

**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 2016-2017.

*(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

<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> Students are required to successfully complete the 6-credit Faculty-specific Chinese language enhancement course, except for:

- (a) Putonghua-speaking students who should take CUND9002 (Practical Chinese and Hong Kong Society) or CUND9003 (Cantonese for Non-Cantonese Speaking Students); and
- (b) students who have not studied 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 should write to the Faculty Board to apply to be exempted from the Chinese language requirement, and
  - (i) take a 6-credit Cantonese or Putonghua language course offered by the School of Chinese especially for international and exchange students; OR
  - (ii) take an elective course in lieu.

(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:
    - (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 2016-2017.

**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
BBMS2011	Research Methods in Medicine and Health	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
BBMS3010	Emerging Infections	3/4	6
BBMS3011	Molecular Neuroscience	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.

<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> Students are required to successfully complete the 6-credit Faculty-specific Chinese language enhancement course, except for:

- (a) Putonghua-speaking students who should take CUND9002 (Practical Chinese and Hong Kong Society) or CUND9003 (Cantonese for Non-Cantonese Speaking Students); and
- (b) students who have not studied 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 should write to the Faculty Board to apply to be exempted from the Chinese language requirement, and
  - (i) take a 6-credit Cantonese or Putonghua language course offered by the School of Chinese especially for international and exchange students; OR
  - (ii) take an elective course in lieu.

Four 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
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

*Minor in Biotechnology & Clinical Research (36 credits)*

		Year	Credits
BBMS1001	Human Biology	1	6
BBMS2005	Biomedical Pharmacology	2	6
BBMS2009	Introduction to Clinical Research	2	6
BBMS2008	Contemporary Topics in Biomedical Technology	2/3	6
BBMS2010	Fundamentals of Clinical Trial Management	2/3	6
BBMS3012	Stem Cell Biotechnologies in Regenerative Medicine	3/4	6
BBMS3018	Biomechanics and Biomedical Technologies	3/4	6
BIOL3409	Business Aspects of Biotechnology	3/4	6
BBMS4005	Biopharmaceutical Research and Development	3/4	6
BMED4604	Cell and Tissue Engineering	3/4	6
/MEDE4604			

*Minor in Kinesiology (36 credits)*

		Year	Credits
BBMS1002	Fundamentals of Human Anatomy and Physiology (for Non-BBiomedSc students)	1	6
EXSC2003	Exercise Physiology	2/3	6
EXSC2007	Exercise Prescription and Training	2	6
EXSC2001	Fundamentals of Motor Control and Learning	2/3	6
EXSC2008	Physical and Health Benefits of Exercise	2/3	6
EXSC2009	Exercise Biomechanics	1/2/3/4	6
EXSC2010	Measurement and Evaluation of Physical Activity	1/2/3/4	6
BBMS3018	Biomechanics and Biomedical Technologies	3/4	6
EXSC3002	Advanced Exercise Physiology	3/4	6

EXSC3014	Rehabilitation Science	3/4	6
EXSC3016	Psychology of Exercise and Health	3/4	6
EXSC3017	Nutrition for Exercise and Health	3/4	6
EXSC3018	Biological Basis of Exercise and Health	1/2/3/4	6
EXSC3019	Exercise and Chronic Diseases	1/2/3/4	6

There are thirteen courses which are listed under both the BBiomedSc major curriculum and the minor options (BBMS1001 Human Biology, BIOC1600 Perspectives in Biochemistry, BBMS2005 Biomedical Pharmacology, BBMS2009 Introduction to Clinical Research, EXSC2003 Exercise Physiology, BBMS2003 Human Genetics, BBMS2010 Fundamentals of Clinical Trial Management, EXSC2008 Physical and Health Benefits of Exercise, BBMS3018 Biomechanics and Biomedical Technologies, BIOC3605 Sequence Bioinformatics, BBMS4005 Biopharmaceutical Research and Development, EXSC3002 Advanced Exercise Physiology, EXSC3014 Rehabilitation Science). 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
BBMS3012	Stem Cell Biotechnologies in Regenerative Medicine	3/4	6
BBMS3017	Advanced Physiological Science	2/3/4	6
BBMS4011	Biomedical Innovation Team Project	2/3/4	12

