

in animals, plants and micro-organisms. Sufficient organic chemistry is provided for understanding of these principles.

## B

### BIOCHEMISTRY

#### BIOC 241 Fundamentals of Biochemistry (3)

##### KCC AA/DP

3 hours lecture per week

Prerequisite(s): MATH 25 or equivalent.

Recommended Preparation: High school science.

BIOC 241 focuses on the fundamentals of general, inorganic, and bioorganic chemistry as they apply to living systems.

Upon successful completion of BIOC 241, the student should be able to:

- Use the metric system and scientific notation.
- Understand modern theories of atomic structure and radioactivity.
- Understand the periodic table and how it is used to predict chemical reactivity.
- Understand modern concepts of chemical bonding.
- Write chemical formulas and names.
- Use kinetic molecular theory to explain chemical phenomena.
- Perform calculations using the mole concept.
- Write and balance chemical equations.
- Perform calculations in stoichiometry.
- Understand the concept of equilibrium.
- Understand acid-base theory and pH.
- Understand solution chemistry and the behavior of dissolved substances.
- Name the basic types of organic molecules.
- Explain the physical and chemical properties of hydrocarbons.
- Explain the physical and chemical properties of the major organic functional groups.

#### BIOC 244 Essentials of Biochemistry (3) KCC

##### AA/DP and KCC AS/NS

3 hours lecture per week

Prerequisite(s): BIOC 241, CHEM 151 or CHEM 161.

BIOC 244 focuses on chemical principles and concepts of living systems. The composition, function, and transformation of biological substances

Upon successful completion of BIOC 244, the student should be able to:

- Distinguish between the 3 major types of chemical bonds and give examples.
- Draw Lewis electron-dot formulae for molecules.
- Predict bond angles for molecules.
- Describe how molecules bond by way of overlapping orbitals (Valance Bond Theory).
- Be able to draw pictures of and name 20 common organic functional groups.
- Explain why simple structural formula drawings and electron-dot formulae don't always accurately describe the geometry of a molecule.
- Draw structural diagrams and condensed formulas for 16 different types of organic compounds. The 16 types are: alkanes, cycloalkanes, alkenes, alkynes, aromatic, alcohols, ethers, thiols, phenols, aldehydes, ketones, acids, esters, amides, anhydrides, and amines.
- Name molecules using the IUPAC system from the 16 major classes of compounds having been shown the condensed formula.
- Draw all structural isomers of a molecule having been shown its formula.
- Distinguish between structural, geometric, and optical isomers.
- Distinguish between the physical and chemical properties of the 16 important types of organic compounds.
- Draw the products of a chemical reaction given the reacting organic molecule and the chemical reagents.
- Explain by word and drawings the resonance structures of benzene and other aromatic compounds.
- Explain how the presence of one or more asymmetric carbons leads to optical activity.
- Draw the optical isomer(s) of a given molecule.
- Explain the terms racemate and racemic mixture.
- Explain how optical isomerism operates in the biological world-especially with respect to enzymes.
- Predict the products of an oxidation-reduction reaction starting with primary and secondary alcohols, aldehydes, and ketones.
- Show with chemical reactions how the Tollens and Benedicts Tests distinguish

aldehydes and ketones.

- Draw the formula of a fat.
- Distinguish between saturated and unsaturated fatty acids.
- Show with a diagram how a soap cleans grease.
- Distinguish between the relative reactivities of esters, amides, and anhydrides.
- Show how a claisen condensation reaction occurs between 2 ester molecules.
- Show how an aldol condensation occurs between 2 reactants. Distinguish between primary, secondary, and tertiary amines.
- Define an acid and a base.
- Describe the pH scale.
- Calculate the pH of a solution of a: weak acid, strong acid, weak base, strong base and buffer
- Calculate the pH of a buffer using the Henderson-Hasselbalch Equation.
- Distinguish between carbohydrates, proteins and fats.
- Draw both the straight chain and cyclic structures of glucose.
- Describe the bonding between sugar molecules in disaccharides and polysaccharides.
- Distinguish between essential and non-essential amino acids.
- Draw a peptide bond. Show the chemical reaction for how one forms.
- Distinguish between primary, secondary, tertiary and quaternary structure in proteins.
- Distinguish between peptides, polypeptides, and proteins.
- Describe how a catalyst works.
- Show with a drawing why enzymes catalyze only very specific chemical reactions. Relate this to optical activity.
- Show how lipids function as cell membranes. Explain why they exclude water.
- Show by drawings the overview of the following metabolic pathways: glycolysis, Krebs Cycle, glycogenesis, glycogenolysis, gluconeogenesis, hexose monophosphate shunt, fatty acid oxidation spiral, fatty acid synthesis, transamination, oxidative phosphorylation and oxidative deamination.
- Explain why and how ATP is a source of such high energy in the body.
- Explain how ATP can be used to drive chemical reactions which have a positive (unfavorable) free energy.
- Be able to draw all activation steps for the following: synthesis of fatty acids, breakdown (oxidation) of fatty acids and formation of acetyl coenzyme-A before entering the Krebs Cycle.

