in present tense; present progressive

**ICGL 242 Pre-intermediate Spanish II 4**

**Prerequisites: ICGL 241 Pre-Intermediate Spanish I or Placement Test**

Leisure activities; intentions and projects; pain, discomfort and symptoms; parts of the body; vocabulary of food; ir a+ infinitive; present perfect; differences between ser and estar; personal pronouns for objects; verb gustar

**ICGL 243 Pre-intermediate Spanish III 4**

**Prerequisites: ICGL 242 Pre-Intermediate Spanish II or Placement Test**

Past habits, customs and circumstances; past and present actions; advice, instructions (imperative); future situations and actions, conditions, hypotheses; past experience; imperfect verb tense; indefinido verb tense; present perfect verb tense; contrast of past tenses

**ICGN 126 Plant Society 2**

**Prerequisites: -**

People interacting with the plant and fungal worlds; differences among cultures and the indigenous uses of medicinal, textile and food plants; the benefits, problems and social implications of their use; hands-on experiences with techniques and methods used by field scientists

**ICGS 106 Fashion and Society 4**

**Prerequisites: -**

Design elements of fashion, fashion terminology, fashion reflecting its temporal and spatial context, fashion and the development of art, fashion is a cultural expression, fashion is creativity, fashion needs customers' approval and endorsements, fashion and consumer behaviour, fashion and consumerism, and ethical issues of fashion

**ICGS 111 Exploring Religions 4**

**Prerequisites: -**

Major religions in the world: Hinduism, Buddhism, Sikhism, Chinese religions, Shinto, Judaism, Christianity, and Islam; origins of the three religious groups, religions arising in India, religions of

China and Japan, and the religions of the family of Abraham; similarities and differences; contemporary new religious developments and related issues; religious diversities present in the world

**ICGS 112      Geography of Human Activities      4**

**Prerequisites: -**

Global Learning Initiative class; a systematic study of patterns and processes of geography; understanding human perceptions of surroundings and alterations of the earth's surface; diversity of cultures, beliefs, and ways of life; establishing global unity and harmony; recognition of equality and respect between persons in diverse regional geographical settings; raising awareness of one's own humanity and human responsibilities; the interrelationship between humans and the spaces they create; human activity as interdisciplinary by nature; the physical and socially created environment people live in; human interactions shaping the human understanding of the environment; the utility of resources; phenomena on the earth's surface relating to human actions; concepts and geographical methodologies; examination of social organizations and environmental consequences; a broad dynamic domain reflecting such developments and issues as social bias, discrimination, and stereotyping in the contemporary world; associating a critical geographical perspective on the past, present and future achievement of the social world

**ICGS 123      Tourism Concepts and Practices      4**

**Prerequisites: -**

Exploring tourism as a geographical system approach and looking at the characteristics of tourism and the demand side first by examining driving forces shaping the strong growth of global tourism and Thailand tourism; the reasons for travelling and selecting a travel destination; examining the roles of tourism organisations both in the public and private sectors especially national tourism organisations, travel suppliers, and travel intermediaries; introducing the concept of community art event and creative tourism for promoting cultural diversity and social inclusion; and special interest tourism in Thailand

**ICGS 130      Political Science      4**

**Prerequisites: -**

The understanding of politics and political systems of the current world; interactions and connections of different ideas; systems of thought and conflict in contemporary society; analysis of political phenomenon; collecting information, organizing information, organizing in groups, analyzing information, presenting clearly and concisely on political phenomenon, state typology, political taxonomy, ideological persuasion, voting systems and outcomes

**ICGS 131      Introduction to International Studies      4**

**Prerequisites: -**

The field of international studies; interdisciplinary approaches; economic globalization; the Bretton Woods system and neoliberalism; political globalization; the United Nations system, the International Court of Justice, and Human Rights; cultural globalization; migration diaspora and transnationalism; the internet and global media; development; modernization and dependency; Global North and Global South; traditional and human security; food; health; energy; environment



**ICGS 132 Career Preparation in a Globalized World 4**

**Prerequisites: -**

Trends in national, regional and international job markets; self-assessment on career options; career plan creation; principles in business communication; job search process and tools; resume, cover letters; interview preparation and simulation; dimensions of culture

**ICGS 133 Foundation of Mediterranean Cultures 4**

**Prerequisites: -**

The Mediterranean as a source of Western culture; Egypt and the Fertile Crescent; Mohammed and the Muslim World; the Promised Land: Moses' Israel; Jesus and the birth of Christianity; Greek history and civilisation; Ancient Italy; arts in Florence and Venice; Modern Italy history; Italian food; the World of Fashion in modern Italy; Italian film; Italian music

**Critical Thinking**

**ICGH 101 Biotechnology: from Science to Business 4**

**Prerequisites: -**

Biotechnology, bioethics, and the law, biotechnology and the regulatory framework, genetic testing, patenting life, biobanks and modern genomics research, genetically modified organisms, human and animal testing; bioterrorism, biological weapons laws, bio-prospecting, pharmaceutical pricing, the future of the human beings and post-humanism

**ICGH 102 Famous Arguments and Thought Experiments in Philosophy 4**

**Prerequisites: -**

An examination of the most striking argumentative moves in Philosophy from Plato's Allegory of the Cave to Searle's Chinese Room and beyond; a transfer and an application of paradigmatic philosophical thinking to current open questions in politics and science

**ICGH 103 Logic, Analysis and Critical Thinking: Good and Bad Arguments 4**

**Prerequisites: -**

Basic formal tools from sentential and predicate logic; logical structures of arguments used in the everyday contexts of life; an analysis of their strengths and weaknesses; common fallacies in reasoning, including reasoning involving determining probabilities; a construction of good arguments using the principles of informal reasoning

**ICGH 105 Technology, Philosophy and Human Kind: Where Are We Now?! 4**

**Prerequisites: -**

An examination of major technological and scientific innovations across the globe and their effects on human life and thought; a focus on agriculture, steel, the printing press, the mechanical clock, magnifying lenses, antibiotics, electricity, steam and combustion engines, and transistor

