

**REGULATIONS FOR THE DEGREE OF
BACHELOR OF BIOMEDICAL SCIENCES
(BBiomedSc)**

These regulations are applicable for candidates admitted under the 4-year BBiomedSc curriculum in the academic year 2012-2013, 2013-2014, 2014-2015 and 2015-2016.

(See also General Regulations and Regulations for First Degree Curricula)

Admission to the BBiomedSc Degree

- BBMS1** To be eligible for admission to the degree of Bachelor of Biomedical Sciences, candidates shall
- (a) comply with the General Regulations;
 - (b) comply with the Regulations for First degree Curricula; and
 - (c) satisfy all the requirements of the curriculum in accordance with these regulations and the syllabuses.

Period of study

- BBMS2** The curriculum for the degree of Bachelor of Biomedical Sciences shall normally require eight semesters of full-time study, extending over not fewer than four academic years, and shall include any assessment to be held during and/or at the end of each semester. Candidates shall not in any case be permitted to extend their studies beyond the maximum period of registration of six academic years.

Selection of courses

- BBMS3**
- (a) Candidates shall select their courses in accordance with these regulations and the guidelines specified in the syllabuses before the beginning of each semester. Changes to the selection of courses may be made only during the add/drop period of the semester in which the course begins, and such changes shall not be reflected in the transcript of the candidate. Requests for changes after the designated add/drop period of the semester shall not be considered, except under exceptional circumstances as approved by the Board of the Faculty.
 - (b) Candidates withdrawing from any course without permission after the designated add/drop period of semester shall be given an F grade.

Curriculum requirements

- BBMS4** To complete the curriculum, candidates shall
- (a) satisfy the requirements prescribed in UG5 of the Regulations for First Degree Curricula; including
 - (i) 12 credits in English language enhancement, including 6 credits in Core University English¹ and 6 credits in an English in the Discipline course;
 - (ii) 6 credits in Chinese language enhancement²; and

¹ Candidates who have achieved Level 5** in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent, may at the discretion of the Faculty be exempted from this requirement and should take an elective course in lieu.

² Putonghua-speaking candidates must take CUND9002 or CUND9003. Candidates who have not studied the Chinese language during their secondary education or who have not attained the requisite level of competence in the Chinese language to take CEMD9008 Practical Chinese for Biomedical Sciences Students can apply to the Faculty:

- (iii) 36 credits of courses in the Common Core Curriculum comprising at least one and not more than two courses from each Area of Inquiry with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits;
- (b) complete satisfactorily not fewer than 240 units of credits, in the manner specified in these regulations and the syllabuses, including the BBIomedSc major of 96 credits with "BBMS4001 Final Year Project" to be taken in the final year of study as the capstone experience.

- BBMS5**
- (a) Candidates shall normally take not fewer than 24 and not more than 30 credits of courses in each semester (except the summer semester), unless otherwise permitted or required by the Board of the Faculty.
 - (b) Candidates shall have to satisfactorily complete the prerequisite courses in order to enroll in succeeding courses, unless with exemption granted by the Board of the Faculty.
 - (c) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, accumulating up to a maximum of 72 credits in one academic year.

Advanced standing

- BBMS6**
- (a) Advanced standing may be granted to candidates who have successfully completed a similar course at other universities or comparable institutions. The amount of credits to be granted for advanced standing shall be determined by the Board of the Faculty, in accordance with UG2 of the Regulations for First Degree Curricula.
 - (b) Credits granted for advanced standing to a candidate shall not be included in the calculation of his/her cumulative GPA unless permitted by the Board of the Faculty but will be recorded on the transcript of the candidate.

Assessment

- BBMS7**
- (a) Candidates shall be assessed for each of the courses which they have registered for, and assessment may be conducted in any one or any combination of the following manners: written examinations or tests, continuous assessment, laboratory work, project reports, or in any other manner as specified in the syllabuses.
 - (b) Grades shall be awarded in accordance with UG8(a) of the Regulations for First Degree Curricula.
 - (c) Written examinations shall normally be held at the end of each semester unless otherwise specified in the syllabuses.
 - (d) Candidates who are unable, because of illness or other special circumstances, to be present at any examination of a course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidates' absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
 - (e) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
 - (f) Candidates are required to make up for failed courses in the following manner:

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- (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese (especially for international and exchange students), or
 - (ii) for exemption from Chinese language requirement and take an elective course in lieu.

- (i) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or
- (ii) re-submitting failed coursework, without having to repeat the same course of instruction; or
- (iii) repeating the failed course by undergoing instruction and satisfying the assessments; or
- (iv) for elective courses, taking another course in lieu and satisfying the assessment requirements.

Discontinuation

- BBMS8** Candidates shall normally be recommended for discontinuation of their studies if they have
- (a) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters; or
 - (b) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester); or
 - (c) exceeded the maximum period of registration specified in BBMS2 of the regulations of the degree; or
 - (d) failed in a core course three times.