*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:

- Teach students a biochemical perspective on each of the Basic Sciences focusing on concepts fundamental to the learning of Biochemistry;
- Promote deep learning of course material through an integrated programme of practical and collaborative tasks;
- Inspire students with a view of the great discoveries and future challenges for Biochemistry;
- Help students make the transition from school to university by developing their teamwork, independent study skills and confidence to communicate within a Biochemistry learning environment;

Prerequisite: Level 3 or above in 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)**

This course aims to familiarise students with biostatistics. It will give students the skills to understand, interpret, and critically evaluate the statistics used in biological and biomedical studies.

The course will also introduce the students to fundamental principles of various statistical tests, basic computational tools for analyzing data, choose the correct statistical test and avoid common statistical pitfalls.

Prerequisite: Pass in one of the following courses: BIOC1600 Perspectives in Biochemistry, BIOL1110 From Molecules to Cells, BIOL2306 Ecology and Evolution, ENVS1301 Environmental Life Science, ENVS2002 Environmental Data Analysis

Assessment: 70% continuous assessment; 30% 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: Level 3 or above in HKDSE Combined Science with Chemistry Component or Integrated Science, or equivalent.

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

Remark: Not for students with Level 3 or above in HKDSE Chemistry.



**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 or equivalent

Assessment: 15% test/quiz; 25% lab report; 60% 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 (15%). The project entails about 100 hours to write up a dissertation (10,000 words) and to give a professional presentation (20 minutes), which accounts for 60% and 25% 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: 15% continuous assessment; 25% oral presentation; 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. Four online-learning modules through the Moodle platform on academic speaking, academic grammar, academic vocabulary, citation and referencing skills and avoiding plagiarism will be offered to students to support their English learning. This course will help students to participate more effectively in their first-year university studies in English, thereby enriching their first-year experience.

Assessment: 100% continuous assessment.

**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% continuous assessment; 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.

**Disciplinary Elective Courses: List A****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.

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: 40% continuous assessment; 60% 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: 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.

**BBMS2011 Research Methods in Medicine and Health Year 2/3 (6 credits)**

This course introduces students to a comprehensive set of knowledge and practical skills necessary for understanding, appraising, and conducting clinical research. Students will start by examining the epistemological basis of scientific inquiry and its evolution, and begin formulating relevant research questions within an empirical framework. Students will then be introduced to different approaches to answer research questions, including major epidemiologic study designs and qualitative research methods, and will learn about important considerations when conducting research, including research ethics, survey design, and data management & analysis. Finally, students will move past learning about the "doing" aspect of research and focus on developing skills related to interpreting and communicating results from research studies.

Assessment: 60% continuous assessment; 40% examination.

**Disciplinary Elective Courses: List B****Year 3/4 (6 credits)****BBMS3001 Medical Microbiology**

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.

Prerequisites: 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; Cytoskeleton and Cell Adhesion; and Cell Proliferation and Differentiation. Students will also be introduced to current methodologies for molecular and cell biology research, and will be exposed to emerging systems and synthetic biology approaches in the study of cellular processes. The course also aims to provoke appreciation of how knowledge in basic science aids in the detection, rationalisation 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.

Prerequisites: 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 aims to introduce the causes, pathogenesis and pathologies of common human diseases related to inflammation and immune reactions. They include human diseases due to acute & chronic inflammation caused by infections, toxic insults and immunologic damages. Principles of diseases due to autoimmunity and malignancies of haematolymphoid organs are also included. The course would consist of lectures and practicals. The latter includes human pathology specimens and principles of immunological investigations.

Prerequisites: Pass in BBMS2004 Introduction to Human Anatomy and BBMS2006 Physiological Basis of Health and Disease

Assessment: 30% continuous assessment; 70% 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

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 one of the following courses: BIOC2600 Basic Biochemistry, BIOL2220 Principles of Biochemistry, BBMS2003 Human Genetics, BBMS2007 Essential Molecular Biology, MEDE2301 Life sciences I (Biochemistry)

Assessment: 30% coursework; 70% examination.

