|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4101BCBMOL  Semester 1  *Biochemistry* | PRACTICAL SKILLS IN BIOCHEMISTRY  (20c) | *Aim:*  To facilitate effective study of Biochemistry by providing a foundation in communication and research skills, data handling, IT, laboratory techniques and underpinning theory. The module will be delivered via a mixture of lectures, practicals, workshops and tutorials. | *Learning activities:*  Lectures, workshops, practicals, tutorials, PDP. | *Assessment:*  Written exam (60%) Oral presentation (40%) |
| 4102BCBMOL  Semester 1  *Biochemistry* | INTRODUCTION TO STRUCTURAL AND FUNCTIONAL BIOCHEMISTRY  (20c) | *Aim:*  To develop a basic fundamental understanding of structural and functional aspects of macromolecules, particularly proteins, in biology. | *Learning activities:*  Lectures & practicals | *Assessment:*  Report (50%) Exam (50%) |
| 4103BCBMOL  Semester 1  *Biochemistry* | INTRODUCTION TO CELL AND MOLECULAR BIOLOGY  (20c) | *Aim:*  To provide an introduction to the fields of cell biology (the study of the structure and function of cells) and molecular biology (the study of the relationships between DNA, RNA and proteins). | *Learning activities:*  Lectures  Practicals  Workshops | *Assessment:*  exam (60%) practical write up (40%) |
| 4110BCBMOL  Semester 1  *Biochemistry* | INTRODUCTION TO BIOTECHNOLOGY  (20c) | *Aim:*  To introduce an overview in biotechnology and the main applications including bioprocessing. How the biotechnology industry has developed in different fields. | *Learning activities:*  Lectures, workshops, practical work. | *Assessment:*  Essay (50%) Poster (50%) |
| 4111BCBMOL  Semester 1  *Biochemistry* | PRACTICAL SKILLS IN BIOTECHNOLOGY  (20c) | *Aim:*  To facilitate effective study of Biotechnology by providing a foundation in communication and research skills, data handling and IT, laboratory techniques and underpinning theory. The module will be delivered by a mixture of lectures, tutorials, workshops and practicals | *Learning activities:*  Lectures, workshops, practicals, tutorials | *Assessment:*  Self awareness statement (10%) Practical test (60%) Oral presentation (30%) |
| 4113BCBMOL  Semester 1  *Biochemistry* | PRACTICAL AND EMPLOYABILITY SKILLS IN BIOCHEMISTRY  (20c) | *Aim:*  To facilitate effective study of Biochemistry by providing a foundation in employability, communication and research skills, data handling, statistics, IT, laboratory techniques and underpinning theory.  Students will have the opportunity to identify and reflect upon aspects of personal development and employability will a strong thread embedded throughout the module. The module will be delivered via a mixture of lectures, practicals, workshops and tutorials. | *Learning activities:*  Lectures  Practicals  Workshops  IT workshops  Tutorials | *Assessment:*  Exam (60%) Self Awareness Statement (10%) Portfolio (30%) |
| 4114BCBMOL  Semester 1  *Biochemistry* | INTRODUCTION TO CELL BIOLOGY  (20c) | *Aim:*  To provide an introduction to the field of cell biology (the study of the structure and function of cells). | *Learning activities:*  Lectures  Practicals  Workshops  Seminars | *Assessment:*  Exam (60%) Poster Presentation (40%) |
| 5101BCBMOL  Semester 1  *Biochemistry* | METHODS IN BIOCHEMISTRY  (20c) | *Aim:*  Theory and practice of a range of methods relevant to research and practice in Biochemistry.  Further development in skills, critical evaluation and career planning.  Tutorial and PDP support for level 5 students on the Biochemistry programme.  The opportunity for Biochemistry Students to undertake the "Making Things Happen" stage of the World of Work Certificate process. | *Learning activities:*  Lectures, workshops, practicals and tutorials | *Assessment:*  Open Book exam (60%) Practical Skills (30%) Statement (10%) |
| 5102BCBMOL  Semester 1  *Biochemistry* | METABOLIC BIOCHEMISTRY  (20c) | *Aim:*  Gain a thorough understanding of how metabolic pathways are integrated and regulated in prokaryote and eukaryote cells. Consider and understand how pathways governing detoxification operate in eukaryote cells. Evaluate the use of laboratory test for the determination of biochemically important molecules. | *Learning activities:*  Lectures to contextualise and deliver the key concepts.  Workshops to explore the lecture material, enhance critical thinking skills.  Seminars to evaluate and reflect on learning.  Practicals to develop subject specific skills and to make the connections with the theory. | *Assessment:*  Final exam (50%) Practical reports (50%) |