Honours classifications

- BBMS9** (a) The degree of Bachelor of Biomedical Sciences shall be awarded in five divisions: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours and Pass. The classification of honours shall be determined by the Board of Examiners for the degree in accordance with the following Cumulative GPA scores, with all courses taken (including failed courses) carrying equal weighting:

<u>Class of honours</u>	<u>CGPA range</u>
First Class Honours	3.60 – 4.30
Second Class Honours	(2.40 – 3.59)
Division One	3.00 – 3.59
Division Two	2.40 – 2.99
Third Class Honours	1.70 – 2.39
Pass	1.00 – 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Cumulative GPA and the Board of Examiners for the degree may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Cumulative GPA falls below the range stipulated in BBMS9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on the Faculty noticeboards.

**SYLLABUSES FOR THE DEGREE OF
BACHELOR OF BIOMEDICAL SCIENCES
(BBiomedSc)**

These syllabuses are applicable for candidates admitted under the 4-year BBiomedSc curriculum in the academic year 2013-2014 and 2014-2015.

Curriculum Structure

1. Courses for Biomedical Sciences Major (96 credits)

Students are required to complete a total of 96 credits of courses for the Biomedical Sciences major, of which the 4 foundation courses, 2 laboratory courses and the final year project course are prescribed.

Prescribed courses (48 credits)

- *Foundation Courses (24 credits)*

		Year	Credits
BBMS1001	Human Biology	1	6
BIOC1600	Perspectives in Biochemistry	1	6
BIOL2102	Biostatistics	1	6
CHEM1042/	General Chemistry I (for students with HKDSE Chemistry)/	1	6
CHEM1041	Foundations of Chemistry (for students without HKDSE Chemistry)		

- *Laboratory Courses (12 credits)*

		Year	Credits
BBMS2001	Basic Biomedical Laboratory Techniques	2	6
BBMS3004	Molecular Diagnostics Laboratory	3/4	6

- *Project: Capstone Experience (12 credits)*

		Year	Credits
BBMS4001	Final Year Project	4	12

Other Courses (48 credits)

- *Any 4 from List A below:*

List A

		Year	Credits
BBMS2002	Evidence-based Practice and Public Health	2	6
BBMS2004	Introduction to Human Anatomy	2	6
BBMS2005	Basic Pharmacology	2	6
BBMS2006	Physiological Basis of Health and Disease	2	6
BBMS2003	Human Genetics	2/3	6

- *Any 4 from List B below:*

List B

		Year	Credits
BBMS3001	Medical Microbiology	3/4	6

BBMS3002	Molecular Biology of the Cell	3/4	6
BBMS3003	Mechanisms and Pathology of Diseases	3/4	6
BBMS3005	Infection and Immunity	3/4	6
BIOC3605	Sequence Bioinformatics	3/4	6

2. Common Core Courses (36 credits)

Students are required to complete 6 Common Core courses (6-credit each) by the end of the second year, comprising at least one and not more than two courses from each Area of Inquiry with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits.

3. Language Enhancement Courses (18 credits)

Students are required to complete 2 English Language courses (6-credit each), including 6 credits of Core University English¹ and 6 credits of English-in-the-Discipline course, and 1 Chinese Language course (6-credit)², within the first and second years of the curriculum in accordance with the Regulations for First Degree Curricula of the University.

4. Minors and/or Electives (90 credits)

Apart from taking the 96 credits of courses for the Biomedical Sciences major as specified in paragraph 1, plus the Common Core courses (36 credits) and the Language Enhancement courses (18 credits), students can plan their study with the remaining credits (i.e. 90 credits) in various manners, subject to time-table constraints and approval of the host faculties. Those interested in enriching and deepening their understanding on topics in the field of biomedical sciences may opt to take a minor and/or electives offered within the BBiomedSc curriculum, while those who would like to broaden their knowledge base outside the realm of biomedical sciences can consider a minor and/or electives offered in other curricula.

Two minor options are offered in the BBiomedSc curriculum.

Minor in Genetics & Genomics (36 credits)

		Year	Credits
BIOC1600	Perspectives in Biochemistry	1	6
BBMS2007	Essential Molecular Biology	2	6
BBMS2003	Human Genetics	2/3	6
BBMS3007	Cancer Genetics	3/4	6
BBMS3008	Essential Proteomics	3/4	6
BBMS3009	Genome Science	3/4	6
BBMS4003	Developmental Genetics	3/4	6
BIOC3605	Sequence Bioinformatics	3/4	6

¹ Candidates who have achieved Level 5** in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent, may at the discretion of the Faculty be exempted from this requirement and should take an elective course in lieu.

² Putonghua-speaking candidates must take CUND9002 or CUND9003. Candidates who have not studied the Chinese language during their secondary education or who have not attained the requisite level of competence in the Chinese language to take CEMD9008 Practical Chinese for Biomedical Sciences Students can apply to the Faculty:

- (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese (especially for international and exchange students), or
- (ii) for exemption from Chinese language requirement and take an elective course in lieu.

