

## **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 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 English<sup>1</sup> and 6 credits in an English in the Discipline course;
    - (ii) 6 credits in Chinese language enhancement<sup>2</sup>; and
    - (iii) 36 credits of courses in the Common Core Curriculum comprising at least

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<sup>1</sup> 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.

<sup>2</sup> 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 Board:

- (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.

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:
    - (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 2015-2016.

### 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

##### Disciplinary Elective 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	Biomedical 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 English<sup>1</sup> and 6 credits of English-in-the-Discipline course, and 1 Chinese Language course (6-credit)<sup>2</sup>, 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 Biology	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

<sup>1</sup> 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.

<sup>2</sup> 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 Board:

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- (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	Biomedical 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, BBMS2005 Biomedical Pharmacology, BBMS2003 Human Genetics, 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 Biotechnologies in Regenerative Medicine	3/4	6
BBMS3013	Clinical Trial Strategies	3/4	6
BBMS3017	Advanced Physiological Science	2/3/4	6

*Notes:*

(1) 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)**

The purpose of this course is to familiarize students with probability and statistics. The course will give students the skills to read, interpret, and critically evaluate the statistics used in biological and medical sciences. The course will also introduce students to the fundamental principles and planning techniques to be able to analyze their own data, choose the correct statistical test and avoid common statistical pitfalls. Students will also learn how to develop testable hypotheses, design experiments to address their hypotheses, and conduct effective scientific communication.

Prerequisite: BIOC1600 Perspectives in Biochemistry or BIOL1110 From Molecules to Cells

Assessment: 60% continuous assessment; 40% 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: 50% continuous assessment; 50% 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 biomedical science 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: 20% continuous assessment; 20% oral presentation; 60% dissertation.



<b>Language Courses</b>
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**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. It will help students develop the necessary skills to use both written and spoken English within their studies. Students will learn to better communicate and discuss scientific concepts, with other scientists as well as to a larger audience. In the writing component, students will describe recent scientific research in language which is readable outside their subject area in the form of a popular science article. In the speaking component, students will discuss scientific concepts with other students and select and present information from their popular science article to a non-specialist audience in a poster presentation. They will also learn essential word parts in medical terminology, and apply word knowledge and strategies for learning new terms and their pronunciation.

Assessment: 100% continuous assessment.

<b>Disciplinary Elective Courses: List A</b>
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**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 BCHM 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, 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, structure and functions of the human body in relation to clinical practice. The course covers embryonic differentiation, musculoskeletal structures, brain and spinal cord, cardiovascular system, respiratory system, gastrointestinal system, endocrine system, and the urogenital system.

Prerequisite: Level 3 or above in HKDSE Biology or Chemistry or Combined Science with Biology or Chemistry component, or equivalent and Pass in BBMS1001 Human Biology

Assessment: 30% continuous assessment; 70% examination.

**BBMS2005 Biomedical Pharmacology Year 2 (6 credits)**

This course provides basic information on the general principles in pharmacology, pharmacokinetics, pharmacodynamics and pharmacogenomics. The interaction of drugs with different body systems will also be covered. In addition, commonly used anti-microbial, anti-inflammatory and anti-cancer drugs will be introduced. This knowledge is highly relevant and applicable to clinical trial and biotechnology-related drug research.

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.

**Disciplinary Elective Courses: List B**

**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 BBMS2001 Basic Biomedical Laboratory Techniques

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, gene engineering, immunotherapeutic and disease prevention.

Prerequisite: Pass in BBMS1001 Human Biology or 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

Not for students who have passed BIOL3401 Molecular Biology or have already enrolled in this course

Assessment: 40% continuous assessment; 60% 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 Biology** **Year 3/4 (6 credits)**

Cancer has profound health impact on our society as a major killer disease. Rapid research advances have greatly improved our understanding of the disease mechanisms of cancer, which has led to better treatments, detection and prevention strategies. This course will provide a comprehensive overview of the genetic, molecular and cell biological processes involved in the initiation and progression of cancer. The key topics include: hallmarks of cancer, genetic and epigenetic events in cancer cells, concept of cancer stem cells, alterations in signalling pathways and metabolism as well as the emerging importance of tumour microenvironment in cancer cells. The development of novel cancer treatments including targeted therapy and immunotherapy, the challenges due to treatment resistance, tumour recurrence and tumour heterogeneity will also be covered. 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 any one of the following courses: BBMS2003 Human Genetics, BBMS2007 Essential Molecular Biology, BBMS3002 Molecular Biology of the Cell, BIOL3401 Molecular