## BIOLOGY

### **BIOL 20 Beginning Biology (3) (Inactive)**

*3 hours lecture per week*

BIOL 20 is a non-laboratory course covering the cell, representative plants and animals, mammalian structure and function, heredity and evolution.

Upon successful completion of BIOL 20, the student should be able to:

- Describe a cell and its parts and functions.
- Explain how green plant structure has adapted to convert solar energy to the usable chemical bond energy trapped in carbohydrates.
- Describe the basic macromolecules that organisms use to meet their nutritional requirements and how they are synthesized and degraded.
- Describe how the parts of an organism's tissue and organ systems help to maintain that organism.
- Explain asexual and sexual reproductive patterns in plants and animals including development.
- Describe Mendelian Genetics.
- Discuss the theory of evolution.
- Examine the interrelationship of abiotic and biotic factors on the balance of nature.
- Relate the sources and the effects of pollutants to the quality of the environment.

### **BIOL 22 Human Anatomy and Physiology (3) (Inactive)**

*3 hours lecture per week*

BIOL 22 focuses on the structure and function of the human body, including reproduction. A non-laboratory course for students with no previous work in chemistry or physics.

Upon successful completion of BIOL 22, the student should be able to:

- Describe the detailed structure and composition of the human body.
- Explain the functions of body parts and the interrelation of their structure with function.
- Discuss the levels of biological organization within the body: cells, tissues, organs and the organ systems.

- Demonstrate an intimate familiarity with the 10 major organ systems: epithelial, skeletal, muscular, nervous, circulatory, endocrine, respiratory, digestive, urinary and reproductive.
- Describe the effects of medical advancements in diagnosis and treatment on health and well-being.

**BIOL 101 Introduction to Science: Biological Sciences (3) KCC AA/DB and KCC AS/NS**

*3 hours lecture per week*

*Recommended Preparation: CHEM 100 or higher level chemistry course.*

BIOL 101 introduces students to the characteristics of science, historical development of scientific concepts, and interaction of society with science. BIOL 101 is illustrated by topics from the biological sciences.

Upon successful completion of BIOL 101, the student should be able to:

- Appreciate the complexities and interrelationship in nature.
- Understand major biological concepts including evolution, classification, cell structure and function, genetics, energy acquisition and utilization, human biology and ecology.
- Understand the scientific process, its characteristics, its limitations, and its place in society.
- Make informal decision on biologically-related issues.

**BIOL 101L Introduction to Science: Biological Sciences Laboratory (1) KCC AA/DY**

*3 hours lab per week*

*Prerequisite(s): Credit or concurrent enrollment in BIOL 101.*

*Recommended Preparation: CHEM 100 or higher level chemistry course.*

BIOL 101L includes laboratory experiments illustrating topics in the biological sciences.

Upon successful completion of BIOL 101L, the student should be able to:

- List the sequence of steps followed in the scientific methods and understand the logic and significance of each step.

- Describe the many applications of the scientific method to everyday life.
- Demonstrate the proper techniques and procedures for microscopy, magnification, scientific illustrations, dissection, genetics, sampling techniques, and other pertinent biological laboratory experiments.

**BIOL 103 Principles of Zoology (3) KCC AA/DB and KCC AS/NS (Inactive)**

*3 hours lecture per week*

*Recommended Preparation: CHEM 100 or higher.*

BIOL 103 is an introductory course in the biology of animals. Topics covered will include basic chemistry, cell biology, genetics, evolution, diversity, systematics, ecology, reproduction, development, and animal morphology, physiology, and behavior.

Upon successful completion of BIOL 103, the student should be able to:

- Describe the atomic and molecular bases of tissues.
- Draw an animal cell, label its parts and list their functions
- Solve monohybrid and multihybrid genetics problems involving complete dominance, codominance, multiple alleles, and sex-linked traits.
- Explain the basic principles of evolution, and the different forms that it takes.
- Connect the unique anatomical features of animals with their respective phyla and class, and list the functions of those anatomical features.
- Explain the principles of ecology, with a focus on consumers.
- Describe the animal organ systems, list their respective parts and their functions.
- Explain the principles of animal behavior

**BIOL 103L Principles of Zoology Laboratory (1) KCC AA/DY (Inactive)**

*3 hours lab per week*

*Prerequisite(s): Credit or concurrent enrollment in BIOL 103.*

The BIOL 103L course includes laboratory observations, dissections, and experiments to illustrate basic principles of animal biology.

Upon successful completion of BIOL 103L, the student should be able to:

- Describe and apply the scientific method as a mode of inquiry.
- Apply concepts presented in lecture to data collected in lab exercises.
- Demonstrate the proper use of dissecting tools, the microscope, stereo microscope, transect and quadrat, and other equipment as available.
- Demonstrate proper dissection procedures used for various available specimens.
- Identify structures and organs revealed by dissection.
- Correlate the anatomical patterns and functions presented in lecture with the structures of the dissection specimens.

**BIOL 120 Anatomy & Physiology of the Human Body (3) KCC AA/DB and KCC AS/NS**  
3 hours lecture per week

BIOL 120 is an introductory level human anatomy and physiology course focusing on the structure of the organ systems of the human body. Course material consists of human anatomical organization, tissues, terminology, and concepts, and major functions.