BIOC4612	Molecular Biology of the Gene	3/4	6
BBMS4004	Public Health Genetics	3/4	6

Minor in Pharmaceutical Sciences (36 credits)

		Year	Credits
BIOC1600	Perspectives in Biochemistry	1	6
BBMS2005	Basic Pharmacology	2	6
BIOC2600	Basic Biochemistry	2	6
CHEM2442	Fundamentals of Organic Chemistry	2	6
BBMS3014	Advanced Pharmacology	3/4	6
BPHM3151	Principles of Pharmacognosy, Herbal Medicines and Nutraceuticals	3/4	6
BPHM4142	Molecular Pharmacology	3/4	6
BPHM4147	Toxicology and Drug Abuse	4	6
BBMS4002	Pharmaceutical Drug Development	4	6

There are four courses which are listed under both the BBiomedSc major curriculum and the minor options (BIOC1600 Perspectives in Biochemistry, BBMS2003 Human Genetics, BBMS2005 Basic Pharmacology and BIOC3605 Sequence Bioinformatics). Students who have taken these four courses for the major will not be allowed to claim credits awarded for the same courses to fulfill the requirements of the minor option.

Electives offered in the curriculum are listed as follows:

		Year	Credits
BBMS3010	Emerging Infections	3/4	6
BBMS3011	Molecular Neuroscience	3/4	6
BBMS3012	Stem Cell & Regenerative Medicine	3/4	6
BBMS3013	Clinical Trial Strategies	3/4	6
BBMS3017	Advanced Physiological Science	2/3/4	6

Notes:

- (1) *The minor option Genetics & Genomics is also open to students from other Faculties, and the minimum entry requirement is a pass in BIOC1600 Perspectives in Biochemistry, and any 1 of these courses: BBMS2007 Essential Molecular Biology, BBMS2003 Human Genetics.*
- (2) *The minor option Pharmaceutical Sciences is also open to students from other Faculties, and the minimum entry requirement is a pass in BIOC1600 Perspectives in Biochemistry and BBMS2005 Basic Pharmacology.*
- (3) *All elective courses may only be offered in alternate years; students should check on course availability and course prerequisites.*

COURSE DESCRIPTIONS

Prescribed Courses: Foundation Courses

BBMS1001 Human Biology Year 1 (6 credits)

This course examines the concepts related to the structure and function of the human body, including the organization of the body from single cell to the coordinated whole. Throughout the course, focus will be placed on the inter-relationship between structure and function in cells, tissues and body systems (cardiovascular, respiratory, digestive, renal, musculoskeletal, neural, immune, and endocrine systems). The course serves a basis for understanding the normal processes of life.

Prerequisite: HKDSE Biology or Chemistry or Combined Science with Biology or Chemistry component, or equivalent

Assessment: 40% continuous assessment; 60% examination.

BIOC1600 Perspectives in Biochemistry Year 1 (6 credits)

This course aims to give students a biochemical perspective on each of the Basic Sciences focusing on concepts fundamental to the learning of Biochemistry and to inspire students with a view of the great discoveries and future challenges for Biochemistry. This course also aims to help students make the transition from school to university by developing their independent study skills within a Biochemistry learning environment.

Prerequisite: HKDSE Biology, Chemistry, or Combined Science with Biology or Chemistry component, or equivalent

Assessment: 50% continuous assessment; 50% examination.

BIOL2102 Biostatistics Year 1 (6 credits)

To introduce students to experimental design and statistical data analysis at an elementary to intermediate level, with an emphasis on practical applications of statistical methods to experimental and observational data in biology, biochemistry, biomedical sciences, biotechnology, food and nutritional science, ecology and environmental sciences. Students will explore the process by which scientists formulate research questions, set null hypotheses, design experiments, collect data and apply statistics to test the hypotheses.

Prerequisite: BIOC1600 Perspectives in Biochemistry

Assessment: 50% continuous assessment; 50% examination.

CHEM1042 General Chemistry I Year 1 (6 credits)

The course aims to provide students with a solid foundation of the basic principles and concepts of chemistry. It also provides students with hands-on training of basic laboratory skills and techniques including volumetric analysis, preparation, purification and characterization of chemical substances and some basic instrumental methods. Students will be equipped with a good foundation of theoretical and practical knowledge and skills for further studies in Chemistry.

Prerequisite: Level 3 or above in HKDSE Chemistry

Assessment: 15% test/quiz; 25% lab report; 60% examination.

CHEM1041 Foundations of Chemistry Year 1 (6 credits)

The course aims to provide students who do not have HKDSE Chemistry or an equivalent background but are interested in exploring Chemistry further, with an understanding of the essential fundamental principles and concepts of chemistry.

Prerequisite: HKDSE Combined Science with Chemistry component or Integrated Science, or equivalent. Not for students with HKDSE Chemistry.

Assessment: 15% test; 20% assignment; 65% written examination.

Prescribed Courses: Laboratory Courses

BBMS2001 Basic Biomedical Laboratory Techniques Year 2 (6 credits)

This course aims to give students a general overview of different experimental approaches and to provide students with hands-on experience in basic techniques in biochemical, molecular and biomedical science laboratory. Topics include microscopy, laboratory instrumentation, separation of macromolecules, enzyme and protein analysis, nucleic acid manipulations, molecular cloning, polymerase chain reaction, labeling and detection of macromolecules. Essential concepts of laboratory data management and research integrity will also be introduced.

Prerequisite: Pass in BIOC1600 Perspectives in Biochemistry

Assessment: 50% laboratory assessment; 50% examination.

BBMS3004 Molecular Diagnostics Laboratory Year 3/4 (6 credits)

This course introduces students to the principles and applications of molecular diagnostic techniques in patient management. Their roles in the diagnosis, prognostication, therapy and surveillance of various hereditary conditions, cancers and non-cancer diseases would be discussed. Concepts of laboratory management, standardization, quality assurance and safety would be introduced.