**ICGH 106 The Greeks: Crucible of Civilization 4**

**Prerequisites: -**

An introduction to an overview of the philosophy and thought of Ancient Greece and its influence on contemporary civilization; theories about knowledge, propaganda, truth, art, psychology, happiness, justice and democracy

- ICGH 107 Contemporary Art and Visual Culture 4**  
**Prerequisites: -**  
 Focusing on current issues in society as reflected in the new media utilized in art today; an analysis of images and group discussions regarding social and historical contexts of contemporary art; creative thinking skills; effects of globalization on the visual world; connections between global and local issues; an investigation of broader social and cultural matters such as ideology, gender, race, and ethnicity
- ICGH 109 Creative Thinking Through Art and Design 4**  
**Prerequisites: -**  
 Combining hands-on studio experiences with demonstrations, lectures and discussions; developing creativity and gaining confidence in communicating one's own unique vision; exploring a variety of art and design mediums; understanding the elements of the visual language; implementing the creative process and creative thinking to develop individual solutions to open-ended problems
- ICGH 110 Drawing as Visual Analysis 4**  
**Prerequisites: -**  
 Developing creativity and cognitive learning skills; utilizing visual communication, design and art principles; mark making; observation, analysis, record, representational plant and still life forms; practice, application, techniques for conventional pencil drawing tools: shape, form, perspective, lines, shading, value, negative space, texture, composition; observation; scientific illustration, realistic representational observation
- ICGH 115 Cinematic Languages and Its Application 4**  
**Prerequisites: -**  
 An introduction, practice and an application of languages to critical thinking and analysis; examining key film languages and textual examples, including narrative theories; genre, film theories; an analysis of key film texts; the development of skills in research, writing and analytical thinking; applied knowledge to creative works; the presentation of original ideas and reflection on the craft approach
- ICGH 124 Life Drawing and Anatomy 4**  
**Prerequisites: -**  
 An introduction, practice and application of observation drawing to record the human form; including key principles of composition, gesture and observation drawing techniques and design skills for static, gesture and motion poses; understanding record and identifying the anatomical make-up of the human form in muscles and skeletons; technical proficiency with suitable media for observation drawing; studio practice; hand-drawing from observations
- ICGH 125 How Can We Know What Is Good? Moral Reasoning and Behavior 4**  
**Prerequisites: -**  
 A survey of philosophical, psychological and scientific contributions to the understanding of moral values and agency; hands-on construction, scrutiny and analysis of ethical argument regarding burning issues in applied ethics

<b>ICGH 126</b>	<b>Behavioral Ethics: Why Good People Do Bad Things</b>	<b>2</b>
<b>Prerequisites: -</b>		
Foundations of behavioral ethics, assumptions of ethical decision making, process of ethical decision making, cognitive errors in ethical decision making: incrementalism, self-serving bias, tangible and abstract, loss aversion, framing, and overconfidence, social and organizational pressures in ethical decision making, situational factors in ethical decision making		
<b>ICGN 107</b>	<b>The Chemistry of Everyday Life</b>	<b>4</b>
<b>Prerequisites: -</b>		
Portable electronics; the air we breathe; radiation from the sun; climate change; energy from combustion; energy from alternative sources; water; polymers and plastics; nutrition; health and medicine; genes and life		
<b>ICGN 111</b>	<b>Physics for CEO</b>	<b>4</b>
<b>Prerequisites: -</b>		
Basic concepts of physics impacting individuals and society on a daily basis: physical quantities, Newtonian mechanics and dynamics, energy and heat, electricity and magnetism, light and sound, and the electromagnetic spectrum		
<b>ICGN 123</b>	<b>The Earth's Dynamic Structure</b>	<b>4</b>
<b>Prerequisites: -</b>		
Introducing fundamental concepts and applying general geology at the beginning level; basic concepts of physical geology, emphasizing on surficial and deep earth processes, including minerals; rocks and their formations, crustal deformation, plate tectonics; weathering and erosion, formation of landscapes, geological resources and environmental geology		
<b>ICGN 127</b>	<b>Practical Mathematics</b>	<b>2</b>
<b>Prerequisites: -</b>		
Fibonacci numbers and the golden ratio, voting and election, data interpretation, probability, cryptography, financial mathematics		
<b>ICGS 103</b>	<b>Economics in Modern Business</b>	<b>4</b>
<b>Prerequisites: -</b>		
Forces of demand and supply, elasticity, opportunity cost; market structures, pricing strategy, business enterprise, consumers behavior; Thai economy, world economy, globalization and technology, profit maximizing, firm and organization, government policies; business analysis and managerial decision-making, competitive advantage, dynamic business environment		
<b>ICGS 113</b>	<b>Perspectives on the Thai Past</b>	<b>4</b>
<b>Prerequisites: -</b>		
The origins of the Thai people in pre-historic times to the late twentieth century; an alternative view incorporating the different regions and various ethnic groups making up present-day Thailand; key issues in Thai history; an analysis of the classics of Thai historiography; an evaluation and interpretation of a range of primary sources dealing with the Thai past; an understanding of how history is written		
<b>ICGS 134</b>	<b>Is Democracy Good?</b>	<b>4</b>
<b>Prerequisites: -</b>		

Democracy as a political system and a 'normal' form of governance throughout the world, especially since the transitional Third Wave of democratization ending in the 1990's; democracy as a highly contested term; forms of governance; contestations in Thailand; arguments of Thai Style Democracy; defining democracy; different forms of democracy; local perception of democracy; critical debate on the merits of democracy; functionality; theoretical and in pragmatic situations; qualitative and quantitative analysis; democratic performance

**ICGS 135 Entrepreneurial Accounting 4**

**Prerequisites: -**

Fundamental accounting concepts; financial statements for small enterprises; financial statement analysis; cost-volume-profit analysis; management decision making; business taxation