Upon successful completion of BIOL 120, the student should be able to:

- Name the parts and major functions of the ten human organ systems: integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, respiratory, digestive, urinary, and reproductive.
- Define the anatomical terms of direction, region, and plane.
- Classify and locate in the human body, the four tissue types.
- Classify and locate in the human body, the common epithelial types.
- Describe the cellular organelles and their respective functions.
- Order the stages of mitosis and meiosis.
- Identify the human body cavities and their contents.
- Solve clinical application problems relevant to course material.

**BIOL 130 Anatomy and Physiology (4) KCC AA/DB and KCC AS/NS**

4 hours lecture per week

*Recommended Preparation: CHEM 100 or higher or biochemistry course; a college level biology or zoology course.*

BIOL 130 focuses on the structure and function of the human body which includes a study of its gross anatomy, microanatomy, physiology, pathology, and pathophysiology.

Upon successful completion of BIOL 130, the student should be able to:

- Describe the structural and functional relationships of the body as a whole, its systems, and its organs.
- Analyze the structure and function of the cell and its interactions with the environment.
- Discuss the structure of the skeletal and muscular organs and relate to locomotion and support.
- Describe the ultrastructure of skeletal muscle and the mechanism of muscular contraction.
- Describe the anatomy and physiology of the endocrine system, and relate hormonal regulation to the pathophysiology of the body.
- Describe the role of the nervous system in functional control of the body, describe the nerve impulse mechanism, understand the role of the autonomic nervous system in homeostatic maintenance, and analyze the integration of sensation.
- Discuss the anatomical structures and components of the cardiovascular and lymphatic systems, and demonstrate an understanding of cardiovascular and immune physiology.
- Describe the anatomical structures of the respiratory system and demonstrate an understanding of pulmonary physiology.
- Describe the anatomy of the digestive system, and analyze the physiological changes of the digestive process.
- Describe the anatomy of the urinary system, and explain how the urinary organs function in the removal of cellular wastes from the blood and transport the wastes from the body.
- Demonstrate an understanding of the role of fluids, the movement of ions, and acid-base balance in maintaining the homeostasis of the body.
- Describe the anatomical structures of the reproductive system and their functions, including the human sexual response.

**BIOL 130L Anatomy and Physiology Laboratory (1) KCC AA/DY**

3 hours lab per week

*Recommended Preparation: Credit or concurrent enrollment in BIOL 130.*

BIOL 130L focuses on gross and microscopic anatomy of the human body with special emphasis upon the skeleton, muscles, heart and blood vessels, and the nervous system.

Upon successful completion of BIOL 130L, the student should be able to:

- Identify the anatomical structures of the muscular, skeletal, nervous, hormonal, circulatory, respiratory, digestive, urinary, and reproductive systems.
- Describe the position and structural relationships of the anatomical components of the muscular, skeletal, nervous, hormonal, circulatory, respiratory, digestive, urinary and reproductive systems.

### **BIOL 171 General Biology I (3) KCC AA/DB and KCC AS/NS**

*3 hours lecture per week*

*Recommended Preparation: BIOC 241, CHEM 100, CHEM 151 or CHEM 161.*

BIOL 171 provides the beginning student with a background in the fundamentals of the Biological Sciences. It is suitable for students preparing for careers in medical technology, nursing, the life sciences, and medicine.

Upon successful completion of BIOL 171, the student should be able to:

- Define the basic principles held in common among the diversity of Biological Sciences.
- Describe the fundamentals of the genetics of natural selection; its history, its influence on modern biological thinking and research, and competing explanations of evolution.
- Apply knowledge of inorganic and biological chemistry principles to cell biology, metabolism, and the origin of life.
- Describe cell structure and cell metabolism.
- Describe the distinguishing characteristics of microorganisms: prokaryotes, viruses, protists, and fungi.
- Demonstrate knowledge of the metric system and scientific notation.

### **BIOL 171L General Biology I Lab (1) KCC AA/DY**

*3 hours lab per week*

*Prerequisite(s): Credit or concurrent enrollment in BIOL 171.*

BIOL 171L is intended to provide the beginning student with selected laboratory experiences concerning the fundamentals of Biological Science. The focus of the lab exercises will be organic molecules, and cell structure and function.

Upon successful completion of BIOL 171L, the student should be able to:

- Demonstrate approved techniques of handling laboratory specimens and equipment.
- Record data accurately and in proper form.
- Describe the characteristics and properties of cellular structures and biomolecules studied in the laboratory.
- Design and use dichotomous keys.
- Understand the principles of population genetics, and solve multihybrid and sex-linked genetics problems.

### **BIOL 172 General Biology II (3) KCC AA/DB and KCC AS/NS**

*3 hours lecture per week*

*Prerequisite(s): BIOL 171 or instructor consent.*

BIOL 172 provides the beginning student with the second part of the fundamentals of the Biological Sciences. It is suitable for students preparing for careers in medical technology, nursing, the life sciences, and medicine.