Prerequisite: Pass in BBMS2001 Basic Biomedical Laboratory Techniques

Assessment: 40% continuous assessment; 60% examination.

Prescribed Course: Project

BBMS4001 Final Year Project Year 4 (12 credits)

The course involves around 300 students' learning hours spreading over 2 semesters. Each student is required to carry out an in-depth study of a specialist field of molecular medicine under the guidance of a supervisor who will provide continuous assessment on the student's performance (20%). The project entails about 100 hours to write up a dissertation (10,000 words) and to give a professional presentation (15–30 minutes), which accounts for 60% and 20% of the final assessment, respectively. The research project also constitutes the capstone experience for the student.

Prerequisite: Pass in BBMS2001 Basic Biomedical Laboratory Techniques

Co-requisite: Pass in BBMS3004 Molecular Diagnostic Laboratory

Assessment: 40% continuous assessment; 60% dissertation.

Language Courses

CAES1000 Core University English

Year 1 (6 credits)

The Core University English (CUE) course aims to enhance first-year students' academic English language proficiency in the university context. CUE focuses on developing students' academic English language skills for the Common Core Curriculum. These include the language skills needed to understand and produce spoken and written academic texts, express academic ideas and concepts clearly and in a well-structured manner and search for and use academic sources of information in their writing and speaking. Students will also complete four online-learning modules through the Moodle platform on academic grammar, academic vocabulary, citation and referencing skills and understanding and avoiding plagiarism. This course will help students to participate more effectively in their first-year university studies in English, thereby enriching their first-year experience.

Assessment: 65% coursework; 35% examination.

CEMD9008 Practical Chinese for Biomedical Sciences Students

Year 1 (6 credits)

This course is designed specifically to raise the students' level of proficiency in the use of the Chinese language in the field of biomedical sciences. It aims at sharpening the students' skills both of writing documents (such as letters, brochures, leaflets, reports and proposals) and of effectively interacting with professional practitioners and members of the public in Chinese. There are also drilling practices to familiarize the students with the simplified forms of some basic Chinese biomedical terms.

Assessment: 50% coursework; 50% examination.

CAES9722 Academic English for Biomedical Sciences Students

Year 2 (6 credits)

This six credit English-in-the-Discipline course will be offered to second year students studying Biomedical Sciences. This course will help students develop the necessary skills to use both written and spoken English within their studies. Students will learn to better communicate and spontaneously discuss general and scientific concepts within their division, with other scientists as well as to a larger audience. Particular emphasis will be placed on enabling students to identify their own language needs and develop appropriate self-learning strategies to improve their proficiency.

Assessment: 100% continuous assessment.

Other Courses

BBMS2002 Evidence-based Practice and Public Health

Year 2 (6 credits)

Evidence-based practice, the overarching principle of all health professions, is premised on the sciences of epidemiology and biostatistics. A solid foundation in evidence-based practice is needed to guide public health decisions. This course is for BBiomedSc, BPharm and BPHM students with key components of epidemiology, biostatistics and public health. Biostatistics will emphasise application and interpretation, with concepts mostly integrated into epidemiology; technical calculations will be minimal. Students will be able to make sense of data, and appraise scientific evidence through an understanding of basic epidemiologic and statistical concepts. These concepts include hypothesis testing, P value, confidence interval, probability, measures of the distribution and determinants of disease, vital statistics, reliability, validity, bias, confounding, interaction, causality, and common epidemiological study designs. These serve as a foundation to understanding subsequent public health topics such as sociology of health, chronic illness and disability, global burden of disease, environment and health, health promotion, health care system,

health policy and health economics.

Prerequisite: Nil

Assessment: 30% continuous assessment; 70% examination.

BBMS2004 Introduction to Human Anatomy Year 2 (6 credits)

The course provides an understanding of the organization and functions of human body in relation to clinical practice. Introduction to human anatomy, cell structure, tissues, embryonic differentiation, musculoskeletal structures, brain and spinal cord, cardiovascular system, respiratory system, gastrointestinal system, endocrine system, urogenital system.

Prerequisite: Level 3 or above in HKDSE Biology or Chemistry or Combined Science with Biology or Chemistry component, or equivalent

Assessment: 30% continuous assessment; 70% examination.

BBMS2005 Basic Pharmacology Year 2 (6 credits)

This course provides basic information on the interaction of drugs with different body systems, and the pharmacological basis in drug therapy, and also cover general principles in pharmacology, drug discovery and development, pharmacokinetics, pharmacodynamics and pharmacogenomics. In addition, the pharmacology of chemical mediators, and commonly used anti-microbial, anti-inflammatory and anti-cancer drugs will be introduced.

Prerequisite: Pass in CHEM1042 General Chemistry I or CHEM1041 Foundations of Chemistry

Assessment: 30% continuous assessment; 70% examination.

BBMS2006 Physiological Basis of Health and Disease Year 2 (6 credits)

This course examines the concepts related to the physiological functions of the human body and their pathophysiological changes under disease conditions. The focus throughout the course will be on the physiological systems, namely haematologic, digestive, cardiovascular, respiratory, neural, endocrine, reproductive, and renal systems. The course serves as a knowledge basis for understanding the functions of the human body in normal and disease states.

