



The School of Life Sciences is a forward and dynamic School, and has grown steadily since its inception in 1989.

There is a very extensive range of modules available in the following subject areas:

- **Biomedical sciences:** considering the processes that regulate the normal functions of the human body. This includes molecular and cell biology, physiology, biochemistry, microbiology, haematology, immunology and pathology.
- **Forensic Science:** crime scene processing, forensic archaeology, drugs, toxicology, DNA, body fluids, entomology, fibres, fire investigation and ballistics.
- **Genetics and molecular biology:** evolution, genetics and molecular biology.
- **Human Biology:** looking at the workings of the human body and mind.
- **Medical Biology:** which focuses on medically related biological issues.
- **Nutrition:** food science, biochemistry, physiology, pharmacology, immunology and microbiology.
- **Pharmacology:** examining how drugs affect their target areas (such as major organs and systems) and how the body reacts.
- **Sports Science and Coaching:** covering the theory and practical aspects of sport science, considering anatomy, biomechanics, physiology and psychology, nutrition and exercise principles.

Updated April 2021/PJW

Entry requirements	GPA of 2.75 or above (out of 4.0) or equivalent.
Pre-requisites	<p>Level 4: prior introductory study of biology {and/or chemistry dependent upon intended subject area(s)} at university level is normally required. For sports science modules, introductory study of psychology/physical education is also useful.</p> <p>Level 5: prior study of biology {and/or chemistry dependent upon intended subject area(s)} at university level 4 is essential.</p> <p>Level 6: substantial prior study of biology {and/or chemistry dependent upon intended subject area(s)} at intermediate university (level 5) is essential.</p> <p>For levels 5 and 6, any specific pre-requisites for individual modules will be detailed in each module description.</p>
Taught at	Penrhyn Road campus

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

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The University makes every effort to ensure that module availability & content is correct at the time of publishing, but it cannot accept responsibility for subsequent changes, as part of the University's policy of continuous improvement & development.

Key:

KEY TO MODULE DESCRIPTORS	
SUITABILITY OF MODULE FOR STUDENTS VISITING KU ON STUDY OPTION	
1	Indicates module is suitable for students visiting KU on Study Option 1 (Whole Year)
2	Indicates module is suitable for students visiting KU on Study Option 2 (Autumn)
3	Indicates module is suitable for students visiting KU on Study Option 3 (Spring)

Notes:

1. All modules are at undergraduate level only.
2. Students enrolled on Study Option 1 are required to study the entire module.
3. Whilst the University makes every effort to ensure that this information is correct at the time of updating (April 2021), it cannot accept responsibility for omissions or subsequent changes. Module availability and content may be subject to change, as part of the University's policy of continuous improvement and development.
4. Details of assessment for students enrolled on either Study Option 2 or 3 where provided are indicative only and may also be subject to change as part of the above policy.

MODULE CODE	TITLE	SUITABILITY KEY		
LEVEL 4 – INTRODUCTORY				
LS4001	Genes, Cells and Tissues	1	2	3
LS4002	The Chemical Foundations of Life	1	2	3
LS4004	Human Physiology	1	2	3
LS4005	Introduction to Forensic Science	1	2	3
LS4006	Food and Nutrition 1 – An Introduction	1	2	3
LS4007	Essentials for Sport and Exercise Science	1	2	3
LS4008/LS5017	Sport and Exercise Psychology	1	2	3
LS4009	Functional Anatomy and Exercise Physiology	1	2	3
LS4010	The Science and Practice of Coaching	1	2	
LEVEL 5 – INTERMEDIATE				
LS5001	Molecular Biology of the Cell	1	2	3
LS5002	Proteins and Metabolism	1	2	3

