**REGULATIONS FOR THE DEGREE OF MASTER OF BIOMEDICAL INNOVATION (MBioInno)**
*(Applicable to candidates admitted in the 2026-27 academic year and thereafter)*

*(See also General Regulations and Regulations for Taught Postgraduate Curricula)*

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**MBI.1 Admission requirements**

To be eligible for admission to the curriculum leading to the Master of Biomedical Innovation, a candidate shall:

(a) comply with the General Regulations;
(b) comply with the Regulations for Taught Postgraduate Curricula;
(c) hold a Bachelor's degree with honours of this University, or another qualification of equivalent standard from this University or from another university or comparable institution accepted for this purpose;
(d) satisfy the University English language requirement applicable to higher degrees as prescribed under General Regulation G2(b); and
(e) satisfy the examiners in a qualifying examination, if required.

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**MBI.2 Qualifying examination**

(a) A qualifying examination may be set to test the candidate's formal academic ability or his/her ability to follow the courses of study prescribed. It shall consist of one or more written papers or their equivalent and may include a project report.
(b) A candidate who is required to satisfy the examiners in a qualifying examination shall not be permitted to register until he or she has satisfied the examiners in the examination.

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**MBI.3 Award of degree**

To be eligible for the award of the degree of Master of Biomedical Innovation, a candidate shall:

(a) comply with the General Regulations;
(b) comply with the Regulations for Taught Postgraduate Curricula; and
(c) complete the curriculum requirements and satisfy the examiners in accordance with the regulations set out below.

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**MBI.4 Period of study**

The curriculum shall normally extend over one academic year of full-time study, or two academic years of part-time study. Candidates shall not be permitted to extend their studies beyond the maximum period of study of three academic years of full-time study, or four academic years of part-time study, unless otherwise permitted or required by the Board of the Faculty.

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**MBI.5 Completion of curriculum**

To complete the curriculum, a candidate shall:

(a) satisfy the requirements prescribed in TPG 6 of the Regulations for Taught Postgraduate Curricula;
(b) take not less than 69 credits in the manner specified in these regulations and the syllabuses, and follow the instructions in the syllabuses prescribed for the curriculum and complete satisfactorily all required written, practical and/or clinical work;
(c) satisfy the examiners in the courses by continuous assessments and/or written examinations; and
(d) complete a satisfactory capstone project on an approved topic, or an industry internship, and may be required to present a written report.

A candidate who fails to fulfil the requirements within the prescribed maximum period of study shall be recommended for discontinuation under the provisions of General Regulation G12.

Candidates who do not wish to specialise in one stream or do not satisfy the requirements of any of the two streams outlined shall be regarded as generalists.

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**MBI.6 Course selection**

Selection of courses shall be made within the curriculum structure delineated, in consultation with the Academic Director.

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**MBI.7 Title of the capstone project**

The title of the capstone report shall be submitted for approval in the year of graduation. The candidate shall submit a statement that the capstone report represents his/her own work (or in the case of conjoint work or work on a secondary dataset, a statement countersigned by his/her co-worker/supervisor, which shows his/her share of the work) undertaken after registration as a candidate for the degree.

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**MBI.8 Assessment**

(a) Candidates who fail to satisfy the examiners in a course may be permitted:
   i) to attend a re-examination; or
   ii) to re-take the prescribed assessment(s) without having to repeat the course; or
   iii) to repeat the course and to re-take the prescribed assessment(s)/examination(s); or
   iv) to enrol in an alternative course in lieu and to take the prescribed assessment(s)/examination(s).

(b) Candidates who fail to satisfy the examiners in the assessment of the capstone experience (applies to both capstone project and industry internship), but has satisfactorily completed the prescribed work, may be permitted to re-submit the written report within a specific period of time or retake the capstone experience.

(c) Candidates may be required to discontinue their studies if they:
   i) are not permitted to retake the prescribed assessment(s) or repeat a course which he/she has failed, or present himself/herself for re-examination(s), or re-submit a revised report of the capstone experience, or retake the capstone experience; or
   ii) fail to satisfy the examiners in the examinations at the third attempt; or
   iii) fail to achieve a cumulative grade point average[1] (CGPA) of 1.0 or higher for two consecutive semesters with course enrolment; or
   iv) exceed the maximum period of study.