**Leadership**

**ICGN 114 The Scientific Approach and Society 4**

**Prerequisites: -**

Scientific literacy; the process of science discovery; verification, its limitation, and the influence in various disciplines; human and animal research ethics; the critical analysis of current scientific articles; the life cycle of scientific knowledge; modeling in science

**ICGN 128 Climate Emergency, Biodiversity Crisis, and Humanity at Risk 2**

**Prerequisites: -**

Anthropogenic activities; biodiversity crisis; biodiversity loss; biological diversity; climate change; climate crisis; climate emergency; ecosystem functions; harmful and unsustainable practices; humanity at risk; mitigation and adaptation; threats, impacts and consequences

**ICGS 104 Essentials of Entrepreneurship 4**

**Prerequisites: -**

Creating new businesses, capturing new markets, enhancing organizational effectiveness; entrepreneurship theories and frameworks, practices of promoting and managing start-ups; the life-cycle of an entrepreneurial venture, concept implementation; entrepreneurial pathway, customer analysis, integrated marketing, funding, securing and managing capital, human capital management under the disruptive environment

**ICGS 118 Skills in Dealing with People Across Cultures 4**

**Prerequisites: -**

The development of skills in dealing with people across cultures, covering topics such as: identity formation and conflict; ethics and moral behavior; values and communication across cultures; culture and tourism; culture and work motivation; culture in educational institutions

**ICGS 121 Abnormal Colleagues: How Do I Make This Work? 4**

**Prerequisites: -**

The stigma of psychological issues; the fear of the workplace gossips and job security; an avoidance of getting treatment and counseling; a recognition of various disorders and devising strategies to effectively communicate and work with people; improving the workplace productivity and relationships

- ICGS 136 Social and Health Issues in Thailand 4**  
**Prerequisites: -**  
 Social and health issues in Thailand; experiential learning approach; site visits to various government and non-governmental organizations; small groups work; identification of issues and characterize the factors affecting the issues; prioritization of the urgency of the issues and determination of the possible solutions; proposing action plans addressing the issues
- ICGS 137 Witchcraft and Gender Representation 4**  
**Prerequisites: -**  
 The term "witch" used to suppress women: accusations of witchcraft to eliminate strong, assertive women; accusations of demonic or magic sources demeaning to women; European, American and African use of witch accusations to stifle women; other forms of oppression of women: the Chinese foot binding, the Indian Suttee, the African genital mutilation; the meaning of gender; gender vs sex; marginalization of women in patriarchal societies; women's rights in the contemporary world; differing concepts of women's rights; global and national enforcement of women's rights; organizations concerned with gender and women's issues: UN, ILO, etc; an application of gender rights to other genders like LGBTQ
- ICGS 138 Business Event Essentials 4**  
**Prerequisites: -**  
 An introduction to business event industry, meetings, incentive travels, conventions, exhibitions; decision making criteria, special events, business event organization management, venue management, logistics for business event industry, stakeholders in business event industry and local community engagement, standards in business event industry, ethics for business event professionals
- ICGS 139 Leadership and Change for a Global Society 4**  
**Prerequisites: -**  
 Concepts and practices for leadership development; developing leadership skills and challenges of change in a global society; the need, vision, initiation for change, teamwork and collaboration for the efficient management
- ICLL 101 Professional Development 2**  
**Prerequisites: -**  
 Professional skills for 21st century workplace through learning or training activities in various topics including innovation management, start-up business, agile workplace or other selected professional development activities approved by the academic advisor and Curriculum Administrative Committee

### Digital Literacy

- ICGH 111 Media Literacy: Skills for 21st Century Learning 4**  
**Prerequisites: -**  
 An integration of the media literacy, the media production, and the media ethics; accessing, analyzing, evaluating, questioning, and producing media texts; social, cultural, and political



- ICGN 133 E-Business: Technology and Digital Strategies 4**  
**Prerequisites: -**  
 The Landscape of technologies in the digital enterprise and e-business; internet-based staples such as web hosting, domain-name acquisition, the social media, the payment systems; electronic business models and digital strategies; emerging trends in technology; legal and ethical issues
- ICGN 134 Introduction to Artificial Intelligence 2**  
**Prerequisites: -**  
 The artificial intelligence terminology; machine learning types and techniques; guidelines for building the machine learning model; neural networks; an evaluation in the AI system; the real-world artificial intelligence; the future trends of the artificial intelligence; dangers and threats of the artificial intelligence
- ICGS 140 Fake News, Censorship and the Politics of Truth 4**  
**Prerequisites: -**  
 Internet and hyper news flows; patterns of information consumption; knowledge of information authenticity; socio-political effects of 'fake news'; impacts and methods of data collection; censorship and contested 'digital space', fact-checking, source evaluation and trust-building online; social power of algorithms, quantification and profiling; citizens journalism and the traditional media
- ICLL 102 Skills for a Digital World 2**  
**Prerequisites: -**  
 Twenty-first century skills for digital economy through learning or training activities in various topics including e-Commerce, Blockchain technology, and data science, or other selected activities approved by the academic advisor and Curriculum Administrative Committee

## **Major Courses**

### **Core Science Courses**

- ICBI 121 Biology I 4**  
**Prerequisites: -**  
 Properties of life, classification, and scientific process; chemistry of life; cells and metabolism; genetics; mechanisms of evolution; diversity of life; plant forms and functions; animal forms and functions; ecology and behavior; practical exercises are included
- ICCH 101 General Chemistry I 4**  
**Prerequisites: -**  
 Concepts of general chemistry; matters, atoms, compounds, reactions, gases, thermodynamics, electrons in atoms, periodic table, chemical bonding; intermolecular forces, and spontaneous changes