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

LS5003	Principles of Pharmacology with Research Methods	1	2	3
LS5004	Research Methods and Concepts in Molecular Ecology and	1	2	3
LS5005	Medical Physiology with Research Methods	1	2	3
LS5006	Research Methods and Topics in Forensic Biology	1	2	3
LS5007	Food and Nutrition 2 – Applied Nutrition	1	2	
LS5008	Infection and Immunity	1	2	3
LS5009	Pathobiology	1	2	3
LS5010	System Pharmacology	1	2	3
LS5012	Research Methods in Exercise Science	1		
LS5013	Sport and Exercise Psychology II	1	2	3
LS5014/ LS6016	Health and Exercise Physiology	1	2	
LS5015	Analysis in Sport and Exercise	1	2	3
LS5016	Sport Coaching Theory	1	2	3
LEVEL 6 – ADVANCED				
LS6001	Molecular Genetics and Bioinformatics	1	2	3
LS6002	Current Concepts in Biomolecular Science	1		
LS6003	Chemotherapy of Infectious & Neoplastic Disease	1	2	3
LS6004	Brain and Behaviour	1	2	3
LS6005	Clinical Chemistry and Haematology (Blood Sciences)	1	2	3
LS6006	Clinical Immunology and Medical Microbiology	1	2	3
LS6007	Clinical Applications of Biomedical Sciences	1		
LS6008	Medical Parasitology	1	2	
LS6009	Food and Nutrition 3: Public Health Nutrition	1	2	3
LS6010	Food and Nutrition 4: Contemporary Issues in Food and	1	2	3
LS6012	Forensic Archaeology	1		
LS6013	Biological Evidence – Advanced Techniques	1		
LS6017	Exercise and Health Psychology	1	2	
LS6018	Extreme Environments and Ergogenic Aids	1	2	3
LS6019	Applied Sport Psychology	1	2	

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

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LS6020	Biomechanics of Sport Performance and Injury	1	2	
LS6021	Notational Analysis in Sport	1	2	3
LS6022	Coaching Practice	1		

LEVEL 4 – INTRODUCTORY

Module Code	LS4001
Module Title	Genes, Cells and Tissues
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	4
Prerequisites	Successful completion of introductory university level biology.
Suitability	<ul style="list-style-type: none"> Open to suitably qualified Study Abroad/International Exchange students enrolled at KU for Study Options 1 or 2 or 3 Not open to Erasmus students (as Level 4)
Content	<p>The module introduces students to the biology of cells; molecular, evolutionary and population genetics; tissue types in the human body; and an introduction to bacteria, viruses and other disease-causing pathogens.</p> <p>In addition to lectures and tutorials, students take part in Laboratory practicals in order to learn a range of key techniques used to study cells, tissues, chromosomes and microbes.</p> <p>Topics:</p> <ul style="list-style-type: none"> Basic preparative techniques for examination of biological specimens by light microscopy and correct use of light microscopes An introduction to the origins of life, the cell concept, cell structure and function of organelles in prokaryotic and eukaryotic cells An introduction to genes, genomes and chromosomes A review of the genetic processes in cells including dna structure, replication, transcription and translation An introduction to patterns of inheritance, mendelian genetics, population and evolutionary genetics, basic calculations in inheritance and population genetics An introduction to genetic recombination and mapping

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

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	<ul style="list-style-type: none"> • An introduction to cytogenetics • An introduction to modern molecular techniques including cloning, recombinant DNA technology and DNA analysis • An introduction to early human development • Structural and functional characteristics of epithelium, connective tissues, muscle and nervous tissues and their subtypes • An introduction to viruses, bacteria and microbial eukaryotes of medical importance • Basic microbiological techniques <p>Autumn Semester topics:</p> <ul style="list-style-type: none"> • Cell membranes • Cell organelles • Mendelian Inheritance • Genetics: Recombination & mapping • Genetics: Population genetics • Genetics: DNA, genes & chromosomes • Genetics: DNA replication • Genetics: transcription & translation • Bacteria • Viruses <p>Spring Semester topics:</p> <ul style="list-style-type: none"> • Introduction to evolution • Origins of life • Eukaryotes of medical importance • Embryology & histology • Molecular techniques in action
Teaching	Lectures, seminars and practical sessions
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • In-class test: MCQs and written questions (30%) • 3 x practical online MCQ tests (30%) • End of year exam (40%)
	<p>Study Option 2:</p> <ul style="list-style-type: none"> • In-class test: MCQs and written questions • 1 x practical online MCQ test
	<p>Study Option 3:</p> <ul style="list-style-type: none"> • Two practical assessments (2 x 25%) • Essay (50%)
Last updated:	11/04/21 PJW