(d) Candidates shall not be permitted to repeat a course for which they have received a passing grade for the purpose of upgrading.

[1] At the end of each semester, a cumulative grade point average (CGPA) for all courses taken by a student (including failed courses), which are graded in the letter grading system, at the time of calculation is computed.

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**MBI.9 Grading system**

Individual courses (except for the capstone experience and the innovator immersion programme for full-time students) will be graded according to the following grading system:

| Grade | Standard | Grade Point |
|---|---|---|
| A+ | Excellent | 4.3 |
| A | | 4.0 |
| A- | | 3.7 |
| B+ | Good | 3.3 |

| | | |
|---|---|---|
| B | | 3.0 |
| B- | | 2.7 |
| C+ | Satisfactory | 2.3 |
| C | | 2.0 |
| C- | | 1.7 |
| D+ | Pass | 1.3 |
| D | | 1.0 |
| F | Fail | 0 |

The capstone experience and the innovator immersion programme (for full-time students) will be graded according to the "Pass" or "Fail" grading system.

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**MBI.10 Examination results**

On successful completion of the curriculum, a candidate who has shown exceptional merit may be awarded a distinction as determined by the Board of Examiners for the degree which shall be recorded in the candidate's transcript.

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**MBI.11 Publication based on work approved**

Any publication based on work approved for a higher degree should contain a reference to the effect that the work was submitted to The University of Hong Kong for the award of the degree.

**SYLLABUS FOR THE DEGREE OF MASTER OF BIOMEDICAL INNOVATION (MBioInno)**

Candidates are required to complete a minimum of 69 credits of courses for the Master of Biomedical Innovation, including:

- 12 credits of ***Foundation Courses***;
- 18 credits of ***Core Courses***;
- 18 credits of ***Specialised Courses*** in either the '**Cellular and Molecular Biotechnology**' or the '**Digital Health Technology**' streams;
- 21 credits of ***Capstone Experience*** (capstone project or industry internship); and
- A non-credit-bearing Innovator Immersion Programme (for full-time students only).

The mode of assessment for *Foundation*, *Core* and *Specialised Courses* comprises continuous assessments and examinations. Candidates are also required to submit a capstone report on a selected project in the chosen specialised stream to the satisfaction of the examiner(s).

Overall curriculum structure

| Component | Content | Credits | Remarks |
|---|---|---|---|
| *Foundation Courses* | Select FOUR from the following:<br>• SBMS7101 Technology and Innovation Management [3]<br>• SBMS7102 Biomedical Entrepreneurship [3]<br>• SBMS7103 Quality Project Management [3]<br>• SBMS7104 Regulatory Affairs [3]<br>• SBMS7105 Effective Science Communication and Data Visualization [3] | 12 | |
| *Core Courses* | Select THREE from the following:<br>• SBMS7201 Essential Skills in High-throughput Sequencing Data Analysis [6] *(co-list in MMedSc "Genomics and Bioinformatics" specialisation)*<br>• SBMS7202 Foundations in Biomedical Data Science [6] *(co-list in MMedSc "Genomics and Bioinformatics" specialisation)*<br>• SBMS7203 Biomedical Product Development [6]<br>• SBMS7204 Integrative Perspectives of Body Functions [6] *(co-list in MMedSc)* | 18 | |
| *Specialised Courses* | **Cellular and Molecular Biotechnology (CMB)**<br>• SBMS7301 Molecular Biology of the Gene and Diseases [6] *(co-list in MMedSc "Core")*<br>• SBMS7302 Advanced Cell Biology [6] *(co-list in MMedSc "Core")*<br>• SBMS7303 Biotechnologies in Neuroscience [3]<br>• SBMS7304 Stem Cell Biotechnologies [3]<br>• SBMS7305 Molecular Cancer Diagnostics and Therapeutics [3]<br><br>**Digital Health Technology (DHT)**<br>• SBMS7401 Advances in Artificial Intelligence in Medicine [6]<br>• SBMS7402 Big Data Analysis in Healthcare [6]<br>• SBMS7403 Digital Health Technology [6]<br>• SBMS7404 Artificial Intelligence and Data Analytics for Biomedical Research [6] | 18 | Candidates who complete 18 credits in ONE stream AND complete a capstone project/internship in this stream are eligible to claim they specialise in this stream.<br><br>Those who do not wish to specialise in one stream or do not satisfy the requirements of any of the two streams outlined shall be regarded as generalists. |
| *Innovator Immersion Programme* | SBMS7000 Innovator Immersion Programme [0] (for full-time students only) | 0 | This non-credit-bearing experimental-learning module is designed for full-time students to utilise their daytime hours |