| 5103BCBMOL  Semester 1  *Biochemistry* | MICROBOLOGY AND BIOTECHNOLOGY  (20c) | *Aim:*  To demonstrate the principles of microbial growth and metabolism and to provide an appreciation of the action of antimicrobials. To provide a general introduction to the ecology of micro-organisms in a variety of habitats. To provide an understanding of the use of microorganisms in natural product formation. | *Learning activities:*  Lectures, practicals and workshops | *Assessment:*  Enumeration of microorganisms (20%) Microbial characterisation (20%) Examination (60%) |
| 5110BCBMOL  Semester 1  *Biochemistry* | RESEARCH METHODS IN BIOTECHNOLOGY  (20c) | *Aim:*  The aim of this module is to equip biotechnology students with essential research skills and knowledge of methods and techniques that are routinely applied in biotechnology research. | *Learning activities:*  Material will be delivered through lectures, workshops and tutorials. The lectures will be designed to introduce the routine laboratory-based methods and techniques currently used in biotechnology research. Workshops will be delivered to enable the  students to develop their analytical/data handling/statistical skills. Tutorials will be linked to personal development and planning (PDP) and assessment tasks and are designed to facilitate student development and learning. | *Assessment:*  Presentation (40%) Report (60%) |
| 5115BCBMOL  Semester 1  *Biochemistry* | MICROBIAL BIOTECHNOLOGY 2  (20c) | *Aim:*  To demonstrate the principles of microbial growth and metabolism and to provide an appreciation of the action of antimicrobials. To provide a general introduction to the ecology of micro-organisms in a variety of habitats. To provide an understanding of the use of microorganisms in natural product formation. | *Learning activities:*  Lectures, practicals and workshops | *Assessment:*  Enumeration of microorganisms (20%) Microbial characterisation (20%) Examination (60%) |
| 6101BCBMOL  Semester 1  *Biochemistry* | ADVANCED STRUCTURAL AND FUNCTIONAL BIOCHEMISTRY  (20c) | *Aim:*  To develop an advanced understanding of structural and functional aspects of  macromolecules, particularly proteins, in biology. | *Learning activities:*  Lectures, practicals, workshops | *Assessment:*  Data/literature analysis (40%) Exam (60%) |
| 6102BCBMOL  Semester 1  *Biochemistry* | BIOCHEMISTRY SYMPOSIA  (20c) | *Aim:*  Retrieve and critically evaluate complex information  Conduct investigations in an independent manner  Demonstrate the wide range of skills and knowledge required to deal with real-life employment opportunities  Integrate and apply theoretical and practical knowledge gained throughout the course to research | *Learning activities:*  The main emphasis of this module will be on problem solving with student directed learning. Acquisition of knowledge will be underpinned by lecture and workshop delivery of material. Students will be expected to attend a series of seminars which will form the basis of an in-depth study of a specified scientific area. This material will be supported by directed reading. | *Assessment:*  Symposia Presentation (50%) Symposia Poster (50%) |
| 6105BCBMOL  Semester 1  *Biochemistry* | CURRENT TOPICS IN BIOTECHNOLOGY  (20c) | *Aim:*  This module will enable students to develop an in depth understanding of the principles and applications of the white, red and blue biotechnology and their impact in our society through an integrated knowledge of concepts. | *Learning activities:*  Lectures, workshops, practical work. | *Assessment:*  Report (50%) Examination (50%) |
| 6106BCBMOL  Semester 1  *Biochemistry* | BIOTECHNOLOGY ENTREPRENEURSHIP  (20c) | *Aim:*  The aim of this module is to introduce students to the concept of entrepreneurship and commercialisation of biotechnology. The module will explore a range of activities, processes and concepts that are needed for new venture creation. The module will equip students with the knowledge and skills vital for communicating ideas and generating value in a knowledge based economy. | *Learning activities:*  Lectures, Workshops, Tutorials. | *Assessment:*  Business plan (50%) Presentation (50%) |
| 7103BTBMOL  Semester 1  *Biochemistry* | BIOTECHNOLOGY:PRINCIPLES AND APPLICATIONS  (30c) | *Aim:*  The module will provide students with the principles of diverse techniques and their applications as they are currently utilised in the field of biotechnology.  It will also provide a platform for gaining an advanced understanding of these techniques and novel disruptive technologies that may replace them through facilitated and independent assessment of the recent research literature.  Assessment of the literature will also allow students to develop and demonstrate their ability to conduct independent research and present information on specific principles and applications of biotechnology using a range of presentation media.  