Biology, BIOL3408 Genetics or equivalent courses  
Assessment: 40% continuous assessment; 60% 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 any one of the following courses: BBMS2007 Essential Molecular Biology, BIOC2600 Basic Biochemistry, BIOL2220 Principles of Biochemistry, BIOL3401 Molecular Biology

Assessment: 50% continuous assessment; 50% examination.

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

This course will present topics applicable to human genetics and genomic biology in the “post-genome” era. Main topics include The Human Genome Project; technologies for genomic analysis such as microarrays and high-throughput sequencing; and bioinformatics for handling, analysing and interpreting genomic data, making use of standard analysis programs and public genomic resources such as the HapMap, 1000 Genome, ENCODE and Epigenetic Roadmap. We also show how the application of genome science to human diseases has led to improved understanding of disease aetiology and mechanisms. Students will gain knowledge and understanding in 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, BIOL3401 Molecular Biology, BIOL3408 Genetics, or equivalent courses

Assessment: 50% assignment; 50% 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 Biomedical Pharmacology**

**Year 2 (6 credits)**

This course provides basic information on the general principles in pharmacology, pharmacokinetics, pharmacodynamics and pharmacogenomics. The interaction of drugs with different body systems will also be covered. In addition, commonly used anti-microbial, anti-inflammatory and anti-cancer drugs will be introduced. This knowledge is highly relevant and applicable to clinical trial and biotechnology-related drug research.

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

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: 40% 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. Course is conducted in the format of group discussion and problem-based learning.

Prerequisite: Pass in BBMS2005 Biomedical Pharmacology

Assessment: 100% continuous assessment.

**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 principles and mechanisms of drug-target interactions and the applications in innovative medicines for the treatment of complex diseases, such as cancer, cardiovascular and metabolic abnormalities. Regulation of gene transcription, receptors, channels, enzymes and lipids signaling will be emphasized in order to understand the mechanism-based design of drugs and biopharmaceutics. The use of in silico, in vitro and in vivo models for drug screening and evaluation will also be covered.

Prerequisite: Pass in BBMS2005 Biomedical Pharmacology or BPHM2141 Pharmacology & Clinical Pharmacy I

Not for students who have passed BBMS4005 Biopharmaceutical Research and Development or have already enrolled in this course

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 infectious diseases with emphasis on zoonotic viral infections and resistance to antibiotics. 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 adaptation, 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 knowledge of pathogenesis, pandemic potential, prevention and eradication of pathogens.

Prerequisite: Pass in BBMS1001 Human Biology or equivalent

Assessment: 60% continuous assessment; 40% examination.

**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, tutorials, presentation of research papers, and research-oriented practical training are emphasized so as to expose students to different areas in molecular neuroscience.

Prerequisite: Pass in any one of these courses: BBMS1001 Human Biology, BIOC2600 Basic Biochemistry, BIOL2220 Principles of Biochemistry, MEDE2302 Life Sciences II (Cell Biology & Physiology), PSYC2022 Biological Psychology

Assessment: 50% continuous assessment; 50% examination.

**BBMS3012 Stem Cell Biotechnologies in Regenerative Medicine Year 3/4 (6 credits)**

Stem cell research and biotechnology has great promise for the future of regenerative medicine. The course covers the stem cell biology of various organ systems particularly in the context of human diseases, the state-of-the-art biotechnologies for stem cell research and their applications in disease modelling, treatment and drug development. In addition, non-scientific aspects such as bioethics, political developments, future development and challenges of stem cell research will also be discussed. Hands-on laboratory experience will be provided. Upon completion, students should have solid knowledge of stem cell biology and their implications in tissue homeostasis and diseases, as well as the latest biotechnologies for stem cell research and their applications.

Prerequisite: Pass in any one of the following courses: BIOC2600 Basic Biochemistry, BIOL2220 Fundamentals of Biochemistry, BIOL3401 Molecular Biology, BBMS2007 Essential Molecular Biology, 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