| | | | |
|---|---|---|---|
| *Capstone Experience* | [Under each option, each project must be designated as Capstone (CMB) or Capstone (DHT)]<br>• SBMS8001 Capstone Project (output in form of capstone report); or<br>• SBMS8002 Industry Internship (output in form of experiential learning report that include weekly learning logs and a reflective essay). For claiming a particular stream, relevance of the internship to the stream must be confirmed by the programme co-directors prior to the start of the internship. | 21 | |

Course List:

*Foundation Courses*

**SBMS7101 Technology and Innovation Management (3 credits)**

Management of innovative technology is critical to the long-term success of any technology-oriented organisations. It is important to understand the technology life cycle in the field of biomedical innovation. In this course, students will learn key stills in this technology translation pathway. Key topics include protection of intellectual properties (IP) rights, technology licensing, formation of start-up founding teams, clinical validation, product management, business and financial planning, and market research. Students will learn key knowledge and practical skills in these areas.

*Contents*

- Biomedical innovation management
- IP protection
- Technology licensing
- Prototyping
- Product management
- Technology transfer

*Aims(s)*

- To identify innovative ideas that have healthcare and market value in the biomedical and digital health sector
- To execute steps in protecting intellectual properties, product management, and technology transfer
- To manage the innovative technology to maximise translational potentials

*Assessment:* 100% Continuous assessment

**SBMS7102 Biomedical Entrepreneurship (3 credits)**

Extracting value from any biomedical innovation through entrepreneurship requires a good understanding of the value of the technology in the market. A successful start-up company requires a mixture of human and financial capital, core technology, and a prudent financial plan, and a suitable business market that harnesses the demand of the market. In this course, we introduce and discuss core skills in biomedical entrepreneurship.

*Contents*

- Biomedical venture
- Formation of founding teams
- Financial planning
- Business models
- Market research
- Valuation and investment management
- Business pitch
- Use of AI technology

*Aims(s)*

- To create a technology start-up company in the biomedical or digital health field
- To develop business models that maximise the value of a technology in the target market

*Assessment:* 100% Continuous assessment

**SBMS7103 Quality Project Management (3 credits)**

Quality project management is essential in biomedical innovation, from basic research to delivering healthcare services. This course will introduce key elements of project management and quality assurance (QA), including setting up standard operating procedure (SOP), continuous improvement plan, data management, risk assessment, and audit plan. We will explore how to apply quality management frameworks in biotechnology and digital health settings.

*Contents*

- Introduction to product management
- Key elements of quality assurance
- Standard operating procedures
- Continuous improvement plan
- Data management
- Risk assessment
- Audit plan

*Aims(s)*

- To perform standard project management planning in the biomedical industry
- To apply standard project management and quality assurance frameworks in the biomedical industry
- To evaluate project management plans and perform risk assessment in the biomedical industry

*Assessment:* 100% Continuous assessment

**SBMS7104 Regulatory Affairs (3 credits)**

Regulatory compliance is an important aspect to ensure pharmaceuticals, medical devices or other biomedical products are safe and effective in accordance to evidence-based medicine. In this course, students will learn the principles and frameworks of regulatory compliance in the healthcare sector. Students will learn design of clinical studies, and assess quality of scientific evidence. We will also explore regulatory and monitoring frameworks, and international best practice of regulatory affairs in the healthcare sector.