Prerequisite: Pass in BBMS1001 Human Biology

Assessment: 30% continuous assessment; 70% examination.

BBMS2003 Human Genetics Year 2/3 (6 credits)

To present an extensive introduction to the principles of genetics, illustrate how they operate in humans with examples, and discuss the applications of these in medical and clinical genetics. Topics include the Mendel's laws of genetics, the basic patterns of Mendelian inheritance in humans, the construction and the analysis of a pedigree, single gene and polygenic inheritance, multifactorial traits and heritability, cytogenetics, karyotypes, structural changes in chromosomes, and non-Mendelian inheritance. Concepts of genetic variations in human populations and Hardy-Weinberg equilibrium will also be presented.

Prerequisite: Pass in BBMS1001 Human Biology or BIOC1600 Perspectives in Biochemistry

Assessment: 30% continuous assessment; 70% examination.

BBMS3001 Medical Microbiology **Year 3/4 (6 credits)**

This course will introduce students to the microbial world by providing general properties of microorganisms including classification, morphologic and growth characteristics, metabolism, genetics and pathogenesis. It will cover aspects of the handling and containment of microorganisms as well as of medical treatment and prevention. Students will explore the applications of microbiology to modern diagnostics, biotechnology and vaccinology.

Prerequisite: Pass in BBMS1001 Human Biology and BBMS2001 Basic Biomedical Laboratory Techniques

Assessment: 50% continuous assessment; 50% examination.

BBMS3002 Molecular Biology of the Cell **Year 3/4 (6 credits)**

The course will cover current topics of cell biology and will provide an overview of the fundamentals of biological processes that contribute to cell growth and survival. Four major areas will be covered: Nucleus and Epigenetics; Signal Transduction; Cell Division and Cytoskeleton; and Cell Proliferation and Differentiation. Students will also be introduced to current methodologies for molecular and cell biology research. The course also aims to provoke appreciation of how knowledge in basic science aids in the detection, rationalization and treatment of genetic diseases, including cancer and other metabolic disorders. Students are expected to research into how good understanding of the basic principles of molecular and cell biology has facilitated development of current strategies for disease intervention.

Prerequisite: Pass in BBMS1001 Human Biology and BBMS2004 Introduction to Human Anatomy

Assessment: 40% continuous assessment; 60% examination.

BBMS3003 Mechanisms and Pathology of Diseases **Year 3/4 (6 credits)**

This course introduces the major pathological mechanisms of common human diseases. They include concepts and pathological features of different types of cell stress, degeneration and adaptive responses. Mechanisms, pathology and complications of common human diseases due to acute & chronic inflammation caused by infections, chemical insults and immunologic damage would be presented. Hormonal and metabolic dysregulation, neoplastic change, and examples of hereditary disorders would be included. The course would consist of lectures and practicals in which human pathology specimens would be used for illustration. Prerequisites: Pass in BBMS2004 Introduction to Human Anatomy and BBMS2006 Physiological Basis of Health and Disease. Assessment: 40% continuous assessment; 60% examination.

BBMS3005 Infection and Immunity **Year 3/4 (6 credits)**

This course will introduce students to the host defense by providing basic concepts and different components of immune system including both nonspecific and specific immunity. It will cover aspects of the pathogen-host interaction, immunologic disorders as well as different humoral, cellular and biochemical elements involved in immune responses. Students will explore the applications of immunology to modern diagnostics, biotechnology, therapeutics and disease prevention.

Prerequisite: Pass in BBMS1001 Human Biology and BBMS3001 Medical Microbiology

Assessment: 60% continuous assessment; 40% examination.

BIOC3605 Sequence Bioinformatics **Year 3/4 (6 credits)**

This course will examine existing bioinformatics tools for DNA and protein sequence analysis. The underlying principles of these analysis programs and services will be presented. Students will learn how to retrieve, analyze, and compare protein and DNA sequences using bioinformatics tools

available on the World Wide Web.

Prerequisite: Pass in BBMS2003 Human Genetics or BBMS2007 Essential Molecular Biology

Assessment: 30% coursework; 70% examination.

Courses for Minor in Genetics & Genomics

BIOC1600 Perspectives in Biochemistry Year 1 (6 credits)

This course aims to give students a biochemical perspective on each of the Basic Sciences focusing on concepts fundamental to the learning of Biochemistry and to inspire students with a view of the great discoveries and future challenges for Biochemistry. This course also aims to help students make the transition from school to university by developing their independent study skills within a Biochemistry learning environment.

Prerequisite: HKDSE Biology, Chemistry, or Combined Science with Biology or Chemistry component, or equivalent

Assessment: 50% continuous assessment; 50% examination.

BBMS2007 Essential Molecular Biology Year 2 (6 credits)

This course aims to enable the students to understand the basics in molecular biology including the process and machineries involving in the storage, utilization and maintenance of the genetic information and the corresponding genomes.

Prerequisite: Pass in BIOC1600 Perspective in Biochemistry

Assessment: 30% continuous assessment; 70% examination.