Upon successful completion of BIOL 172, the student should be able to:

- Demonstrate basic knowledge of Botany - The Plant Kingdom: evolution and diversity of plants, reproduction and development in plants, transport mechanisms of plants, and regulation and control in plants.
- Demonstrate basic knowledge of the Animal Kingdom (including humans): evolution and diversity (including taxonomy and systematics), support and movement, digestion and nutrition, respiration, circulation and immunity, homeostasis - thermoregulation, osmoregulation, and excretion, endocrine systems, neurons and nervous systems, sexual reproduction and development.

- Discuss the principle concepts of animal behavior: evolutionary considerations, mechanisms of behavior and developmental behavior, comparative animal behavior.
- Discuss the principles of Ecology: biosphere and biomes, communities and ecosystems, populations and environmental interactions.

### **BIOL 172L General Biology II Lab (2) KCC AA/DY**

*3 hours lab per week*

*Prerequisite(s): Credit or concurrent enrollment in BIOL 172.*

BIOL 172L is intended to provide the beginning student with further laboratory experiences in the fundamentals of Biological Science. The focus of the lab exercises will be microbes, plants, and animals.

Upon successful completion of BIOL 172L, the student should be able to:

- Demonstrate approved techniques of handling laboratory specimens and equipment.
- Record data accurately and in proper form.
- Recognize the characteristics of the various taxonomic groups of plants and animals.
- Describe and recognize the structural features and physiological functions of selected plants and animals, with emphasis on human anatomy and physiology.
- Describe the physical, chemical and biological features of selected ecological systems.

### **BIOL 265 Ecology and Evolutionary Biology (3) KCC AA/DB**

*3 hours lecture per week*

*Prerequisite(s): BIOL 172.*

*Comment: BIOL 265 may not be audited.*

BIOL 265 is an introduction to the underlying principles of ecology and evolution. Unique communities that have evolved in Hawai'i are included in the course.

Upon successful completion of BIOL 265, the student should be able to:

- Apply the appropriate terminology when describing, explaining, and applying ecological theory.

- Summarize abiotic environmental features including climate, soil and geographical structure.
- Identify the biological and physical structures of ecosystems, major biogeochemical cycles, and energy flow.
- Examine the basic principles of population dynamics including birth and mortality rates, population growth models, life history strategies, competition and carrying capacity.
- Define the interactions within communities including interspecific competition, predation, and mutualism.
- Describe the evolutionary adaptations of organisms to their environment.
- Give examples of evolutionary principles that produced unique island communities.
- Evaluate the impact of habitat alteration and destruction, loss of biodiversity, and effects of alien species.
- Interpret and produce tabular and graphical representations of information, including tables, graphs, and maps.
- Locate and critique the value of printed and online resources.
- Evaluate the consequences of population growth, increased resource use and pollution on global ecosystems.

### **BIOL 265L Ecology and Evolutionary Biology Lab (1) KCC AA/DY**

*Prerequisite(s): BIOL 172; credit or concurrent enrollment in BIOL 265.*

*Comment: BIOL 265L may not be audited.*

BIOL 265L is a laboratory that accompanies BIOL 265 and emphasizes investigation of local environments.

Upon successful completion of BIOL 265L, the student should be able to:

- Use correctly the standard field and laboratory techniques and equipment of environmental assessment.
- Design and carry out experiments that test hypotheses about environmental questions.
- Record observations, make interpretations, synthesize results of assessment of ecological

phenomena and effectively communicate findings.

- Summarize the roles of different organisms in an ecosystem.
- Distinguish between transient and dynamic flows of energy and nutrients in the environment.
- Evaluate and describe populations in terms of abundance and spatial distribution.
- Identify current environmental problems in Hawai'i.
- Explain and give examples of the problems associated with the introduction of alien species into Hawai'i.

### **BIOL 275 Cell and Molecular Biology (3) KCC AA/DB**

*3 hours lecture per week*

*Prerequisite(s): BIOL 171; BIOL 171L; BIOL 172; BIOL 172L; CHEM 272; or instructor consent*

*Recommended concurrent: BIOL 275L.*

*Comment: BIOL 275 was formerly BIOL 270.*

BIOL 275 is a course in cell and molecular biology for life science majors. This course is designed to give the student a fundamental understanding of the structure and biochemistry of eucaryotic and procaryotic cells. The course also covers the basic principles of molecular biology and includes modern advances in biotechnology, recombinant DNA technology and bioinformatics.

Upon successful completion of BIOL 275, the student should be able to:

- Describe, in detail, the organization of life at the cellular and subcellular levels and explain the experiments that developed this knowledge.
- Describe the structure and function of biological membranes and the processes that occur at cell surfaces and explain the experiments that developed this knowledge.
- Describe, in detailed and specific terms, the fundamental processes that occur in respiration and photosynthesis.
- Describe the fundamental principles of molecular biology and molecular genetics as they relate to the inheritance of genetic traits; the structure, replication and repair of DNA; and the transcription, processing and translation of RNA. Explain the experiments that developed this knowledge.
- Describe the fundamental principles of

molecular biology and molecular genetics as they relate to biotechnology; the laboratory manipulation of DNA, RNA and proteins; and the ethical issues surrounding such research and applications.

- Describe the molecular structures and the biochemistry of the cytoskeleton, intracellular traffic and motility and explain the experiments that developed this knowledge.
- Describe the basic processes involved in intracellular and intercellular signaling and how these processes impact the cell cycle and cancer theory. Explain the experiments that developed this knowledge.
- Describe the theories explaining the development of eucaryotes and the evolution of multicellular organisms.