*Contents*

- Clinical trial design and management
- Evaluation of scientific and clinical evidence
- Regulatory frameworks
- Continuous monitoring
- Regulation of drugs
- Regulation of medical devices

*Aims(s)*

- To design and execute clinical trials that generate high quality clinical evidence of a medical product
- To apply the principles and best practice of regulatory frameworks to medical products
- To maintain regulatory compliance of a medical product throughout its life cycle

*Assessment:* 100% Continuous assessment

**SBMS7105 Effective Science Communication and Data Visualization (3 credits)**

This course is designed to equip students with the skills and knowledge necessary to effectively communicate scientific concepts and data to various audiences, including academic, business sectors, and the general public. Students will learn principles of effective science communication and data visualization techniques through hands-on activities and real-world examples. By the end of the course, students will be able to create compelling visual representations of data and communicate complex scientific information clearly and concisely.

*Contents*

- Principles of effective communication and data visualization
- Verbal and non-verbal oral presentation skills
- Tools and technologies for data visualization
- Effective multimedia design
- Ethical considerations in science communication

*Aims(s)*

- To develop students' skills in effectively communicating complex scientific information to different audiences
- To provide students with hands-on experience in creating compelling data visualizations
- To enhance students' ability to engage and persuade audiences through clear and concise communication
- To instil ethical considerations and best practices in science communication and data visualization

*Assessment:* 50% Continuous assessment; 50% Final examination

*Core Courses*

**SBMS7201 Essential Skills in High-throughput Sequencing Data Analysis (6 credits)**

This course aims to provides a practical introduction to the analysis of genomics, transcriptomics, and other omics data using statistical and bioinformatics approaches. Students will learn essential workflows, data processing techniques, and analytical methods for interpreting high-throughput sequencing data. Topics include quality control, alignment, variant calling, differential expression analysis, and integrative multi-omics approaches. Hands-on exercises with real datasets will reinforce key concepts and develop proficiency in relevant tools and scripting. By the end of the course, students will be familiar with the analysis and interpretation of next-generation sequencing data for biomedical research and clinical applications.

*Contents*

- Gene identification
- Information searching and retrieval: Entrez and SRS
- Internet resources: DNA and protein sequence databases
- Patterns, Motifs and Profiles analysis
- Phylogenetic analysis Sequence alignment: multiple sequence alignment
- Sequence database searching: FASTA, BLAST, Smith
- Waterman, algorithm and parameters
- Simple sequence analysis

*Aim(s)*

- To provide students with a practical introduction to the analysis of genomics, transcriptomics, and other omics data using statistical and bioinformatics approaches
- To familiarise students with the analysis and interpretation of next-generation sequencing data for biomedical research and clinical applications

*Assessment:* 70% Continuous assessment, 30% Final examination

*Core Courses*

**SBMS7202 Foundations in Biomedical Data Science (6 credits)**

This course offers a comprehensive introduction to the computational and statistical foundations of biomedical data analysis. Students will gain essential programming skills and an understanding of fundamental data structures relevant to bioinformatics. Key statistical methods—including probability, hypothesis testing, regression, and introductory machine learning—are explored through applications in biomedical research. Hands-on exercises with real-world datasets help develop practical skills in data analysis, visualisation, and interpretation. By the end of the course, students will develop a solid foundation for working with biomedical data and applying computational techniques in research or industry settings.

*Contents*

- Advanced R programming for biomedical data science
- Statistical modelling & machine learning
- Biomedical databases & big data technologies
- Generative AI in biomedicine
- Advanced data visualization & interpretability
- Data science for precision medicine & healthcare delivery

*Aim(s)*

- To design and implement robust statistical models to address hypothesis-driven biomedical research questions
- To leverage machine learning and generative AI to solve challenges in drug development, diagnostics, and public health
- To collaborate effectively across disciplines to translate data-driven insights into clinical or research advancements

*Assessment:* 50% Continuous assessment, 50% Final examination

*Core Courses*

**SBMS7203 Biomedical Product Development (6 credits)**

This course aims to provide students with a comprehensive understanding of the processes involved in developing innovative biomedical products. This course covers key concepts and methodologies essential for successful product development in the biomedical industry, including market analysis, regulatory requirements, design principles, prototyping, testing, and commercialization strategies. Students will have the opportunity to apply their knowledge through hands-on projects and case studies.