BBMS2003 Human Genetics Year 2/3 (6 credits)

To present an extensive introduction to the principles of genetics, illustrate how they operate in humans with examples, and discuss the applications of these in medical and clinical genetics. Topics include the Mendel's laws of genetics, the basic patterns of Mendelian inheritance in humans, the construction and the analysis of a pedigree, single gene and polygenic inheritance, multifactorial traits and heritability, cytogenetics, karyotypes, structural changes in chromosomes, and non-Mendelian inheritance. Concepts of genetic variations in human populations and Hardy-Weinberg equilibrium will also be presented.

Prerequisite: Pass in BBMS1001 Human Biology or BIOC1600 Perspectives in Biochemistry

Assessment: 30% continuous assessment; 70% examination.

BBMS3007 Cancer Genetics Year 3/4 (6 credits)

Cancer has profound impact on our society as a major killer disease. Rapid research advances have greatly improved our understanding of the disease mechanisms of cancer. This course will provide a comprehensive overview of the genetic, molecular and cell biological processes involved in the initiation and progression of the disease. A better understanding of the disease mechanisms of cancer has led to improved treatments, early detection methods, and the development of effective prevention strategies. We will highlight the hallmarks of cancer and the genetic nature of cancer including the mutation mechanism leading to activation of oncogenes and inactivation of tumour suppressor genes driving clonal evolution and progression of cancer cells. The epigenetic mechanisms including histone modification and DNA methylation in the regulation of expression of oncogenes and tumour suppressor genes in cancer cells will be included. The alterations in cell signal pathways and metabolism in cancer cells resulting from these aberrant gene expressions will be studied. The concept of cancer stem cells and their impact on resistance to treatment and tumour recurrence will be introduced. The genetic basis of cancer predisposition, linkage analysis, the concepts of genomic instability of cancer and genomic landscape of cancer will also be covered. These have profound impact on the development of rational cancer treatments including

molecular-targeted therapies, that take into account of cancer biodiversity including variable genetic mutations in individual cancer and cancer cell heterogeneity, will also be examined. The emerging importance of tumour microenvironment and its impact on growth and behavior of human cancers will be introduced. These current concepts in molecular and cellular biology of cancer will be illustrated in the context of different human tumour types, particular those with local prevalence.

Prerequisite: Pass in BBMS2003 Human Genetics or BBMS2007 Essential Molecular Biology
Assessment: 35% continuous assessment; 65% examination.

BBMS3008 Essential Proteomics **Year 3/4 (6 credits)**

This course will introduce protein structure and contemporary proteomics relevant to biomedical sciences. Protein structure will include protein structure classification and identification, protein modelling, and structure determination by X-ray crystallography and NMR. Proteomics will include protein mass spectrometry, isotope labelling, and protein-protein interaction techniques.

Prerequisite: Pass in BBMS2007 Essential Molecular Biology or BIOC2600 Basic Biochemistry
Assessment: 50% continuous assessment; 50% examination.

BBMS3009 Genome Science **Year 3/4 (6 credits)**

This course will present topics applicable to genomic biology and the “post-genome” phase of molecular biology. Main topics include genome-scale sequencing, analysis of genetic variations and gene expression profiling. Recent progresses in the Human Genome Project, the HapMap Project, linkage disequilibrium, linkage analysis, genome-wide association studies, and functional genomics will be presented. Experimental methods in genome science including gene mapping, DNA sequencing, next-generation genome sequencing, SNP genotyping, gene chips and other array technologies for transcriptome profiling will also be covered. Student will be familiar with genomics that will be useful in their future career, be it in science or industry.

Prerequisite: Pass in BIOL2102 Biostatistics and any one of these courses: BBMS2003 Human Genetics, BBMS2007 Essential Molecular Biology
Assessment: 60% assignment; 40% examination.

BBMS4003 Developmental Genetics **Year 3/4 (6 credits)**

This course covers the genetic bases as well as cellular and molecular processes of embryo development. Topics include: genetic control of body plans and pattern formation, morphogenesis, cell fate determination, formation of organ systems such as cardiac, skeletal and nervous systems, germ cells and sex determination, stem cells, regeneration, common congenital malformations. Methods and technologies for studying developmental genetics, studies of model organisms, and examples relevant to human diseases and modern medicine are discussed.

Prerequisite: Pass in any one of these courses: BBMS2003 Human Genetics, BBMS2007 Essential Molecular Biology, BIOL3401 Molecular Biology, BIOL3408 Genetics, or equivalent courses

Assessment: 40% continuous assessment; 60% examination.

BIOC3605 Sequence Bioinformatics **Year 3/4 (6 credits)**

This course will examine existing bioinformatics tools for DNA and protein sequence analysis. The underlying principles of these analysis programs and services will be presented. Students will learn how to retrieve, analyze, and compare protein and DNA sequences using bioinformatics tools available on the World Wide Web.

Prerequisite: Pass in BBMS2003 Human Genetics or BBMS2007 Essential Molecular Biology
Assessment: 30% coursework; 70% examination.

BIOC4612 Molecular Biology of the Gene **Year 3/4 (6 credits)**

This course aims to provide an up-to-date knowledge of molecular biology, especially with respect to the regulation of eukaryotic gene expression and molecular embryology. These are essential for the understanding of normal development and diseases. Topics include structure and assembly of transcription factors, the mechanisms of transcriptional activation and initiation, DNA sequence elements in control of gene expression, locus control region, genomic imprinting, chromatin remodeling by histone modifications, splicing factors, RNA processing and transport, regulation of translation, regulation of gene expression in cell stress response, and gene expression during development.