<b>ICCH 102</b>	<b>General Chemistry II</b>	<b>4</b>
<b>Prerequisites: ICCH 101 General Chemistry I</b>		
Comprehensive general concepts and principles of chemistry; solutions, equilibria, acids and bases, solubility, electrochemistry, chemical kinetics, chemistry of main-group and transition elements, coordination compound, nuclear chemistry and selected topics in chemistry		
<b>ICCH 103</b>	<b>Integrated Laboratory Techniques in Chemistry I</b>	<b>2</b>
<b>Prerequisites: MU LabPass or lecturer permission</b>		
Laboratory practicals for general chemistry: measurements; stoichiometry; solids, liquids and solutions; gases; thermochemistry; equilibrium; acids and bases; electrochemistry; kinetics; chemical safety practice and regulations		
<b>ICMA 106</b>	<b>Calculus I</b>	<b>4</b>
<b>Prerequisites: Placement test or ICMA 100 Foundation Mathematics</b>		
Brief review of trigonometry; limits and continuity; differentiation and its techniques; derivatives of algebraic and trigonometric functions; graph sketching; applications of the derivatives; antiderivative and integration; area under a curve and between curves		
<b>ICPY 101</b>	<b>Physics I</b>	<b>4</b>
Prerequisites: -		
Measurement, units and dimensions; vectors, linear motion, newton's law of motion, rotational motion, energy, momentum, static equilibrium, fluid mechanics		
<b>ICPY 105</b>	<b>Integrated Laboratory in Physics I</b>	<b>2</b>
<b>Prerequisites: ICPY 101 Physics I</b>		
Lab practice on measurement and uncertainty, propagation of errors, and data analysis for Newton's laws of motion; refraction and diffraction; heat transfer		
<b>ICSC 333</b>	<b>Scientific Research and Presentations</b>	<b>2</b>
<b>Prerequisites: ICBI 121 Biology I, ICMA 252 Biological Statistics Laboratory</b>		
Scientific methods of discovery including developing a hypothesis and testing, experimentation, interpretation of the results; proper format for presenting papers in public and in a scientific forum; practical sessions and participation in scientific seminars included		

### Major Core Courses

<b>ICBI 207</b>	<b>Ethics for Bioscience</b>	<b>4</b>
<b>Prerequisites: ICBI 121 Biology I</b>		
Ethical issues in research in various fields of biology; publications and plagiarism; experiments and research involving human volunteers and experimental animals; medical practices, the design of field and clinical trials		
<b>ICBI 214</b>	<b>General Microbiology</b>	<b>4</b>
<b>Prerequisites: ICBI 121 Biology I</b>		
Co-requisite: ICBI 271 General Microbiology Laboratory		
Structures, physiology and ecology of viruses, bacteria, protozoa and fungi especially bacteria, aspects of microbiology importance in health, sanitation, food processing and industry		



<b>ICBI 271</b>	<b>General Microbiology Laboratory</b>	<b>2</b>
<b>Prerequisites: ICBI 121 Biology I</b>		
<b>Co-requisite: ICBI 214 General Microbiology</b>		
Basic techniques in microbiological experiments; the microscopic examination of microbial cells and spores; simple staining; Gram staining; colony morphology; viable cells count; hemacytometer; cultivation on liquid and solid media; the bacterial identification using selective and differential media		
<b>ICCH 221</b>	<b>Organic Chemistry I</b>	<b>4</b>
<b>Prerequisites: ICCH 102 General Chemistry II</b>		
Concepts and mechanistic considerations of organic chemistry; molecular structures and properties; methane and alkane chemistries; stereochemistry; acyclic compounds; alkyl halides; alkenes; conjugation and resonance; alcohols; ethers and epoxides; alkynes		
<b>ICCH 223</b>	<b>Organic Chemistry Laboratory</b>	<b>2</b>
<b>Prerequisites: ICCH 103 Integrated Laboratory in Chemistry or lecturer permission</b>		
Supplementary organic laboratory practicals for those interested in developing more and advanced organic laboratory techniques through running more advanced organic reactions; Grignard synthesis; Friedel-Crafts; Diazonium salts; Diels-Alder and the spectroscopic analysis		
<b>ICCH 225</b>	<b>Biochemistry</b>	<b>4</b>
<b>Prerequisites: ICBI 121 Biology I, ICCH 221 Organic Chemistry I or lecturer's permission</b>		
Biomolecules, structure, conformation, and functions of proteins and DNA, controls and processes of metabolism at the cellular and molecular levels		
<b>ICCH 226</b>	<b>Biochemistry Laboratory</b>	<b>2</b>
<b>Prerequisites: ICBI 121 Biology I, ICCH 103 Integrated Laboratory in Chemistry and ICCH 221 Organic Chemistry I, or lecturer permission</b>		
Laboratory practicals in biochemistry: physical and chemical properties of biological molecules; DNA protein extractions; enzyme kinetic and activity analysis; buffers; carbohydrate metabolism mechanism		
<b>ICMA 151</b>	<b>Statistics for Science I</b>	<b>4</b>
<b>Prerequisites: Placement test or ICMA 100 Foundation Mathematics</b>		
Statistical ideas and concepts; probability, conditional probability; distribution functions; expected value; estimators, good estimators; hypothesis testing		
<b>ICMA 252</b>	<b>Biological Statistics Laboratory</b>	<b>2</b>
<b>Prerequisites: ICMA 151 Statistics for Science I</b>		
Statistical softwares; probability; hypothesis testing; linear regression; non-parametric statistics		