*Contents*

- Overview of product development cycle
- Market analysis
- Design principles and prototyping
- Regulatory requirements and quality assurance
- Intellectual property and commercialization

*Aim(s)*

- To equip students with understanding of the key concepts and processes involved in developing innovative biomedical products
- To Familiarize students in conducting market analysis, evaluating opportunities, prototyping techniques, and quality assurance practices in the healthcare industry

*Assessment:* 50% Continuous assessment, 50% Final examination

**SBMS7204 Integrative Perspectives of Body Functions (6 credits)**

This course aims to equip students with current knowledge on the mechanisms of human body functions from an integrative perspective. This course provides students with an in-depth exploration of the complex mechanisms governing human body functions. This course offers a comprehensive understanding of various physiological systems and their integrative roles in maintaining overall health and well-being. Students will delve into inherited metabolic disorders, hypertension, heart disease, body weight regulation, obesity, systemic inflammation, neuronal diseases, and hypoxia physiology. These topics will enhance students' knowledge of the underlying factors contributing to various health conditions and diseases. Furthermore, the course will cover neuromuscular control of movement and neuromuscular disorders, shedding light on the intricate interplay between the nervous and musculoskeletal systems in facilitating movement and addressing related disorders. In addition to physiological aspects, students will explore cognition and behavior, as well as psychiatric disorders. These topics will provide insight into the complex relationship between neurological processes and cognitive functions, and mental health. By the end of this course, students will not only be equipped with current knowledge in the field but will also be adept at applying state-of-the-art research approaches to the study of human body functions in various contexts.

*Contents*

- Homeostatic regulation of body functions: circadian and temporal regulation
- Metabolic and hormonal control: oxygen and glucose
- Motor control: movement, coordination and behaviour
- Neuropsychological functions: cognition and emotion

*Aim(s)*

- To provide the students with the current knowledge on the mechanisms of human body functions with an integrative perspective
- To introduce state-of-the-art research approaches to the study of human body functions

*Assessment:* 50% Continuous assessment, 50% Final examination

**SBMS7301 Molecular Biology of the Gene and Diseases (6 credits)**

This course delves into the intricate molecular mechanisms underlying genetic diseases and their implications for human health. Students will explore cutting-edge research on gene function, epigenetic regulation, protein structure, dysfunction, and disease, providing a comprehensive understanding of molecular biology in the context of various disorders. Through in-depth analysis of genetic mutations, cancer biology, neurodegenerative processes, and regenerative medicine, students will gain insight into potential therapeutic strategies and advancements in the field.

*Contents*

- Complex genetic diseases
- Reverse genetics and cloning of human disease genes: the cystic fibrosis gene
- Epigenetic regulation by histone modifications
- Gene function analysis: model organism and transgenic animals
- Introduction to protein structure and function
- Protein dysfunction and disease
- Targeting gene mutations by activity-based compounds for cancer therapy
- Genetic mutations and cancer
- MicroRNA biogenesis and RNA therapeutics
- Molecular mechanisms of ageing
- Protein misfolding, amyloid formation and neurodegeneration
- Stem cell and regenerative medicine

*Aim(s)*

- To provide students with a deep understanding of the molecular basis of genetic diseases and their impact on human health
- To explore advanced topics in molecular biology, including epigenetic regulation, protein function, and genetic mutations
- To equip students with knowledge of cutting-edge research in cancer biology, neurodegeneration, and regenerative medicine
- To foster critical thinking and analytical skills in evaluating molecular mechanisms underlying diseases
- To prepare students for careers in research, biotechnology, and healthcare focused on molecular biology and disease mechanisms

*Assessment:* 50% Continuous assessment, 50% Final examination

**SBMS7302 Advanced Cell Biology (6 credits)**

This course is a is a dynamic course that that explores advanced topics in cellular biology, providing students with a comprehensive understanding of cutting-edge research and technologies in the field. The course content encompasses a range of topics such as epigenetics, cell signalling, autophagy, model systems for research, RNA biology, metabolic processes, immune cell communication, bioengineering, structural biology, glial cell biology, and stem cell biology applications. The course is designed to be adaptable to incorporate the latest developments and emerging trends in cellular biology, ensuring that students are equipped with the most up-to-date knowledge and skills in this rapidly evolving field.