Prerequisite: Pass in BBMS2007 Essential Molecular Biology
Assessment: 20% assignment; 80% examination.

BBMS4004 Public Health Genetics Year 3/4 (6 credits)

Public health genetics is the study of variation in the genome, its inheritance, and its contribution to health and disease. The main features of public health genetics research will be highlighted including how genetic and environmental factors play a role in disease susceptibility; emergence of biobanks; cancer genomics; personalised medicine; and Mendelian randomisation. This course will also discuss the use of genetic epidemiology in the study of human diseases, the use of genetic testing in the diagnosis and screening of diseases as well as the use of genetic information in the treatment of diseases. It will also explore the ethical, legal and policy questions raised when applying genomics to health care.

Prerequisite: Pass in BIOL2102 Biostatistics and BBMS2003 Human Genetics
Assessment: 100% continuous assessment.

Courses for Minor in Pharmaceutical Sciences

BIOC1600 Perspectives in Biochemistry Year 1 (6 credits)

This course aims to give students a biochemical perspective on each of the Basic Sciences focusing on concepts fundamental to the learning of Biochemistry and to inspire students with a view of the great discoveries and future challenges for Biochemistry. This course also aims to help students make the transition from school to university by developing their independent study skills within a Biochemistry learning environment.

Prerequisite: HKDSE Biology, Chemistry, or Combined Science with Biology or Chemistry component, or equivalent

Assessment: 50% continuous assessment; 50% examination.

BBMS2005 Basic Pharmacology Year 2 (6 credits)

This course provides basic information on the interaction of drugs with different body systems, and the pharmacological basis in drug therapy, and also cover general principles in pharmacology, drug discovery and development, pharmacokinetics, pharmacodynamics and pharmacogenomics. In addition, the pharmacology of chemical mediators, and commonly used anti-microbial, anti-inflammatory and anti-cancer drugs will be introduced.

Prerequisite: Pass in CHEM1041 Foundations of Chemistry or CHEM1042 General Chemistry I
Assessment: 30% continuous assessment; 70% examination.

BIOC2600 Basic Biochemistry Year 2 (6 credits)

This course is designed to present an overview of biochemistry of fundamental importance to the life process. We aim to develop appreciation of the basics in biochemistry as a common ground for science and non-science students to progress into their areas of specialization. Students intending to pursue further studies in Biochemistry, Molecular Biology and Biomedical Sciences will find this

course particularly helpful. Topics including structure and functions of carbohydrates, lipids, nucleic acids, amino acids and proteins; enzymes and co-enzymes; basic bioenergetics; key metabolic processes in a living cell; signaling across cell membranes; flow of genetic information will be covered.

Prerequisite: BIOC1600 Perspectives in Biochemistry

Assessment: 40% continuous assessment; 60% examination

CHEM2442 Fundamentals of Organic Chemistry Year 2 (6 credits)

The major objective of this course is to give the students a basic understanding of organic chemistry, especially in the context of daily life. This will be achieved through the introduction of the chemistry of organic functional groups that form the basis of organic molecules. The concepts presented in the lectures will be reinforced by a series of laboratory experiments.

Prerequisite: Pass in CHEM1042 General Chemistry I; and Not for students who have passed CHEM2441 Organic Chemistry I or have already enrolled in this course

Assessment: 15% lab report; 25% test/quiz; 60% examination.

BBMS3014 Advanced Pharmacology Year 3/4 (6 credits)

This course is to introduce our students to state-of-the-art in pharmacology and pioneer drug research in selected topics. This course explores the current development in pharmacology and advances in biomedical science which brings us to a new level of understanding how drugs act. Topics include drug use and research in diseases affecting different populations: elderly, stressful working class and pediatric population, such as cardiovascular, gastrointestinal, respiratory, metabolic diseases, and dysfunctions of reproductive, and central & peripheral nerve systems. Drugs for several special and popularly discussed health issues are also included.

Prerequisite: Pass in BBMS2005 Basic Pharmacology

Assessment: 50% continuous assessment; 50% examination.

BPHM3151 Principles of Pharmacognosy, Herbal Medicines and Nutraceuticals Year 3/4 (6 credits)

This course broadens the horizon of students in the field of, and provides them with background knowledge of, herbal medicines and nutraceuticals. Phytochemistry, pharmacology of phytochemicals such as alkaloids, phenolic glycosides, volatile oils, terpenoids and carbohydrates; therapeutic uses, adverse effects and drug interactions of common herbal medicines, nutrients, dietary supplements and functional food; safety issues and quality control of herbal medicines and nutraceuticals.

Prerequisite: Pass in BIOC1600 Perspectives in Biochemistry and CHEM1042 General Chemistry I/CHEM1041 Foundations of Chemistry and CHEM2442 Fundamentals of Organic Chemistry

Assessment: 50% continuous assessment; 50% examination.