**BBMS3010 Emerging Infections****Year 1/2/3/4 (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, control and eradication of pathogens.

Prerequisite: Pass in BBMS1001 Human Biology or equivalent

Assessment: 50% continuous assessment; 50% examination.

**BBMS3011 Molecular Neuroscience****Year 1/2/3/4 (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. Latest techniques in neuroscience research, such as the use of viral-mediated expression of transgenes, optogenetics, chemogenetics, and induced pluripotent stem cells, will be introduced. Lectures, tutorials, presentation of research papers, and research-oriented practical training are emphasized so as to expose students to different areas in molecular neuroscience through multiple learning activities.

Prerequisite: Pass in any one of the following courses: BBMS1001 Human Biology, BIOL1110 From Molecules to Cells, BIOC2600 Basic Biochemistry, BIOL2220 Principles of Biochemistry, MEDE2302 Life Sciences II (Cell Biology & Physiology), PSYC2101 Foundations of Neuroscience, PSYC2110 Developmental Neuroscience

Assessment: 50% continuous assessment; 50% examination.

**Courses for Minor in Genetics & Genomics****BIOC1600 Perspectives in Biochemistry****Year 1 (6 credits)**

This course aims to:

- Teach students a biochemical perspective on each of the Basic Sciences focusing on concepts fundamental to the learning of Biochemistry.
- Promote deep learning of course material through an integrated programme of practical and collaborative tasks.
- Inspire students with a view of the great discoveries and future challenges for Biochemistry.
- Help students make the transition from school to university by developing their teamwork, independent study skills and confidence to communicate within a Biochemistry learning environment.

Prerequisite: Level 3 or above in 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: 40% continuous assessment; 60% examination.

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

### **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.

Prerequisites: 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: 40% assignment; 60% 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 one of the following courses: BIOC2600 Basic Biochemistry, BIOL2220 Principles of Biochemistry, BBMS2003 Human Genetics, BBMS2007 Essential Molecular Biology, MEDE2301 Life sciences I (Biochemistry)

Assessment: 30% coursework; 70% examination.

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

To provide an up-to-date knowledge of molecular biology, especially with respect to the regulation of eukaryotic gene expression.

Prerequisite: Pass in any one of the following courses: BIOC3601 Basic Metabolism, BIOL3401 Molecular Biology, BIOL3402 Cell biology and Cell Technology, BIOL3404 Protein Structure and Function, 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; precision 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.

Prerequisites: 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 aim to:

- Teach students a biochemical perspective on each of the Basic Sciences focusing on concepts fundamental to the learning of Biochemistry.
- Promote deep learning of course material through an integrated programme of practical and collaborative tasks.
- Inspire students with a view of the great discoveries and future challenges for Biochemistry.
- Help students make the transition from school to university by developing their teamwork, independent study skills and confidence to communicate within a Biochemistry learning environment.

Prerequisite: Level 3 or above in 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: 40% continuous assessment; 60% 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

Assessment: 40% test/quiz; 60% examination.

Remark: Not for students who have passed CHEM2441 Organic Chemistry I or have already enrolled in this course.



**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.

Prerequisites: 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

Assessment: 70% assignment; 30% examination

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

**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.

**Courses for Minor in Biotechnology & Clinical Research**
**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.

**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: 40% continuous assessment; 60% examination.

**BBMS2009      Introduction to Clinical Research      Year 2 (6 credits)**

The purpose of clinical research is to determine the safety and efficacy of treatments intended for human use. It helps researchers to learn how to prevent, diagnose and treat human illness. Clinical Trial is a key type of clinical research. The aim of this course is to equip students with necessary knowledge and skills for planning, designing and conducting clinical trials. The overall course learning outcome is to build a strong understanding of the scientific, practical, and ethical aspects of clinical trials.