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

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Module Code	LS4002
Module Title	The Chemical Foundations of Life
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	4
Prerequisites	Previous introductory chemistry study useful
Suitability	Open to suitably qualified Study Abroad/International Exchange students enrolled at KU for Study Option 1 or 2 or 3 Not open to Erasmus students (as Level 4)
Content	<p>The module is intended to give students an understanding of how basic chemical elements are bonded to form complex biomolecules in living systems. The module will then elaborate on the role that structure of proteins, carbohydrates and lipids plays in defining their properties and function along with describing some of the laboratory techniques used in their investigation. The module will also introduce the importance of energy transformations in living organisms.</p> <p>Autumn Semester content summary: <i>carbon structures, chemical reactions and calculations.</i></p> <ul style="list-style-type: none"> • Structure of the atom: protons, neutrons, electrons; electrons and orbitals; metals and non-metals, ions, radicals. • Structure of molecules; from small organics to large biomolecules, identification and naming of common functional groups. • Atomic and molecular measurements; molecular mass, moles, concentration • 3D molecular shape and isomerism: optical and geometrical isomerism, configuration and conformations. • Bonding within molecules (covalent) and between molecules (ionic, hydrogen, van der Waals). • Distribution of electrons within molecules; electronegativity; inductive and resonance effects. • Movement of electrons between molecules; making and breaking of bonds; equilibrium, substitution, elimination, reduction and oxidation reactions. • Common reactions of organic and bio-organic molecules. • Water; physical, solvent and colligative properties. • Acids and bases, pH and pKa. <p>Spring Semester content summary: <i>fundamental biochemistry of proteins, lipids, carbohydrates, and bioenergetics and enzyme kinetics.</i></p> <ul style="list-style-type: none"> • An introduction to structures and functions of the major groups of biomolecules including:

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

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	<ul style="list-style-type: none"> ○ Proteins: amino acids, peptides and proteins, protein structure and function ○ Carbohydrates: mono-, di- and polysaccharides, structure and functions ○ Lipids: fatty acids, triacylglycerols, membrane lipids and sterols. <ul style="list-style-type: none"> ● Bioenergetic principles and an overview of energy-generating pathways and their roles in aerobic and anaerobic respiration (glycolysis, citric acid cycle and oxidative phosphorylation). ● Kinetics of reactions: order, simple integrated rate equations, Arrhenius equation. ● Introduction to enzyme kinetics (K_m, V_{max}, competitive and non-competitive inhibitors). ● Laboratory skills: titrations, qualitative chemical analysis, the effect of temperature change on rate. Construction and use of standard curves in quantitating unknown analytes.
Teaching	Lectures, tutorials, workshops and practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> ● Exam: MCQ and SAQ test (40%) ● Open book on line MCQ test (30%) ● Portfolio of practical assessments (30%)
	Study Option 2: <ul style="list-style-type: none"> ● Online report for titration practical ● Practical MCQ test ● Taught material MCQ test
	Study Option 3: <ul style="list-style-type: none"> ● Proforma based practical report on enzyme kinetics and protein assay practicals ● MCQ & SAQ test on taught material.
Last updated:	11/04/21 PJW

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Module Code	LS4004
Module Title	Human Physiology
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	4
Prerequisites	Successful completion of introductory university level biology
Suitability	<ul style="list-style-type: none"> ● Open to suitably qualified Study Abroad/International Exchange students enrolled at KU for Study Options 1 or 2 or 3 ● Not open to Erasmus students (as Level 4)