BPHM4142 Molecular Pharmacology Year 3/4 (6 credits)

This advanced course in pharmacology focuses on the mechanisms of drug action at molecular level. Regulation of gene transcription, G-protein coupled receptors, ligand-gated ion channels, voltage-gated ion channels, osmolyte or mechanosensitive channels, transient receptor potential channels and gap junction channels, receptor enzymes, second messengers system, regulation of signaling pathways, receptor internalization and alternative signaling pathways.

Prerequisite: Pass in BBMS2005 Basic Pharmacology

Assessment: 70% assignment; 30% examination.

BPHM4147 Toxicology and Drug Abuse Year 4 (6 credits)

This course provides students with an understanding of the toxicological problems encountered in clinical practice, drug development and medical research. Basic principles of toxicology including mechanisms of toxicity, biotransformation and toxicity of drugs, as well as genetic toxicology will be covered. The clinical toxicology component of this course introduces the concept of therapeutic drug monitoring and management of acute chemical poisoning. This course also aims to highlight the clinical issues associated with drugs of abuse, enhancing the students' understanding on the physiological, pharmacological and sociological consequences of drug abuse and how these issues should be managed in clinical practice.

Prerequisite: Pass in BBMS3014 Advanced Pharmacology
Assessment: 40% continuous assessment; 60% examination.

BBMS4002 Pharmaceutical Drug Development

Year 4 (6 credits)

This course provides knowledge on the processes involved in the development of pharmaceutical products, including process validation, quality assurance, regulated manufacturing practices, and intellectual property protection. The development of products will be studied with an emphasis on quality, safety, and efficacy.

Prerequisite: Pass in BBMS3014 Advanced Pharmacology
Assessment: 40% continuous assessment; 60% examination.

Elective Courses

BBMS3010 Emerging Infections Year 3/4 (6 credits)

This course will introduce students to the comparative human/animal infections and emerging diseases with emphasis on zoonotic viral infections. The course analyzes the emerging patterns of microbes of recent concern, focusing on the particularly innovative molecular processes these organisms use to ensure their success in surviving, multiplying and transmission in the human host. It also provides new insights into the phylogenetic relationships between microorganisms based on molecular systematics as well as into the latest issues of pathogenesis, pandemic potential, prevention and eradication.

Prerequisite: Pass in BBMS3005 Infection and Immunity or BBMS3001 Medical Microbiology

Assessment: 100% continuous assessment.

BBMS3011 Molecular Neuroscience Year 3/4 (6 credits)

This is an advanced course aiming to provide students with the latest frontier on molecular and cellular mechanisms that underlie the structure and function of the central nervous system. This interdisciplinary course covers fundamental concepts on the molecular basis of brain functions during development and aging, and discusses how dysregulation of these processes might lead to various brain disorders. Topics include axon guidance, synaptic transmission, formation and plasticity of synapses, learning and memory, and diseases of the nervous systems such as cognitive and emotional disturbance. Lectures and research-oriented practical training are emphasized so as to expose students to different research areas in molecular neuroscience.

Prerequisite: Pass in BBMS2006 Physiological Basis of Health and Disease

Assessment: 50% continuous assessment; 50% examination.

BBMS3012 Stem Cell & Regenerative Medicine Year 3/4 (6 credits)

Numerous human diseases resulting from the loss or malfunction of highly specialized cell types are currently incurable due to lack of capacity to regenerate as a result of diseases (e.g., myocardial infarction a.k.a. heart attack), traumas (such as accidental spinal cord injuries) or aging (e.g., macular degeneration). Recent advances in stem cell research have enabled clinicians and researchers to pursue the revolutionary paradigm of cell-based therapies and organ regeneration. The generation of human cell-based bioartificial tissues also opens up unprecedented new avenues for drug discovery, toxicity screening and disease modeling. In this course, a comprehensive introduction of the biology of stem cells, tissue engineering, industrial and clinical applications, as well as such non-scientific aspects as bioethics, historical and political developments will be given. Upon completion, students should have a global perspective of the emerging field of stem cell and regenerative medicine that bounds to revolutionize how medicine will be practiced.

Prerequisite: Pass in BBMS3002 Molecular Biology of the Cell

Assessment: 40% continuous assessment; 60% examination.

BBMS3013 Clinical Trial Strategies Year 3/4 (6 credits)

This course will discuss the history, planning, and analysis of clinical trials, as well as the research ethics in clinical trials. The main features of clinical trials will be highlighted including study designs and monitoring; research ethics practice; Good Clinical Practice (GCP); randomization; sample size calculations; protocol development; clinical trials analysis and study interpretations.

Prerequisite: Pass in BIOL2102 Biostatistics and BBMS2002 Evidence-based Practice and Public Health

Assessment: 50% continuous assessment; 50% examination.

BBMS3017 Advanced Physiological Science

Year 2/3/4 (6 credits)

This is an advanced course aiming to provide students with latest advances on the understanding and research of physiological functions in normal and disease states. The course content is focused on the molecular, cellular and systemic functions of various physiological systems (including neural, respiratory, cardiovascular, and endocrine), highlighting the scientific contents applicable to the physiological function and pathophysiological changes under disease conditions. Lectures and research-oriented practical learning are emphasized so as to expose students to different research areas of physiological science.

Prerequisite: Pass in BBMS2006 Physiological Basis of Health and Disease

Assessment: 100% continuous assessment