### **BIOL 275L Cell and Molecular Biology Lab (2) KCC AA/DY**

*4 hours lecture/lab per week*

*Prerequisite(s): BIOL 171; BIOL 171L; BIOL 172; BIOL 172L; CHEM 272; credit or concurrent enrollment in BIOL 275; or instructor consent.*

*Comment: BIOL 275L is cross-listed as MICR 240. BIOL 275L was formerly BIOL 270L.*

BIOL 275L is a lecture/laboratory in cell and molecular biology for life science majors. This course is taken either concurrently or after BIOL 275. Through lectures and laboratory exercises, students will acquire a fundamental understanding of the biochemistry of the cell. Students will also acquire competence in tissue culture and experience with modern advances in biotechnology and recombinant DNA technology.

Upon successful completion of BIOL 275L the student should be able to:

- Prepare media and buffers needed for the culture of animal, plant and microalgae cells.
- Demonstrate proficiency in the specialized sterilization and quality control procedures used in a tissue culture laboratory.
- Demonstrate proficiency in routine cell culture protocols such as feeding schedules and medium supplements, subcultivation procedures, cell enumeration and viability testing, cryopreservation, and the detection and disposition of contaminated cultures.
- Demonstrate knowledge of the basic principles of protein chemistry by applying these principles in the designing and reporting of experiments utilizing enzymatic reactions, electrophoresis and immunoassays.

- Demonstrate knowledge of the basic principles of DNA structure, function, and chemistry by applying these principles in the designing and reporting of experiments utilizing DNA extraction and purification, electrophoresis, restriction enzyme analysis, DNA amplification, sequencing, and sequence analysis using standard bioinformatics databases and analysis protocols.
- Describe in detail the organization of life at the cellular and subcellular levels.
- Describe the structure and function of biological membranes and demonstrate an understanding of the processes which occur at the cell surface.
- Describe in detailed and specific terms the fundamental catabolic and anabolic metabolic processes that occur at the cellular level.
- Describe and experimentally manipulate the cytoskeleton particularly as it relates to intracellular traffic, cytokinesis and cell motility.
- Describe and experimentally manipulate the basic processes involved in cell signaling and the cell cycle and define the role of these processes in cell differentiation and in cancer.
- Describe the theories explaining the development of eukaryotes and the evolution of multicellular organisms.
- Describe and debate the ethical issues surrounding existing and proposed research and applications using living cells.

- Know the unique anatomical characteristics of major plant groups and relate these structures to the functions they perform.
- Demonstrate the basic knowledge of plant genetics and evolution of floral structures in terms of ecology and morphology.
- Develop a balanced and pragmatic knowledge in Botany.

### **BOT 101L General Botany Laboratory (1) KCC AA/DY**

*3 hours lab per week*

*Prerequisite(s): Credit or concurrent enrollment in BOT 101.*

BOT 101L focuses on laboratory observations and experiments illustrating basic principles of plant biology.

Upon successful completion of BOT 101L, the student should be able to:

- Demonstrate the ability of critical thinking and logical reasoning through the use of the scientific method.
- Work independently or in groups in the laboratory by performing observations, drawings, dissections and behavioral objectives.
- Cultivate responsibility and mutual respect for each other, especially during the discussions.

## **BOTANY**

### **BOT 101 General Botany (3) KCC AA/DB and KCC AS/NS**

*3 hours lecture per week*

BOT 101 is an introduction to the structure, growth, functions and evolution of plants. Plant relationships to the environment and particularly plant relationships to humans and human activities will be analyzed in BOT 101.

Upon successful completion of BOT 101, the student should be able to:

- Demonstrate the knowledge of the important biological concepts and theories (as: cell theory, energy flow, photosynthesis, growth, reproduction, etc.) and recognize that they may be explained in terms of the natural laws of physics and chemistry.

### **BOT 105 Ethnobotany (3) KCC AA/DS and KCC AS/SS**

*3 hours lecture per week*

BOT 105 is an introduction to plants and their influence upon the culture of Hawai'i and the Pacific. In BOT 105 the uses of cultivated and wild plants of the world are described.

Upon successful completion of BOT 105, the student should be able to:

- Demonstrate the knowledge of habits, habitats, reproductions and interactions of plants and their environment.
- Identify the role and influence played by plants on the culture of Hawai'i and Pacific.
- Demonstrate a knowledge of the economic importance and ecology of cultivated as well as the wild plants in the world.

- Understand and appreciate the complete dependence of all living things on plants.

### **BOT 130 Plants in the Hawaiian Environment (3)**

#### **KCC AA/DB and KCC AS/NS**

*3 hours lecture per week*

BOT 130 is an introduction to the plant species and communities of the Hawaiian ecosystems. It discusses the plant's evolution, ecology, and economic values to humans. It also includes the observations and systematics of native and introduced flora.

Upon successful completion of BOT 130, the student should be able to:

- Discuss the geologic history of the Hawaiian Islands.
- Discuss the arrival and establishment of native and introduced species.
- Discuss the major Hawaiian ecosystems.
- Discuss variations of plant parts, especially parts and functions.
- Recognize common native and introduced plant species.
- Discuss the ecology and economic values of native/introduced species.
- Recognize the effects of humans on the flora of the Hawaiian Islands.