Through the assessments the module will further hone the writing and presentation skills of the students and their ability to assimilate and critique scientific literature at a postgraduate level. | *Learning activities:*  Material will be delivered through lectures and tutorials. The lectures are designed to introduce the students to the basic principles of specific techniques currently used in the field of biotechnology. Lectures will also cover the specific applications of these techniques in biotechnology. This module will link with other modules, which will provide more detail on the biological aspects of the technologies at the molecular level.  The coursework will run over the semester and will involve the students presenting a biotechnological process for a learning aid or a visual protocol. This will be a group-based project and thus allow students to develop their transferable skills alongside their academic skills. At the end of the year the students will present their work visually using the IT skills they have developed.  Tutorials will run throughout the module to provide students with support in developing their knowledge of the 'principles and applications' underlying biotechnology and for providing support with the coursework.  Course Work I (report):  Individual students will identify, read and critically appraise a recent research paper (or papers) outlining the methods employed in the research and the theory and rationale behind their use. The students will consider the alternative methods that could have been employed. The students will present this in a formal report.  Tutorials will be provided to facilitate the students in their choice of paper(s), how they critique the methods and structure their reports.  Course Work II (presentation):  Students will identify, read and critically appraise a recent paper (or papers) outlining a new technology or news developments in an existent technology. Students will present their data as short 10 minute presentations. They will give lucid insight into the theory behind the new or improved technologies. Journals that will facilitate this include Nature Methods, Biotechniques, Methods etc. Tutorials will be provided to facilitate the students in their choice of paper(s), how they critique the methods and structure their presentations. | *Assessment:*  Report (50%) Presentation (50%) |
| 4104BCBMOL  Semester 2  *Biochemistry* | PHYSIOLOGICAL BIOCHEMISTRY  (20c) | *Aim:*  To provide an introduction to, and make the link between, nutrition, physiology and cellular metabolism in prokaryote and eukaryote cells. In addition, the chemistry which underpins each biochemical process is made clear by making use of worked examples and through practical experiments. | *Learning activities:*  Lectures to contextualise and deliver the key concepts.  Workshops to explore the lecture material, develop critical thinking skills and prepare for the exam.  Seminars to evaluate learning.  Practicals to develop subject specific skills and make the link with theory. | *Assessment:*  Practical reports (50%) Exam (50%) |
| 4105BCBMOL  Semester 2  *Biochemistry* | BIOCHEMISTRY EMPLOYABILITY  (20c) | *Aim:*  This module provides students with:  Employability and IT skills  An opportunity for group work  Topics of interest to biochemistry professionals.  The opportunity to identify and reflect upon aspects of personal development  The opportunity to develop their organisational awareness.  Opportunity for individual PDP | *Learning activities:*  Lectures, tutorials, workshops and seminars | *Assessment:*  Self Aware Statement (10%) Group Poster (45%) Scientific Newsletter (45%) |
| 4106BCBMOL  Semester 2  *Biochemistry* | INTRODUCTION TO MICROBIOLOGY AND BIOTECHNOLOGY  (20c) | *Aim:*  This course aims to: provide a broad spectrum of knowledge about microorganisms and their activities which will provide a foundation for microbiology modules at Levels 5 and 6. | *Learning activities:*  Lectures: will cover most of the learning outcomes.  Practicals: to develop some basic microbiological skills required to observe and study microorganisms.  Workshop: to build upon student understanding of various aspects of process biotechnology and aid revision. | *Assessment:*  Exam (60%) Report (40%) |
| 4112BCBMOL  Semester 2  *Biochemistry* | MICROBIAL BIOTECHNOLOGY 1  (20c) | *Aim:*  This course aims to: provide a broad spectrum of knowledge about microorganisms and their activities which will provide a foundation for microbiology modules at Levels 5 and 6. | *Learning activities:*  Lectures: will cover most of the learning outcomes.  Practicals: to develop some basic microbiological skills required to observe and study microorganisms.  Workshop: to build upon student understanding of various aspects of process biotechnology and aid revision. | *Assessment:*  Exam (60%) Report (40%) |