Prerequisite: Pass in any one of the following courses: BIOL2102 Biostatistics, MATH1853 Linear Algebra, Probability and Statistics, STAT1601 Elementary Statistical Methods, STAT1603

Introductory Statistics

Assessment: 100% continuous assessment (Performance in each lecture and tutorial session 30%, Course project 20%, Test 50%).

**BBMS2008      Contemporary Topics in Biomedical Technology      Year 2/3 (6 credits)**

Biomedical technology brings together the latest innovations from science, medicine and engineering, applying them in biomedical research and healthcare. We are in the midst of a revolution in biomedical technology, with an industry undergoing exponential growth and offering exceptional opportunity for coming decades. This course reflects on major breakthroughs past and present, on frontier technologies in biomedical technology, and on how the intersection between biomedical science and business is set to transform healthcare.

Prerequisite: Pass in any one of the following courses: BBMS1001 Human Biology, BIOC1600 Perspectives in Biochemistry, BIOL1110 From Molecules to Cells, ENGG1207 Foundations of Biochemistry for Medical Engineering, MEDE2301 Life Sciences I (Biochemistry)  
 Assessment: 30% continuous assessment; 30% assignment; 40% group project.

**BBMS2010 Fundamentals of Clinical Trial Management** **Year 2/3 (6 credits)**

Clinical trial management, an essential aspect of clinical trials, is critical to the reliability and acceptability of drug, technology, or clinical intervention trials. Good clinical practice (GCP) refers to a set of international quality standards that defines the processes and regulations under which clinical trials on human subject's function. This course is designed to explain GCP and prepare students with skills in the conduct and management of clinical trials based on GCP and other regulatory requirements. The course is also integral to preparing students for a career in clinical trial research and management.

Assessment: 100% continuous assessment.

**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.

**BBMS3018 Biomechanics and Biomedical Technologies** **Year 3/4 (6 credits)**

The Biomechanics and Bio-prosthetic Technology course provides fundamental understanding of the human anatomy and physiology with application of the modern biomedical technology and prosthetic devices. In general, the course provides an overview of musculoskeletal anatomy, the structural function and mechanical properties of biodynamics and biological tissues. Specific course topics will include structure and function relationships in tissues and organs; application of stress and strain analysis to biological tissues; analysis of forces in human function and movement; energy and power in human activity; and introduction to modeling viscoelasticity of tissues. In addition, students will be provided with unique learning approach in theoretical background and cutting-edge laboratory hands-on bio-prosthetic technology experience.

Prerequisite: Pass in any one of the following courses: BBMS2004 Introduction to Human Anatomy, BBMS2006 Physiological Basis of Health and Disease, BIOL3205 Human Physiology, MEDE2302 Life Sciences II (Cell Biology & Physiology), MEDE3301 Life Sciences III (Physiology)

Assessment: 40% continuous assessment; 60% examination.

**BIOL3409 Business Aspects of Biotechnology** **Year 3/4 (6 credits)**

The course will give an overview of the innovative developments in biotech industry and provide the students with useful tools in learning how an exciting research idea can be turned into a viable business.

Prerequisite: Pass in any level 3 BIOL or BIOC or BBMS course; NOT for students who have passed in BIOL2409.

Assessment: 100 % continuous assessment

Remark: This course is only for students admitted in 2017-2018 or before.

**BBMS4005 Biopharmaceutical Research and Development Year 3/4 (6 credits)**

This course focuses on the research and development of innovative medicines, including drugs and biologicals. Principles and methodologies for identification of receptors, enzymes, lipids and nucleic acids as drug targets will be discussed. The mechanism-based discovery of life-saving and life-enhancing new medicines during the past 10 years will be emphasized, especially for certain complex diseases and conditions such as ageing, diabetes type 2 and obesity. In addition, the new approaches for the manufacturing process of biopharmaceutics will be introduced.

Prerequisite: Pass in any of the following courses: BBMS2005 Biomedical Pharmacology, BPHM2141 Pharmacology and Clinical Pharmacy I, BBMS2008 Contemporary Topics in Biomedical Technology, BIOC2600 Basic Biochemistry, BBMS3012 Stem Cell Biotechnologies in Regenerative Medicine, MEDE2302 Life Sciences II (Cell Biology & Physiology)

Assessment: 70% continuous assessment; 30% examination

Remark: Not for students who have passed BPHM4142 Molecular Pharmacology, or have already enrolled in this course.