### **BOT 130L Plants in the Hawaiian Environment Laboratory (1) KCC AA/DY**

*3 hours lab per week*

*Prerequisite(s): Credit or concurrent enrollment in BOT 130.*

BOT 130L focuses on observations of plant species, populations and communities as they interact with their environment through field survey methodologies and field trips. Students will become familiar with the taxonomy and ecology of native and introduced species.

Upon successful completion of BOT 130L, the student should be able to:

- Demonstrate the ability of critical thinking and logical reasoning through the use of scientific method.
- Work independently or in-groups in the laboratory by performing observations, dissections and completing behavioral objectives for each lab exercise.

- Recognize the major plant families.
- Recognize and identify economic plants.
- Discuss the effects of environmental factors on plant distribution and dispersal.

### **BOT 201 Plant Evolutionary Diversity (3) KCC AA/DB**

*3 hours lecture per week*

*Prerequisite(s): BOT 101, college general biology, or consent of instructor.*

*Corequisite(s): BOT 201L.*

BOT 201 discusses evolutionary trends in the plant world, including reproductive, morphological and life history adaptations by algae, fungi and vascular plants.

Upon successful completion of BOT 201, the student should be able to:

- Explain the role of evolution in plant diversity.
- Distinguish between morphological and anatomical diversity among algae, fungi and plants.
- Use the nomenclature system to classify various species algae, fungi, and plants.
- Describe the roles of algae, fungi, and plants in their natural habitats.

### **BOT 201L Plant Evolutionary Diversity Laboratory (1) KCC AA/DY**

*3 hours lab per week*

*Corequisite(s): BOT 201.*

*Comment: BOT 201L may not be audited. BOT 201L may not be taken credit/no credit.*

BOT 201L applies the principles discussed in BOT 201 through laboratory experiences in the lab setting and out in the field or natural ecosystem.

Upon successful completion of BOT 201L the student should be able to:

- Identify and classify representative species of algae, fungi and vascular plants.
- Sketch, classify and describe the various species of algae, fungi and vascular plants

- investigated in the laboratory
- Prepare a scientific laboratory report with appropriate annotations.
- Prepare herbarium specimens of appropriate species.
- Apply the observational and experimental techniques and methodologies employed in the natural sciences.

- Compute sales and income taxes.
- Complete a total payroll including calculation of gross earnings, various taxes, other payroll deductions, and net earnings for each employee.
- Compute depreciation using straight-line, declining balance, and sum of the years digits methods.
- Compute inventory value by the specific identification, average cost, FIFO, and LIFO methods.
- Solve problems in metric.
- Convert Balance Sheet and Income Statements from dollars to percents for horizontal and vertical analysis; compute current and acid-test ratios and inventory turnover.

## BUSINESS

### **BUS 55 Computational Problems in Business (3) (Inactive)**

*3 hours lecture per week*

*Prerequisite(s): Qualification for MATH 24.*

BUS 55 focuses on basic math applications to common business and financial problems. Training in computational skills will include use of adding machines and calculators.

Upon successful completion of BUS 55, the student should be able to:

- Demonstrate proficiency in the use of the electronic calculator and 10-key adder.
- Demonstrate knowledge of basic arithmetic processes including fractions, decimals, and percentages and their application to business problems.
- Solve business math problems for banking and sales records, interest in finance, markup and markdown, cash and trade discounts, taxes, payroll, depreciation, inventory, metric, and basic financial reports.
- Demonstrate correct usage of the electronic calculator.
- Demonstrate correct usage of the ten-key adder.
- Demonstrate basic skills in the handling of whole numbers, fractions, decimals, and percentages.
- Describe basic checking account records and prepare a bank reconciliation.
- Solve simple interest problems for principal, rate, and time.
- Solve problems in merchandise pricing including mark-ups based on cost or selling price.
- Demonstrate the use of cash and trade discounts.

### **BUS 56 Advanced Computational Problems in Business (3) (Inactive)**

*3 hours lecture per week*

*Prerequisite(s): BUS 55.*

BUS 56 is a continuation of BUS 55. Advanced computational skills in solving advanced business and financial problems requiring more sophisticated mathematical analysis.

Upon successful completion of BUS 56, the student should be able to:

- Demonstrate proficiency in the quantitative skills, and an understanding of business and financial transactions and concepts related to accounting and merchandising.
- Demonstrate proficiency in advanced computational techniques for solving problems.
- Demonstrate quantitative reasoning skills needed for solving advanced business problems.

### **BUS 100 Using Mathematics to Solve Business Problems (3) KCC AA/FS and KCC AS/ML**

*3 hours lecture per week*

*Prerequisite(s): A grade of "A" in MATH 24, or a grade of "C" or higher in MATH 25, or a grade of "C" or higher in MATH 81, or tested placement at MATH 100 or higher level math; qualification for ENG 22 or ESOL 94.*

BUS 100 is a survey of important elementary concepts in algebra, logical structure, numeration systems, and probability and statistics designed to acquaint students with examples of mathematical

reasoning, and to develop their capacity to engage in logical thinking and to read critically the technical information with which our society abounds. The intent of this course is to present a broad knowledge of mathematical topics to assist students in exercising sound judgment in making personal and business decisions.