## Major Required Courses

<b>ICBI 213</b>	<b>Genetics</b>	<b>4</b>
<b>Prerequisites: ICBI 121 Biology I</b>		
DNA as genetic material, Mendelian genetics, chromosomal basis of heredity, complex traits, evolutionary genetics, molecular genetics, formulation of genetic hypotheses		
<b>ICBI 216</b>	<b>Cell Biology</b>	<b>4</b>
<b>Prerequisites: ICCH 225 Biochemistry</b>		
Analysis of the structures and functions of cellular organelles; cellular activities; cell-to-cell interaction and communication with environment		
<b>ICBI 221</b>	<b>Animal Biology</b>	<b>4</b>
<b>Prerequisites: ICBI 121 Biology I</b>		
A survey of the animal kingdom; diversity and ecology of animals; animal structure, function and behavior; demonstrations and practical exercises included		
<b>ICBI 231</b>	<b>Plant Biology</b>	<b>4</b>
<b>Prerequisites: ICBI 121 Biology I</b>		
A survey of the plant kingdom; diversity and ecology of plants; plant structure, function and behavior; demonstrations and practical exercises included		
<b>ICBI 262</b>	<b>Practical Field Ecology and Conservation</b>	<b>4</b>
<b>Prerequisites: ICBI 121 Biology I</b>		
Reviewing ecological literature; formulating research questions; preparing for ecological investigations; characterizing sites; sampling strategies in different habitats; statistical techniques; objective interpretation of data; unambiguous communication of results; field work include		
<b>ICBI 308</b>	<b>Molecular Biology</b>	<b>4</b>
<b>Prerequisites: ICBI 213 Genetics</b>		
Critical thinking styles, brief of key instruments, reviews on basic functional interactions of macromolecules, molecular biology of genes and genomes, genetic engineering and genome analysis; group discussion included		
<b>ICBI 381</b>	<b>Evolutionary Biology</b>	<b>4</b>
<b>Prerequisites: ICBI 308 Molecular Biology, ICCH 225 Biochemistry</b>		
Natural selection; molecular evolution; evolutionary genomics; species and speciation; taxonomy and phylogeny; macroevolution; evolution, coevolution and radiation; biogeography; evolutionary biology and ecology; evolutionary biology and conservation		
<b>ICBI 383</b>	<b>Systematic Biology and Biodiversity</b>	<b>2</b>
<b>Corequisite: ICBI 381 Evolutionary Biology</b>		
Theory and procedures of classical and modern systematic analysis in botanical or zoological systems, based on either morphological or molecular characters; introduction to phylogenetic construction and analysis; character construction and weighting; characters in molecular systematics; ways of evaluating the quality of systematic results in morphological and molecular		

data; the comparative method; cladistic biogeography; coevolution; species concepts; classification and the nomenclatorial codes

**ICBI 499 Research Project and Seminar in Biological Sciences 8**

**Prerequisites: must complete 120 credits before register for this course**

Small research project in biological sciences under supervision of an advisor; proposal and final presentations required to complete this course

**Elective Courses**  
**The Biomedical Science Module**

**ICBI 204 Developmental Biology 4**

**Prerequisites: ICBI 221 Animal Biology**

Embryogenesis; molecular and cellular aspects of differentiation morphogenesis in a variety of vertebrates and invertebrates; comparative study of normal and deviate development in well known mammals

**ICBI 301 Functional Histology 4**

**Prerequisites: ICBI 221 Animal Biology**

Microscopic characteristics of cells, tissues, and organs of the human body; systematic and sequential consideration of fundamental cytology; normal histology of basic tissues; embryological development and microscopic organization of the major organs and organ systems

**ICBI 303 Basic Immunology 4**

**Prerequisites: ICBI 214 General Microbiology, ICBI 216 Cell Biology**

Current understanding of the cellular and molecular interactions in the inductions, expression, and regulation of the cellular and humeral immune responses; recent knowledge and applications concerning immunity to various microbial infections as well as antigen-antibody interactions; serodiagnosis and detection of cell-mediated immune response

**ICBI 305 Human Anatomy I 4**

**Prerequisites: ICBI 221 Animal Biology**

Human anatomy and function; laboratory exercises dissections of human cadavers: head, neck, back, anterior chest wall and upper limb

**ICBI 306 Human Anatomy II 4**

**Prerequisites: ICBI 305 Human Anatomy I**

Human anatomy and function; laboratory exercises dissections of human cadavers: thorax, abdomen, pelvis, perineum and lower limb

**ICBI 307 Nutrition and Dietetics 4**

**Prerequisites: ICCH 225 Biochemistry**

Importance of food and nutrients for good health; significance of physiological, biochemical and sociological factors of nutritional requirements; practical application of food and nutrition to diet planning and implementation suited to vulnerable groups and individual therapeutic needs

<b>ICBI 309</b>	<b>Pathobiology</b>	<b>4</b>
<b>Prerequisites: ICBI 216 Cell Biology</b>		
Pathophysiological mechanism of diseases; cell injury and cell death; inflammation and repair; bacterial, viral, fungal and parasitic infections; disturbances of minerals and pigments; disorders of immune response; disturbance of body fluid and blood flow; fever and hypothermia; cellular differentiation and neoplasia; practical exercises included		
<b>ICBI 311</b>	<b>Human Physiology</b>	<b>4</b>
<b>Prerequisites: ICBI 215 Biochemistry</b>		
Function and control mechanisms of nervous, muscular, circulatory, respiratory, excretory, digestive, endocrine and reproductive systems; their interrelationships in homeostasis; demonstration and practical exercise included		
<b>ICBI 324</b>	<b>Introduction to Medical Toxicology</b>	<b>4</b>
<b>Prerequisites: ICBI 215 General Biochemistry, ICBI 311 Human Physiology</b>		
The process of illness and disease pertaining to the human exposure to drugs, chemicals, gases and heavy metal in non-therapeutic situations, both accidental and intentional and the biotransformation of drugs and chemicals during these situations; basics of life support measures in poisoned patients, skin and gastric decontamination procedures; indications and mechanism of action of specific antidote; enhance elimination; management of chemical hazardous material incidents and mass casualty events involving toxic chemical		
<b>ICBI 328</b>	<b>Essential Pharmacology</b>	<b>4</b>
<b>Prerequisites: ICCH 225 Biochemistry, ICBI 311 Human Physiology</b>		
Basic knowledge regarding the use of drugs and chemicals to treat diseases; drug metabolism; mechanisms of drug actions in the body; indications, contraindications, and cautions in using drugs to treat diseases; adverse drug reactions; drug interactions; pharmacokinetics and pharmacodynamics; basics of how drugs are used to treat diseases of the nervous system, respiratory system, cardiovascular system, and endocrine system integrated with basic knowledge in physiology, immunology, bacteriology, virology, biochemistry, molecular biology, metabolic and biotransformation both in normal and diseased states		
<b>ICBI 332</b>	<b>Medical Microbiology</b>	<b>4</b>
<b>Prerequisites: ICBI 214 General Microbiology, ICCH 225 Biochemistry</b>		
Nature and epidemiology of infectious disease and the role of microorganisms in health and disease; clinical effects of microbial infection on the human host; microorganisms commonly encountered by physician assistants in clinical practice		
<b>ICBI 341</b>	<b>Neurobiology</b>	<b>4</b>
<b>Prerequisites: ICBI 221 Animal Biology</b>		
Developmental neurobiology, neuroanatomy, and neurophysiology; some clinical aspects as the results of neuropathological defects or lesions; practical exercises included		
<b>ICBI 391</b>	<b>Health Psychology</b>	<b>4</b>
<b>Prerequisites: ICBI 121 Biology I, ICCH 225 Biochemistry</b>		
Individual psychology and the ways it affects adjustment to illness; prevention of illness through health promotion		