**BMED4604 / MEDE4604 Cell and Tissue Engineering Year 3/4 (6 credits)**

This course firstly introduces the nature on cell and tissue organization, tissue dynamic processes including development, homeostasis and wound healing. Second, it reviews in detail the basic components of engineered tissues including cells, scaffolds and signals. For cells, important cellular-fate processes such as attachment, migration, proliferation, differentiation and apoptosis, and the cell culture technology will be reviewed before focusing on stem cells and their relevance in tissue engineering. For scaffolds, the analogous role of scaffolds and extracellular matrix of native tissues will be compared and the technological advancement in scaffold design and fabrication will be highlighted. On signals, different types of cell-regulating signals including soluble biofactors, insoluble matrix factors and cell-cell interactions and biophysical signals such as topological and mechanical signals will be introduced before an integrative summary on the application of these signals in designing stem cell niche can be made. Apart from employing these signals extrinsically, direct genetic manipulation of cells can also achieve the purpose of modifying cellular functions. The basic understanding and technological achievement of gene transfer and delivery and its applications in tissue engineering will be covered.

Prerequisites: BMED1207 Fundamentals of chemistry and biology for biomedical engineering, BMED2206 Engineering in Biology and Medicine, BMED2301 Life sciences I (Biochemistry), BMED2302 Life sciences II (Cell Biology & Physiology) and BMED3301 Life sciences III (Physiology)

Assessment: 20% practical work, 20% continuous assessment, 60% examination

Remark: BMED4604 for candidates admitted under the 4-year BBiomedSc curriculum in the academic year 2018-2019 and thereafter, MEDE4604 for candidates admitted under the 4-year BBiomedSc curriculum in the academic year 2017-2018 and before.

**Courses for Minor in Kinesiology**

**BBMS1002 Fundamentals of Human Anatomy and Physiology Year 1 (6 credits)**

This course provides the basic concepts related to the structure and function of the human body, including the organization of the body from single cell to the coordinated whole. Particularly, the course will focus on the body systems that respond to physical exercise, including cardiovascular, respirator, renal, musculoskeletal, neural, and endocrine. The course serves a basis for understanding the normal processes of life. In addition, the course will describe how different tissues are organised to perform the essential physiological functions in human body.

Assessment: 40% continuous assessment; 60% examination

Remark: This course is for Non-BBimedSc students.

### **EXSC2003 Exercise Physiology**

**Year 2/3 (6 credits)**

This course will introduce the key physiological and metabolic responses to acute and chronic exercise. Students will examine and evaluate physiological changes that occur to respiratory, cardiovascular and musculoskeletal systems during an acute bout of exercise and following a period of exercise training. The physiological basis of anaerobic and aerobic training and muscle training will be discussed. The environmental factors such as temperature and altitude that affect the responses to exercise will also be discussed. Students will participate in practical sessions held in the exercise physiology laboratory to assess their own anaerobic power, aerobic capacity, and isokinetic muscle strength.

Assessment: 100% coursework

### **EXSC2007 Exercise Prescription and Training**

**Year 2 (6 credits)**

This course will introduce the theoretical constructs underpinning exercise prescription and training and equip students with the necessary knowledge and skills to conduct basic pre-participation health screening, assess components of fitness and to design exercise programs for apparently healthy individuals. This course is designed to prepare students for exercise professional accreditation, particularly in becoming an American College of Sports Medicine (ACSM) Certified Personal Trainer. Students will participate in practical sessions held in the fitness gym to undergo physical fitness testing and fitness training activities.

Assessment: 100% coursework.

### **EXSC2001 Fundamentals of Motor Control and Learning**

**Year 2/3 (6 credits)**

Human movement is a highly complex process. Simply negotiating your way to lectures requires the processing of a host of sensory information, effective decision-making, and the coordinated contraction and relaxation of skeletal muscles. This course offers an introductory overview of how we control movement and how we develop and refine our movement skills. Emphasis is placed on basic principles of human movement and their application to health and exercise.