*Contents*

- Epigenetics cell signalling
- Autophagy
- Tumour and Drosophila models
- RNA biology and RNA-targeting CRISPR-Cas systems
- Cell metabolism (bioenergetics and thermodynamics)
- Glycolysis, gluconeogenesis and PPP
- How to decode immune cell language
- Engineering life
- Structural biology
- Glial cell biology
- Stem cell biology and application

*Aim(s)*

- To provide students with general knowledge of cell biology
- To provide students with up-to-date knowledge and understanding of advanced topics in cellular biology

*Assessment:* 50% Continuous assessment, 50% Final examination

**SBMS7303 Biotechnologies in Neuroscience (3 credits)**

This course offers a comprehensive introduction of molecular, genetic, and cellular tools and techniques employed in modern neuroscience research. Students will learn about the principles and applications of gene therapy, optogenetics, advanced microscopy, and other biotechnological approaches to investigate brain function and neurological diseases. Emphasis will be placed on critical analysis of current research, experimental design, and the ethical considerations surrounding the use of biotechnology in neuroscience. This course will equip students with the basic knowledge and skills necessary to understand and contribute to the rapidly evolving field of neurobiotechnology, to prepare them for careers in academia, the pharmaceutical industry, and related areas.

*Contents*

- Molecular tools for studying neural function
- Advanced microscopy and imaging techniques
- Gene therapy for neurological disorders
- Neuroinflammation and immunotherapies

*Aim(s)*

- To introduce students to the principles and applications of biotechnology in the field of neuroscience
- To familiarize students with the latest biotechnological tools and techniques used in neurobiological research
- To facilitate critical thinking and problem-solving skills in applying biotechnological approaches to study complex neural processes

*Assessment:* 50% Continuous assessment, 50% Final examination

**SBMS7304 Stem Cell Biotechnologies (3 credits)**

This course provides an in-depth exploration of the various biotechnological approaches and methodologies used in stem cell research and their applications. Students will examine the latest advancements in stem cell technologies, including cell reprogramming, disease modelling, drug discovery, and cell replacement therapies. Through a series of lectures, case studies and quizzes, students will gain a comprehensive understanding of the diverse biotechnological tools available for manipulating and harnessing the potential of stem cells for regenerative medicine, disease modelling, and drug discovery.

*Contents*

- Types of stem cells and their role in developmental biology
- Stem cell engineering and cellular reprogramming
- Stem cell to model disease and in drug discovery
- Stem cells in regenerative medicine
- Cellular reprogramming for tissue repair and rejuvenation

*Aim(s)*

- To provide students with a comprehensive understanding of stem cell biology and the biotechnological tools used in stem cell research
- To familiarize students with the latest advancements in stem cell reprogramming, differentiation, and stem cell engineering
- To explore the applications of stem cell biotechnologies in regenerative medicine, disease modelling, and drug discovery

*Assessment:* 60% Continuous assessment, 40% Final examination

**SBMS7305 Molecular Cancer Diagnostics and Therapeutics (3 credits)**

This course covers the molecular mechanisms underlying cancer development, progression, and treatment, with a focus on diagnostic techniques and therapeutic strategies at the molecular level. Students will develop a solid foundation in cancer biology and genetics, to appreciate the concepts underlying the latest developments in cancer mutation testing and precision oncology. Additionally, the course will cover targeted therapies, immunotherapies, and personalised medicine approaches for cancer treatment.