- ICBI 402      Epidemiology      4**  
**Prerequisites: ICBI 121 Biology I, ICMA 151 Statistics for Science I, ICMA 252 Biological Statistics Laboratory**  
 Prevalence of endemic health problems caused by infectious diseases or non-infectious disorders; diseases of Southeast Asia in comparison with those occur in tropical Africa and America; field studies included
- ICBI 403      Introduction to Tropical Medicine      4**  
**Prerequisites: ICBI 214 General Microbiology**  
 Environmental factors in tropical countries facilitating endemic diseases; geographical distribution and transmission of commonly found diseases caused by microbes, protozoa, and helminthes with special reference to Southeast Asia; non-infectious diseases existing in the region such as nutritional disorders, food poisoning, snake and other venomous bites and stings; prevention of the tropical diseases
- ICBI 404      Molecular Biology Laboratory      2**  
**Co-requisites: ICBI 213 Genetics, ICBI 308 Molecular Biology**  
 A laboratory course focusing on the process of DNA cloning in bacteria; DNA transformation and purification; restriction endonuclease digest and ligation; PCR and gel electrophoresis
- ICBI 405      Community Health      4**  
**Prerequisites: ICBI 207 Ethics for Bioscience**  
 Survey of community health status; primary health care concept; health system analysis and health manpower development; practical sessions in local hospitals and field trips included
- ICBI 406      Ergonomics      2**  
**Prerequisites: ICBI 121 Biology I**  
 Physiological and psychological aspects in the workplace emphasizing raising efficiency of the human, machine and environment interaction; work station design; work posture; manual materials handling; work-rest cycle, and seating
- ICBI 407      Occupational Health and Safety      4**  
**Prerequisites: ICBI 207 Ethics for Bioscience and ICMA 252 Biological Statistics Laboratory**  
 Environmental factors at work regarding workers' health and safety, such as air, water, food, chemical or biological materials handled in the production line, including waste and waste disposal; evaluation harmful effects of such factors for controlling them; prevention of dissatisfaction and risk assessment in the workplace
- ICBI 411      Psychopathology      4**  
**Prerequisites: ICBI 121 Biology I**  
 An introduction / overview to the definition, assessment, and classification of abnormal behavior as well as historical approaches to the understanding and treatment of abnormal behavior; selected forms of psychopathology; major orientations; clinical assessment; psychotherapies and biological treatments; cross-cultural issues dealing with abnormality

**ICCH 222      Organic Chemistry II      4**

**Prerequisites: ICCH 221 Organic Chemistry I**

Concepts of organic reactions through mechanistic approach; aromaticity and electrophilic aromatic substitution; spectroscopy and structure; aldehydes and ketones; carboxylic acids and derivatives; carbanions, amines, phenol and aryl halides; fats; carbohydrates; amino acids

### **The Ecology and Conservation Module**

**ICBI 385      Freshwater Ecology and Conservation      4**

**Prerequisites: ICBI 262 Practical Field Ecology and Conservation OR At the discretion of the instructor**

**Co-requisites: ICBI 386 Practical Freshwater Ecology and Conservation**

Adaptations; behavior; diversity; physiology; ecological roles; trophic interactions; diversity and productivity; influence of catchment; human activities; significance of global climate changes; increasing competition for water resources; sustainable management; conservation measures

**ICBI 386      Practical Freshwater Ecology and Conservation      2**

**Prerequisites: ICBI 262 Practical Field Ecology and Conservation OR At the discretion of the instructor**

Laboratory procedures; field techniques; measuring abiotic conditions; surveying biotic communities; assessing trophic interactions; headwater streams; floodplains; standing waters; evaluating anthropogenic impacts; rehabilitation & restoration; water resource conservation

**ICBI 387      Terrestrial Ecology and Conservation      4**

**Prerequisites: ICBI 262 Practical Field Ecology and Conservation OR At the discretion of the instructor**

**Co-requisites: ICBI 388 Practical Terrestrial Ecology and Conservation**

Adaptations; behaviour; diversity & productivity; physiology; ecological roles; trophic interactions; ecosystems and resources; land-use change; anthropogenic activities; sustainable management; significance of global climate change; conservation measures

**ICBI 388      Practical Terrestrial Ecology and Conservation      2**

**Prerequisites: ICBI 262 Practical Field Ecology and Conservation OR At the discretion of the instructor**

Laboratory and field procedures; experimental design; mapping habitats; measuring abiotic conditions; analysing biotic communities; diversity indices; similarity indices; biotic interactions; behaviour; evaluating anthropogenic impacts; a habitat reconstruction; conservation