Assessment: 100% continuous assessment.

### **EXSC2008 Physical and Health Benefits of Exercise**

**Year 2/3 (6 credits)**

This course will investigate the role of exercise, physical activity (PA), inactivity and sedentary behaviour in health and wellness, with particular emphasis on the role of exercise and physical activity in the prevention and treatment of major non-communicable diseases (NCDs). Key terms relating to PA will be defined. Various PA measurement methods and their use in PA epidemiology and public health research will be discussed. Students will learn about fundamental study designs and methodologies used in evaluating the impacts of PA on health. Students will obtain skills and knowledge necessary to critically evaluate evidence on health benefits of PA. Students will learn whether the beneficial impacts of PA on health outcomes are independent of, or modified by other health risk factors, such as obesity, sedentary behaviour and genetic risk.

Assessment: 100% coursework

Remark: This course is equivalent to EXSC1002 Physical Activity and Health.

### **EXSC2009 Exercise Biomechanics**

**Year 1/2/3/4 (6 credits)**

This course will introduce you to the basic concepts of mechanics on the structure and function of the human movement. You will develop an understanding of the mechanical principles and rules that are governing motion. Examples and case studies from real life will be used to enhance your understanding

of how the laws of mechanics can be applied so as to contribute to maintaining the health or even the performance of the individual/athlete.

Assessment: 100% coursework.

**EXSC2010 Measurement and Evaluation of Physical Activity** **Year 1/2/3/4 (6 credits)**

This course will introduce students to the basic concepts, principles and applications of physical activity measurement and evaluation. Students will be able to describe advantages and disadvantages of various physical activity assessment tools. Moreover, students will learn about historical and new techniques needed to measure and evaluate physical activity. In addition, students will learn how emerging wearable technologies can be utilized under various applications to increase physical activity and decrease sedentary time. Students will also be able to apply various measurement techniques to evaluate the accuracy of physical activity assessment tools.

Assessment: 100% continuous assessment

Remark: This course is equivalent to EXSC2006 Measurement of Physical Activity.

**BBMS3018 Biomechanics and Biomedical Technologies** **Year 3/4 (6 credits)**

The Biomechanics and Bio-prosthetic Technology course provides fundamental understanding of the human anatomy and physiology with application of the modern biomedical technology and prosthetic devices. In general, the course provides an overview of musculoskeletal anatomy, the structural function and mechanical properties of biodynamics and biological tissues. Specific course topics will include structure and function relationships in tissues and organs; application of stress and strain analysis to biological tissues; analysis of forces in human function and movement; energy and power in human activity; and introduction to modeling viscoelasticity of tissues. In addition, students will be provided with unique learning approach in theoretical background and cutting-edge laboratory hands-on bio-prosthetic technology experience.

Prerequisite: Pass in any one of the following courses: BBMS2004 Introduction to Human Anatomy, BBMS2006 Physiological Basis of Health and Disease, BIOL3205 Human Physiology, MEDE2302 Life Sciences II (Cell Biology & Physiology), MEDE3301 Life Sciences III (Physiology)

Assessment: 40% continuous assessment; 60% examination.

**EXSC3002 Advanced Exercise Physiology** **Year 3/4 (6 credits)**

This course will scientifically address the question “why exercise can result in the improvement of human health?” by providing an in-depth discussion on the latest discovered mechanisms that are responsible for the widespread health benefits of exercise, including the antioxidant, anti-inflammatory, anti-aging, anti-tumor, myokine/exerkine, cardioprotective, glucose-lowering and fat-beiging effects of exercise. This course will also explore the fundamental cellular and molecular mechanisms that underpin the physiological adaptations from exercise leading to the enhancement of human health.

Prerequisite/ Co-requisite: Pass in EXSC2003 Exercise Physiology

Assessment: 100% continuous assessment

Remark: This course is replaced by EXSC3018 with effect from the 2019-20 academic year.