| 4115BCBMOL  Semester 2  *Biochemistry* | INTRODUCTION TO MOLECULAR BIOLOGY  (20c) | *Aim:*  To enable students to understand the importance of the molecular mechanisms underpinning molecular biology. This will then allow for the introduction of omics and model organisms which will be further developed at level 5.  Tutorials linked to subject material as well as personal development planning are embedded in this module. | *Learning activities:*  Lectures  Practicals  Workshops  Tutorials | *Assessment:*  Exam (60%) Individual Newsletter (40%) |
| 5104BCBMOL  Semester 2  *Biochemistry* | STRUCTURAL AND FUNCTIONAL BIOCHEMISTRY  (20c) | *Aim:*  To develop a deeper understanding of structural and functional aspects of  macromolecules, particularly proteins, in biology. | *Learning activities:*  Lectures, workshops, practicals | *Assessment:*  Data/literature analysis (50%) Examination (50%) |
| 5105BCBMOL  Semester 2  *Biochemistry* | MOLECULAR BIOLOGY AND FUNCTIONAL GENOMICS  (20c) | *Aim:*  To provide a detailed understanding of the molecular mechanisms that are applicable to human disease states, development, genetic engineering, high-throughput technologies, and to introduce and develop bioinformatics practical skills. | *Learning activities:*  Lectures  Practical  Workshops | *Assessment:*  Analysis of NGS experiment (30%) Examination (70%) |
| 5106BCBMOL  Semester 2  *Biochemistry* | MOLECULAR CELL BIOLOGY  (20c) | *Aim:*  The module will introduce students to a range of important cellular processes and some of the main molecular mechanisms associated with the regulation of these processes. | *Learning activities:*  Lectures  Practicals  Workshops | *Assessment:*  Exam (50%) Report (50%) |
| 5111BCBMOL  Semester 2  *Biochemistry* | SYNTHETIC BIOLOGY AND BIOENGINEERING 1  (20c) | *Aim:*  To provide the student with the basic concepts of synthetic biology and a good understanding of the foundational science that underpins synthetic biology, and develop appreciation for the importance of social responsibility in bioengineering. | *Learning activities:*  Lectures, Tutorials, Workshops, Practicals. | *Assessment:*  Examination (60%) Report of practical work (40%) |
| 6103BCBMOL  Semester 2  *Biochemistry* | ADVANCED CELL AND MOLECULAR BIOLOGY  (20c) | *Aim:*  To provide the student with state of the art knowledge of central aspects of cell and molecular biology and to encourage development of skills for experimental design. | *Learning activities:*  Lectures  Workshops | *Assessment:*  exam (60%) experimental design (40%) |
| 6104BCBMOL  Semester 2  *Biochemistry* | MICROBIAL TECHNOLOGY  (20c) | *Aim:*  To provide an understanding of the microbial principles that underline advanced microbiological technology | *Learning activities:*  Delivery of theoretical information will be via lectures but these will be supported with workshops particularly in the are of bioinformatics. Practical sessions will be used to provide skills in advanced microbial culture (fermentation), population analysis (flow cytometry) and fluorescent microscopy. | *Assessment:*  Exam (60%) Full report (40%) |
| 6107BCBMOL  Semester 2  *Biochemistry* | SYNTHETIC BIOLOGY AND BIOENGINEERING 2  (20c) | *Aim:*  To provide in-depth knowledge of current concepts and applications of synthetic biology and bioengineering with emphasis on tackling specific industrial, biomedical, and environmental challenges. | *Learning activities:*  Lectures, Tutorials, Workshops, Practicals. | *Assessment:*  Examination (60%) Report of Practicals Work (40%) |
| 7104BTBMOL  Semester 2  *Biochemistry* | CELL TECHNOLOGY  (20c) | *Aim:*  To provide an understanding of cell culture as a technological component of aspects of biological research and commercial exploitation. | *Learning activities:*  Lectures, practical. | *Assessment:*  Examination (60%) Report (40%) |
| 7101BTBMOL  Yearlong  *Biochemistry* | FERMENTATION TECHNOLOGY PRINCIPLES  (30c) | *Aim:*  To give an insight into Industrial, Microbiology and Biochemistry. This module will show how fundamental principles can be applied to industrial processes and will examine the wide range of microbial processes and products. | *Learning activities:*  Lectures, workshops, practicals | *Assessment:*  Exam (50%) Report (20%) Presentation (30%) |
| 7102BTBMOL  Yearlong  *Biochemistry* | RECOMBINANT DNA AND GENOMICS  (30c) | *Aim:*  To provide in-depth knowledge of current concepts and techniques in gene manipulation, emphasizing the developments and applications of genomics. | *Learning activities:*  Lectures, practicals, workshops, tutorials, student-centred activities. | *Assessment:*  Examination (50%) Essay (20%) Mini-project (30%) |