**ICBI 440      Marine Ecology and Conservation      4**

**Prerequisites: ICBI 262 Practical Field Ecology and Conservation OR At the discretion of the instructor**

**Co-requisites: ICBI 442 Practical Marine Ecology and Conservation**

Adaptations; behaviour; diversity; physiology; ecological roles; marine ecosystems; marine resources; trophic interactions; human activities; sustainable management; significance of global climate change; coral reef bleaching; reef rehabilitation & restoration; mangrove deforestation & reforestation; conservation measures

**ICBI 442      Practical Marine Ecology and Conservation      2**  
**Prerequisites: ICBI 262 Practical Field Ecology and Conservation OR At the discretion of the instructor**

Laboratory and field procedures; analyzing abiotic conditions; surveying biotic communities; assessing productivity; evaluating anthropogenic threats

**ICBI 443      Fungal Ecology      4**  
**Prerequisites: ICBI 231 Plant Biology**

Ecology of fungi and fungi-like microorganisms (slime molds and water molds); importance in food chains; nutrient recycling; morphology and physiology; nutrition and metabolism; growth and differentiation; reproduction and life cycles; classification; ecological roles; culture collection; advantages of fungi and fungal products

### **The Biotechnology Module**

**ICBI 315      Microbial Physiology and Genetics      4**  
**Prerequisites: ICBI 214 General Microbiology**

Microbial growth; metabolism; microbial structures and functions; gene structure regulation of microbial metabolism; microbial genetic structure; maintenance, expression, and exchange of genetic materials in microbial cells

**ICBI 316      Environmental Microbiology      4**  
**Prerequisites: ICBI 214 General Microbiology**

Fundamental aspect of microbial physiology and ecology; influence of environment on microorganisms; effect of microbial metabolic processes on the environment, biogeochemical cycle, microbial activity in augmentation

**ICBI 372      Utilization of Water and Wastewater Treatment      4**  
**Prerequisites: ICBI 121 Biology I**

Principles and methods in treatment and utilization of water and wastes; basic concepts of water and wastewater treatment; treatment of wastes from food and beverage industries

**ICBI 404      Molecular Biology Laboratory      2**  
**Co-requisites: ICBI 214 Genetics, ICBI 308 Molecular Biology**

A laboratory course focusing on the process of DNA cloning in bacteria; DNA transformation and purification; restriction endonuclease digest and ligation; PCR and gel electrophoresis

**ICBI 414      Industrial Microbiology      4**  
**Prerequisites: ICBI 214 General Microbiology**

Physiology, nutrition and growth of microorganisms important to various industries; control of microbial growth in industrial production process; application of microorganisms in production of cells, primary and secondary metabolites

**ICBI 415      Biotechnology      4**  
**Prerequisites: ICBI 214 General Microbiology, ICBI 225 Biochemistry**

Technology and the applications of scientific principles in relation to animals, plants, microorganisms; production of cellular compounds in public health, agriculture and industry

- ICBI 432 Plant Biotechnology 4**  
**Prerequisites: ICBI 231 Plant Biology**  
 Concepts of plant biotechnology; quality and quantity improvement of plant and their products; technique for micropropagation, germplasm collection, bioactive compound from plants; technology for crop improvement
- ICBI 433 Fermentation Technology 4**  
**Prerequisites: ICBI 214 General Microbiology or ICFS 213 General Microbiology for Food Science and technology, or equivalent**  
 Principle of biological fermentation process; submerged fermentation; solid state fermentation; disinfection of the equipment; factors affecting the process; raw material for fermentation; media design, optimization of fermentation condition; process control, downstream processing; quality control of products
- ICBI 434 Food Biotechnology 4**  
**Prerequisites: ICCH 225 Biochemistry**  
 Concept of food biotechnology; food components and qualities of food; chemical property of food; biochemical changes in food; condition and factors affecting the process and quality of food; food sanitation and hygiene; food preservation; industrial process for food production: e.g. flour, oil, meat, dairy, cereal products, etc.
- ICBI 435 Molecular Techniques in Biotechnology 4**  
**Prerequisites: ICCH 226 Biochemistry Laboratory, ICBI 213 Genetics, ICBI 308 Molecular Biology**  
 Current techniques in DNA manipulations; genomic; transcriptomic and proteomic; molecular techniques in real applications
- ICBI 436 Industrial Enzymology 4**  
**Prerequisites: ICBI 214 General Microbiology, ICCH 225 Biochemistry**  
 Industrial applications of enzyme in: alcohol production, analytic enzymes, animal feed, baking, brewing, cheese and whey, chemical biotransformation, detergents, effluent and waste treatment, fruit juices, immobilized enzymes, leather, olive and other edible oils, protein modification, pulp and paper, textiles, and wine; experimental practice imitates the research process to discover a new product of enzyme from bacteria: i.e. isolation and selection, optimization for growth and production, purification, immobilization of the enzyme, enzyme assay
- ICBI 437 Current Issues in Biotechnology 2**  
**Prerequisites: ICBI 214 General Microbiology, ICCH 225 Biochemistry**  
 Recent advances in biotechnology research and development; Bioinformatics; local and foreign expert guest speakers
- ICBI 461 Cell Technology 4**  
**Prerequisites: ICBI 216 Cell Biology**  
 Structure, growth and function of plant and animal cells; technology involved in cell and tissue culture; cell preservation; protoplast culture and fusion; cell cloning and fusion; monoclonal



antibody production; breeding and genetic engineering; applications of stem cells for agriculture and therapeutic purposes

**ICCH 222      Organic Chemistry II      4**

**Prerequisites: ICCH 221 Organic Chemistry I**

Concepts of organic reactions through mechanistic approach; aromaticity and electrophilic aromatic substitution; spectroscopy and structure; aldehydes and ketones; carboxylic acids and derivatives; carbanions, amines, phenol and aryl halides; fats; carbohydrates; amino acids