**EXSC3014 Rehabilitation Science** **Year 3/4 (6 credits)**

This course will present both theoretical perspectives and applied aspects of rehabilitation science. Students will study human functional capacity as it relates to deficits of neuromuscular, cardiovascular and respiratory mechanisms that underlie functional disability. Emphasis is placed on the application of fundamental theoretical principles to enhance human performance and quality of life of persons with movement difficulties in dynamic environments.

Prerequisite: Pass in any one of the following courses: EXSC2003 Exercise Physiology, EXSC2008 Physical and Health Benefits of Exercise

Assessment: 100% continuous assessment.

**EXSC3016 Psychology of Exercise and Health****Year 3/4 (6 credits)**

This course primarily looks at the psychological aspects of exercise and health behaviours. The content will cover different models of psychology that have been used for explaining and intervening exercise and health behaviours among diverse populations. In addition, the course reveals the role of exercise and physical activity on mental health/illnesses and psychological well-being. Students will explore the assessment and research methods of psychology to evaluate psychological factors of exercise and health behaviours. Mental skills training and counselling techniques useful for fostering behavioural adherence towards exercise and other health enhancing behaviours will be demonstrated. Students will be given opportunities to develop evidence-based behavioural change strategies and intervention programs based on psychological principles for the promotion of physical activity and health behaviours.

Assessment: 100% continuous assessment

Remark: This course is equivalent to EXSC2002 / EXSC3015 Sport and Exercise Psychology.

**EXSC3017 Nutrition for Exercise and Health****Year 3/4 (6 credits)**

This course will introduce the basic principles of human nutrition and the functional role of nutritional components such as water/fluid, vitamins, minerals, carbohydrate, fat, and protein for health and exercise performance. Students will be exposed to appropriate nutritional practices that assist with weight loss and weight management and that positively influence exercise performance. Students will participate in learning activities to apply the sports nutrition knowledge in real-life scenario.

Assessment: 100% coursework

Remark: This course is equivalent to EXSC3013 Sport and Exercise Nutrition.

**EXSC3018 Biological Basis of Exercise and Health****Year 1/2/3/4 (6 credits)**

This course will address the question “why exercise can result in improvement of human health?” by providing an in-depth discussion on the latest discovered biological mechanisms that are responsible for the widespread beneficial effects of exercise on health, including the anti-inflammatory effect, antioxidant effect, myokines, cardioprotective effect, fat-beiging effect, glucose-lowering effect, anti-cancer effect, and brain health effect of exercise. This course will also explore the fundamental cellular and molecular mechanisms that underpin the physiological adaptations from exercise leading to the enhancement of human health. Students will participate in practical sessions held in the laboratory to assess their own body fat and glucose tolerance.

Assessment: 100% coursework

Remark: This course is equivalent to EXSC3002 Advanced Exercise Physiology.

**EXSC3019 Exercise and Chronic Diseases****Year 1/2/3/4 (6 credits)**

Exercise and chronic diseases course will introduce you to the prevention, rehabilitation and management of the chronic conditions in which exercise can play a vital role. You will be able to understand the most effective way to change the behaviour of an individual regarding exercise and how to design safe and effective exercise programmes for individuals with chronic diseases. You will be exposed to clinical case scenarios with the primary objective to develop the skills in evidence-based practice.

Assessment: 100% coursework.

**Elective Courses****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, BBMS3017 Advanced Physiological Science

Assessment: 40% continuous assessment; 60% 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.

**BBMS4011 Biomedical Innovation Team Project Year 2/3/4 (12 credits)**

This course will simulate real-life pre-seed start up accelerator programmes. It will walk students through the complete process of setting up a biomedical technology-based start up company. During the 24-weeks, the students will be asked to: (1) identify potential biomedical research outputs for translation into a product, (2) work on their ideas, (3) identify different types of talents they would potentially recruit to build the team, (4) name the company and product and (5) work out a business model. The curriculum will cover topics from evaluating biomedical research output for translation into viable products to the intricacies of setting up a company.

Assessment: 100% continuous assessment.