Upon successful completion of BUS 100, the student should be able to:

- Analyze deductive arguments using elementary symbolic logic.
- Explore general methods for determining probabilities.
- Use statistical measures of central tendency and dispersion.
- Find mean, median, mode, and standard deviation.
- Use financial formulas as models. Derive effective yield, future value, mortgage payments. Describe the difference between compound interest savings accounts and annuities.
- Use exponential models to explore growth and decay.

### **BUS 120 Principles of Business (3)**

*3 hours lecture per week*

BUS 120 surveys the fundamentals of the American business enterprise and examines the foundations and responsibilities of accounting, business, management, finance and marketing in the business environment.

Upon successful completion of BUS 120 the student should be able to:

- Discuss and explain the impact of external factors on business decisions relative to the accomplishment of the mission and objectives of an organization.
- Define various forms of ownership and determine their appropriateness relative to an organization's resources, goals, and objectives.
- Examine and explain various business functions and practices and their impact on the successful operation of a business.
- Determine the impact of internal business decisions on local communities, other businesses, the environment, and other areas external to the company.

- Specify ethical standards for businesses operating in the USA and contrast with foreign markets.
- Relate the business environment and functions to personal career choices.

### **BUS 150 Personal Finance (3) (Inactive)**

*3 hours lecture per week*

BUS 150 will provide students with basic knowledge in finance, insurance, and investment strategies. The content will demonstrate to a student how to obtain financing for the purchase of real and personal property. It will detail the different types of car, health, and life insurance options available. Basic investment strategies for the different stages of life will be presented.

Upon successful completion of BUS 150, the student should be able to:

- Identify the steps necessary in obtaining a loan for the purchase of real property (mortgage) and personal property (car, computer, etc.).
- Demonstrate the ability to choose a financial institution that best suits their particular needs.
- Understand the need for good credit and the necessary steps in obtaining it.
- Understand the need for property insurance (car and home) and the different coverages available.
- Understand and demonstrate the ability to choose the appropriate life insurance coverage needed.
- Identify the various health insurance policies available and be able to choose one appropriate for their situation.
- Demonstrate investment strategies for the different stages of life such as newly married or retired.

### **BUS 191V Topics in Business Education I (Variable) (Inactive)**

*Variable hours lecture/lab per week according to course content.*

*Prerequisite(s): Consent of department chair.*

BUS 191V is a dynamic offering of varying topics in Business Education. The actual course content consists of activities and topics selected from existing

100 level Business Education courses listed in the KCC General Catalog. Content varies and consists of targeted activities and topics in Accounting, Business, Information Technology, Business Law, Entrepreneurship, Information and Computer Science, and/or Marketing courses.

Upon successful completion of BUS 191V, the student should be able to:

- Demonstrate the ability to think and read critically about topics in Business Education.
- Develop business communication (written and oral) abilities in both individual and group situations.
- Exhibit problem solving and decision-making skills in a business environment.
- Exhibit the ability to learn business techniques and practices in both independent and cooperative activities.
- Examine personal values and value systems of others in society and the work place.
- Develop skills for lifelong learning necessary to maintain currency in a business environment.

**BUS 191D: Topics in Business Education I: Introduction to Databases/Microsoft Access (1) (Inactive)**

*1 hour lecture per week*

*Prerequisite(s): Consent of the Business Education Department Chair.*

BUS 191D is an introduction to basic database concepts and terminology, including an introduction to database design and the relationship between databases, tables, records and fields. The course includes hands-on use in a computer environment that provides the students with experience designing, creating, and manipulating a database using Microsoft Access.

Upon successful completion of BUS 191D, the student should be able to:

- Critically analyze, evaluate and respond in oral and written forms to selected readings in Business Education topics.
- Demonstrate written and oral business communication abilities in both individual and group situations.
- Solve problems and make decisions in a business environment.
- Apply appropriate business techniques and

practices in both independent and cooperative activities.

- Examine personal values and value systems of others in society and the work place.
- Describe the importance of lifelong learning skills required to maintain currency in a business environment.
- Define common database terminology such as tables, records, fields, keys, views and relationships.
- Describe the database design process.
- Define advantages of good database design.
- Define a database management system (DBMS) and describe relationships of DBMS to a database and to users.
- Design simple relational database with proper documentation.
- Design databases and their applications that allow queries and report generation.

**BUS 220 (Alpha) Business Seminar (3) (Inactive)**

*3 hours lecture per week*

*Prerequisite(s): Approval by Business Education Department Chairperson.*

*Comment: BUS 220 (Alpha) is repeatable twice for credit.*

BUS 220 (Alpha) will examine the latest topics that are important for businesses. These topics provide for a dynamic offering of activities that span across subject areas such as Accounting, Business Law, Business Math, Electronic Commerce, Entrepreneurship, Management, Marketing, Information and Computer Science, and Information Technology. These topics will vary from semester to semester, and this format will allow for current contemporary subjects to be offered in a timely manner to keep up with the rapidly changing technologies that businesses must understand and

utilize in order to survive in a global economy. Topics may include web electronic commerce for the entrepreneur, project development from a distance, and programming accounting packages for small businesses.