**ICCH 200      Analytical Chemistry A      4**

**Prerequisites: ICCH 102 General Chemistry II**

Separation techniques and concepts of modern analytical methods essential for quantitative and qualitative characterization; treatment of the analytical data; principles and applications of chemical equilibria; electrochemical methods; separation methods; practical exercises involving infrared spectrometry, UV-vis spectrometry, gas chromatography-mass spectrometry

**ICCH 201      Analytical Chemistry B      4**

**Prerequisites: ICCH 102 General Chemistry II**

An introduction to the concepts of modern analytical methods for the quantitative and qualitative analyses and molecular structure characterisation; gas and liquid chromatography, molecular absorption and emission spectroscopy; atomic absorption and emission spectroscopy; an introduction to nuclear magnetic resonance; concept and standards of quality assurance

**Major Electives that may be applied to any module**

**ICBI 211      Genetics and Molecular Biology I      4**

**Prerequisites: ICBI 121 Biology I**

An introductory course to genetics and Molecular Biology, which provides a deeper information on genes/chromosome as inheritable elements, processes of Mitosis and Meiosis, DNA mutations, Mendelian Genetics and Central Dogma

**ICBI 355      Geographic Information Systems      2**

**Prerequisites: ICBI 2 1 1 Genetics and Molecular Biology I, ICMA 2 5 2 Biological Statistics Laboratory or ICCS 161 Introduction to Data Science**

Basic concepts and techniques of Geographic Information Systems (GIS); applications of GIS

**ICBI 380      Introduction to Systems Biology and Bioinformatics      4**

**Prerequisites: ICBI 2 1 1 Genetics and Molecular Biology I, ICMA 2 5 2 Biological Statistics Laboratory or ICCS 161 Introduction to Data Science**

An introduction to computational and mathematical modeling of complex interaction within biological systems; biological databases; information archiving and retrieval and tools for molecular sequence analysis

- ICBI 464 Entrepreneurship and Innovation in Science 4**  
**Prerequisites: must complete at least 120 credits before register for this course**  
 Developing the entrepreneur mindset through life science and innovation; from academia to entrepreneur, current trends in biomedical industry; how to do a startup project; find opportunities and passion driving innovation; considering factors for successful entrepreneurship, including business plans, finding funds, regulatory requirements, market needs; ethics and professionalism; intellectual property and risks
- ICBI 465 Internship in Biological Sciences A 4**  
**Prerequisites: Students must complete at least 120 credits and placement will be subjected to the internship policy of the Biological Science Program**  
 Internship in the area of biological sciences under supervision
- ICBI 466 Internship in Biological Sciences B 12**  
**Prerequisites: Students must complete at least 120 credits and placement will be subjected to the internship policy of the Biological Science Program**  
 Internship in the area of biological sciences under supervision
- ICBI 471 Special Topics in Biological Sciences A 4**  
**Prerequisites: -**  
 Experience and knowledge equivalent to 4-trimester credits from biological science and related courses taken at other qualified universities and institutions; subject to approval by the Program Director of Biological Sciences
- ICBI 472 Special Topics in Biological Sciences B 4**  
**Prerequisites: -**  
 Experience and knowledge equivalent to 4-trimester credits from biological science and related courses taken at other qualified universities and institutions; subject to approval by the Program Director of Biological Sciences
- ICBI 473 Special Topics in Biological Sciences C 4**  
**Prerequisites: -**  
 Experience and knowledge equivalent to 4-trimester credits from biological science and related courses taken at other qualified universities and institutions; subject to approval by the Program Director of Biological Sciences
- ICBI 474 Special Topics in Biological Sciences D 4**  
**Prerequisites: -**  
 Experience and knowledge equivalent to 4-trimester credits from biological science and related courses taken at other qualified universities and institutions; subject to approval by the Program Director of Biological Sciences
- ICBI 475 Special Topics in Biological Sciences E 4**  
**Prerequisites: -**  
 Experience and knowledge equivalent to 4-trimester credits from biological science and related courses taken at other qualified universities and institutions; subject to approval by the Program Director of Biological Sciences

<b>ICBI 481</b>	<b>Current Issues in Biological Sciences A</b>	<b>2</b>
<b>Prerequisites: -</b>		
Experience and knowledge equivalent to 2-trimester credits from biological science and related courses taken at other qualified universities and institutions; subject to approval by the Program Director of Biological Sciences		
<b>ICBI 482</b>	<b>Current Issues in Biological Sciences B</b>	<b>2</b>
<b>Prerequisites: -</b>		
Experience and knowledge equivalent to 2-trimester credits from biological science and related courses taken at other qualified universities and institutions; subject to approval by the Program Director of Biological Sciences		
<b>ICBI 483</b>	<b>Current Issues in Biological Sciences C</b>	<b>2</b>
<b>Prerequisites: -</b>		
Experience and knowledge equivalent to 2-trimester credits from biological science and related courses taken at other qualified universities and institutions; subject to approval by the Program Director of Biological Sciences		
<b>ICMA 213</b>	<b>Calculus II</b>	<b>4</b>
<b>Prerequisites: ICMA 106 Calculus I</b>		
Derivatives of logarithmic and exponential functions; techniques of integration; improper integrals and indeterminate forms; applications of the derivative and integration; infinite series; functions of several variables; limits and continuity; partial derivatives.		
<b>ICPY 102</b>	<b>Physics II</b>	<b>4</b>
<b>Prerequisites: ICPY 101 Physics I</b>		
Oscillations and wave; light and sound; Thermodynamics; electricity and magnetism; Modern Physics		
<b>ICPY 496</b>	<b>Biophysics</b>	<b>4</b>
<b>Prerequisites: ICBI 121 Biology I</b>		
Introduction to biophysics; physical methods in the study of biological systems, including molecular and cellular biology; mathematical modeling of biological phenomena; applications of physics to biology; instruments in biophysics.		