*Contents*

- Introduction to molecular basis of cancer
- Hallmarks of cancer and molecular alterations Genetic and epigenetic changes in cancer development
- Molecular diagnostics in cancer
- Targeted therapies and personalised medicine
- Immunotherapies in cancer treatment

*Aim(s)*

- To provide students with a comprehensive understanding of the molecular mechanisms involved in cancer development and progression
- To familiarize students with state-of-the-art molecular diagnostic techniques used in cancer diagnosis and monitoring
- To explore the principles and applications of targeted therapies, immunotherapies, and personalised medicine in cancer treatment
- To enhance critical thinking skills in evaluating the efficacy and challenges of molecular cancer diagnostics and therapeutics

*Assessment:* 60% Continuous assessment, 40% Final examination

**SBMS7401 Advances in Artificial Intelligence in Medicine (6 credits)**

This course prepares students to lead the design, development, and ethical deployment of cutting-edge artificial intelligence (AI) systems in biomedicine and healthcare. Building on foundational machine learning concepts, the curriculum emphasises deep learning architectures, generative AI, and clinical AI deployment, empowering students to solve complex challenges in medical diagnostics, biomedical discovery, and healthcare delivery. Through hands-on projects with Python and industry-standard frameworks (e.g., TensorFlow, PyTorch), students will master scalable AI workflows, from prototyping to real-world implementation, while critically addressing regulatory, legal, and societal implications.

*Contents*

- Machine learning & deep learning engineering
- AI system development & deployment
- Medical image informatics
- AI for biomedical discovery
- Generative AI in healthcare
- Evaluation of AI systems

*Aim(s)*

- To design and train deep learning models tailored to heterogeneous biomedical data (imaging, EMRs, genomics)
- To deploy scalable, reproducible AI systems in clinical environments with attention to interoperability and regulatory standards
- To critically evaluate AI performance, bias, and clinical relevance using domain-specific validation frameworks
- To propose ethically sound AI solutions that address gaps in healthcare delivery, precision medicine, or biomedical research

*Assessment:* 70% Continuous assessment, 30% Final examination

**SBMS7402 Big Data Analysis in Healthcare (6 credits)**

This course equips students with the technical and analytical expertise required to manage, analyse, and derive actionable insights from large-scale healthcare datasets. Focusing on real-world challenges in public health, clinical care, and biomedical research, the curriculum emphasises statistical modeling, infectious disease dynamics, and scalable data infrastructure. Students will master industry-standard tools and methodologies to address pressing issues such as health outcome analysis, precision public health, and optimization of primary care delivery through data-driven decision-making.

*Contents*

- Data standards & health informatics frameworks
- Big data analysis of electronic health records (EHRs)
- Advanced biostatistics & statistical modelling
- Infectious disease modelling & surveillance
- Public health informatics
- Big data in primary healthcare

*Aim(s)*

- To design and implement robust statistical models to analyse complex healthcare datasets, including EHRs, genomic data, and public health surveillance streams
- To apply infectious disease modelling frameworks to simulate outbreaks and evaluate intervention strategies
- To critically assess data quality, bias, and ethical implications in large-scale healthcare analytics
- To translate analytical findings into actionable policies or clinical workflows to improve healthcare delivery and population outcomes

*Assessment:* 50% Continuous assessment, 50% Final examination

*Specialised Courses*: Digital Health Technology (DHT)

**SBMS7403 Digital Health Technology (6 credits)**

This course prepares students to lead the design, development, and deployment of cutting-edge digital health solutions that integrate mobile/wearable devices, cloud computing, and artificial intelligence (AI). Building on foundational skills, the curriculum emphasises scalable system architecture, human-AI collaboration, and regulatory-compliant innovation, enabling students to address complex challenges in remote patient monitoring, personalised medicine, and global health equity. Through hands-on projects, students will engineer end-to-end digital health systems, from sensor data processing to cloud-based AI deployment, while critically evaluating clinical impact and ethical risks.