Upon successful completion of BUS 220 (Alpha), for the topic(s) chosen, the student should be able to:

- Demonstrate the ability to think and read critically about topics in Business Education.
- Develop business communication (written and oral) abilities in both individual and group situations.
- Exhibit problem solving and decision-making skills in a business environment.
- Exhibit the ability to learn business

techniques and practices in both independent and cooperative activities.

- Examine personal values and value systems of others in society and the work place.
- Develop skills for lifelong learning necessary to maintain currency in a business environment.
- Describe its impact on current business practices.

### **BUS 220B Topics in Retailing Seminar (3)**

**(Inactive)**

*45 class hours*

*Prerequisite(s): Approval by Business Education Department Chairperson.*

Participants in the BUS 220B seminar will study current trends in retailing in the State of Hawai'i. Emphasis is on developing teaching units in different topics, concepts and principles in retailing as it applies to Hawai'i.

Upon successful completion of BUS 220B, for the topic(s) chosen, the student should be able to:

- Describe its impact on current business practices.
- Understand principles and concepts of retailing.
- Develop teaching units in retailing.
- Develop specific strategies for the promotion of the retail merchandise concentration.

### **BUS 250 Applied Math in Business (3) KCC AA/FS and KCC AS/ML**

*3 hours lecture per week*

*Prerequisite(s): Qualification for MATH 135.*

*Recommended Preparation: Qualification for ENG 100 or ESL 100; ICS 100 or ICS 101.*

BUS 250 covers the algebra and geometry of linear, quadratic, exponential, and logarithmic functions as applied to the mathematics of finance – annuities, perpetuities, present value. BUS 250 also covers derivatives, graphical analysis, and mathematical models as applied to business, with selected coverage of algebra, geometry, and calculus emphasizing business applications and decision making.

Upon successful completion of BUS 250, the student should be able to:

- Solve linear, quadratic, exponential and

logarithmic equations – with applications to business like solving for interest rate(s) and solving for various terms of investment.

- Describe the derivative of a function, and apply rules for differentiation.
- Apply derivatives in curve sketching with applications to business as in solving for marginal revenue/cost, marginal tax rate, minimum cost, and maximum profit.
- Calculate present and future values (PV and FV) of simple and compound interest.
- Apply formulas for interest to solve problems involving installment buying and credit card purchases.
- Apply formulas for interest to solve problems involving debt consolidation and rescheduling of debt payments.
- Apply formulas for interest to solve problems involving issuing and discounting promissory notes, and government/corporate bonds.
- Solve for PV, FV, payment, interest, and duration of ordinary/due simple annuities, general annuities, deferred annuities, sinking funds, and constant growth annuities.
- Solve for PV, payment, and interest rate for ordinary and due perpetuities.
- Describe the various types of mortgage loans; use amortization schedules, and calculate the various components of mortgage payment(s).
- Apply amortization tables to calculate the various components of mortgage payments(s), and refinancing options.
- Master the use of financial calculator(s) and Excel to formulate, analyze, and interpret mathematical models in business, and to develop models to solve time value of money (TVM) problems.

### **BUS 291V Topics in Business Education II (Variable) (Inactive)**

*Variable hours lecture/lab per week according to course content.*

*Prerequisite(s): Consent of department chair.*

BUS 291V is a dynamic offering of varying topics in Business Education. The actual course content consists of activities and topics selected from existing

200 level Business Education courses listed in the KCC General Catalog. Content varies and consists of targeted activities and topics in Accounting, Business, Information Technology, Business Law, Entrepreneurship, Information and Computer Science, and/or Marketing courses.

Upon successful completion of BUS 291V, the student should be able to:

- Demonstrate the ability to think and read critically about topics in Business Education.
- Develop business communication (written and oral) abilities in both individual and group situations.
- Exhibit problem solving and decision-making skills in a business environment.
- Exhibit the ability to learn business techniques and practices in both independent and cooperative activities.
- Examine personal values and value systems of others in society and the work place.
- Develop skills for lifelong learning necessary to maintain currency in a business environment.

### **BLAW 200 Legal Environment of Business (3)**

*3 hours lecture per week*

BLAW 200 is an introduction to the laws impacting business operations.

Upon successful completion of BLAW 200, the student should be able to:

- Demonstrate a broad understanding of the American system of jurisprudence, its concepts, involvement and procedures.
- Recognize broad principles of law relating to the three basic business organizations, contracts, agency, employment, independent contractors, personal property (including bailments), concurrent interests, product liability and consumer protection, environment laws, bankruptcy, torts, anti-trust and ethics.

## **BUSINESS LAW**

### **BLAW 130 Business Law (3) (Inactive)**

*3 hours lecture per week*

BLAW 130 is a broad introduction to business law.

Upon successful completion of BLAW 130, the student should be able to:

- Recognize broad principles of law relating to contracts, agency, personal property, and business organizations, negotiable instruments, sales, real property, trusts, and estates.
- Demonstrate general awareness of legal rights and obligations arising out of business and financial dealings.