*Contents*

- Advanced biomedical signal processing
- Digital health system design
  - User Interface (UI)/User Experience (UX):
  - Scalable Infrastructure
  - AI-Human Integration
- Evaluation & quality management
- Generative AI in digital health
- Digital health project lifecycle

*Aim(s)*

- To design and deploy secure, interoperable digital health systems that integrate wearable sensors, AI, and cloud infrastructure
- To apply advanced signal processing and machine learning techniques to analyse multimodal health data (e.g. biosignals, imaging, EMRs)
- To navigate global regulatory frameworks and quality management systems for digital health product certification
- To lead interdisciplinary teams to address gaps in healthcare access, chronic disease management, or telehealth delivery

*Assessment:* 100% Continuous assessment

**SBMS7404 Artificial Intelligence and Data Analytics for Biomedical Research (6 credits)**

Artificial intelligence (AI) and big data analysis methods are widely used to accelerate biomedical research, ranging from biomarker discovery, genomics, metagenomics, single cell analytics, protein structure prediction, drug discovery to synthetic biology. In this course, students will gain knowledge and practical skills of computational and AI techniques that are used to analyse various biomedical data in modern biomedical research. Emphasis will be placed in formulation, application, and evaluation of computational, statistical and AI solutions for common biomedical research problems.

*Contents*

- Analysis of genomics, transcriptomics, and metagenomic data
- Analysis of proteomics and metabolomic data
- Single cell analytics and multi-omics
- Structural bioinformatics
- AI for drug discovery and molecular analysis
- AI for synthetic biology
- Responsible use of AI in biomedical research

*Aim(s)*

- To formulate appropriate computational and statistical solutions to common biomedical research problems
- To develop and use suitable bioinformatics tools to process common biomedical data in a research setting
- To interpret analytical results of common biomedical research studies

*Assessment:* 70% Continuous assessment, 30% Final examination

*Capstone Experience*

The 21-credit capstone requirement allows students to put their diverse learning experience into practice. Student should choose one option where the project or internship should be designated as Capstone (CMB) or Capstone (DHT).

*Contents*

- **SBMS8001 Capstone Project (21 credits)**
  - Undertake a research and development (R&D) project with an academic supervisor at HKU, preferably focusing on technology development and evaluation
  - Assessment: 30% supervisor's assessment on project performance and 70% on written capstone report
  - Written report will be evaluated by two HKU internal staff

Or

- **SBMS8002 Industry Internship (21 credits)**
  - Undertake an industry internship in an external company with an HKU academic as an internal coordinating supervisor, preferably focusing on technology development and evaluation
  - Assessment: Experiential learning report (written report) that includes weekly log-book and reflective essays; performance report from supervisor in local institutions or biotech industry
  - Assessment: 50% written report, and 50% assessment of internship performance by industry external supervisor
  - Written report will be evaluated by HKU internal staff

*Aim(s)*

- To put their diverse academic learning into practice, develop their practical abilities, collaborate with experts, and make significant contributions to their respective fields of study

*Assessment:* 100% Continuous assessment

*Non-credit-bearing Innovator Immersion Programme*

The Innovator Immersion Programme is a compulsory non-credit bearing year-long programme for full-time students in the Master of Biomedical Innovation programme. The Programme harnesses the non-teaching hours during weekdays to provide enhanced experiential learning activities. Part-time students interested in enrolling in the immersion program are required to remit an additional fee, which represents the difference between the part-time and full-time tuition fees.

**SBMS7000 Innovator Immersion Programme (0 credit)**

This year-long compulsory non-credit-bearing course consists of a structured series of experiential learning activities that support a student's career development as a biomedical innovator and entrepreneur. These activities complement other courses in this Master of Biomedical Innovation programme. The immersion programme consists of several structured experimental learning components such as hands-on laboratory skill training, deep tech entrepreneurship launcher, industry engagement, and innovation bootcamp.

*Contents*

- Biotechnology laboratory: hands-on cellular and molecular laboratory skills that are pertinent to modern biotechnology
- Entrepreneurship launcher: structured hands-on programme that allows students to experience the entrepreneurial journey from ideation to execution
- Industry engagement: exclusive seminars, meet-ups, and field trips to engage with industry professionals in biotechnology and digital health in Hong Kong and the Greater Bay Area
- Innovation bootcamp: hackathon-style hands-on experience in designing innovative biomedical product, with a focus on design thinking

*Aim(s)*

To foster practical skills, innovative thinking, and real-world insights essential for biomedical innovation through experiential learning

*Assessment:* 100% Continuous assessment