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

<p>Content</p>	<p>The module introduces students to fundamental physiological concepts which underpin the coordinated functioning of the human body, including homeostasis, cellular communication and movement of molecules through body compartments. The main physiological systems of the body are then covered, including the nervous, muscle, endocrine, respiratory, cardiovascular, and renal and digestive systems.</p> <p>Autumn Semester content summary: <i>basic concepts in physiology, Renal Physiology, Cardiovascular physiology, Endocrine physiology.</i></p> <ul style="list-style-type: none"> • Fundamental physiological concepts: What is physiology? The concept of homeostasis. Movement of molecules and ions through body compartments. • Cellular communication; signal transduction pathways. • The Endocrine System: <ul style="list-style-type: none"> ○ Hormone structure and synthesis, hormone transport in the blood, hormone metabolism and excretion, mechanisms of hormone action, control of hormone secretion. ○ Selected examples of pathophysiology. • The Urinary System: <ul style="list-style-type: none"> ○ Structure of the kidneys and urinary tracts. ○ Filtration, reabsorption and secretion in the nephron. ○ Composition of urine. ○ Control of micturition, regulation of fluid, electrolyte and acid-base balance. ○ Selected examples of pathology of the urinary system. • The Digestive System: <ul style="list-style-type: none"> ○ Digestion and absorption of carbohydrate, protein, fat, vitamins and minerals and water. ○ Regulation of secretion and motility of the gastrointestinal tract. ○ Selected examples of pathology of the gastrointestinal system. <p>Spring Semester content summary: <i>Respiratory, Neurophysiology, gastrointestinal physiology, muscle physiology</i></p> <ul style="list-style-type: none"> • Neurophysiology: <ul style="list-style-type: none"> ○ Structure and classification of neurons. ○ Membrane potentials, the resting potential, graded potentials and action potentials. ○ Synapses, excitatory and inhibitory chemical synapses, neurotransmitters and neuromodulators, modification of synaptic transmission. ○ Selected examples of neuropathology. • The Respiratory System: <ul style="list-style-type: none"> ○ Organisation of the respiratory system. ○ Ventilation ○ Exchange of gases in alveoli and tissues.
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	<ul style="list-style-type: none"> ○ Transport of oxygen and carbon dioxide in blood. ○ Control of respiration. ○ Hypoxia. ○ Selected examples of disorders of the respiratory system. ● The Urinary System: <ul style="list-style-type: none"> ○ Structure of the kidneys and urinary tracts. ○ Filtration, reabsorption and secretion in the nephron. ○ Composition of urine. ○ Control of micturition, regulation of fluid, electrolyte and acid-base balance. ○ Selected examples of pathology of the urinary system. ● The Digestive System: <ul style="list-style-type: none"> ○ Digestion and absorption of carbohydrate, protein, fat, vitamins and minerals and water. ○ Regulation of secretion and motility of the gastrointestinal tract. ○ Selected examples of pathology of the gastrointestinal system. ● Muscle: <ul style="list-style-type: none"> ○ Skeletal muscle: molecular mechanisms of contraction, the neuromuscular junction, mechanics of single fibre contraction, skeletal muscle energy metabolism, types of skeletal muscle fibres. Selected pathologies of skeletal muscle. ○ Smooth muscle: excitation-contraction coupling, types of smooth muscle.
Teaching	Lectures, tutorials and practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> ● Exam: MCQs and Short answer questions (40%) ● Practical: MCQ (30%) ● Coursework portfolio: 3 x short answer questions written assignment (30%)
	Study Option 2: <ul style="list-style-type: none"> ● Practical test (25%) ● Assignment (25%) ● End of semester test (50%)
	Study Option 3: <ul style="list-style-type: none"> ● Practical test (25%) ● Assignment (25%) ● Exam (50%)
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Module Code	LS4005
Module Title	Introduction to Forensic Science

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	4
Prerequisites	Successful completion of introductory university level biology/chemistry.
Suitability	<ul style="list-style-type: none"> • Open to suitably qualified Study Abroad/International Exchange students enrolled at KU for Study Option 1 or 2 or 3 • Not open to Erasmus students (as Level 4)
Content	<p>This module is designed to introduce students to the key types of forensic science and to the role and expertise of different forensic specialists. This module is also designed to encourage independent learning and research.</p> <p>The module first introduces students to the various categories of forensic evidence, before going on to cover these in greater detail.</p> <p>Autumn Semester content summary: <i>an introduction to the human skeleton, skeletal anatomy, forensic toxicology and Hair analysis.</i></p> <p>Spring Semester content summary: <i>designed to introduce students to the key type of forensic sciences and to the role and expertise of different forensic specialists.</i></p> <p>Topics covered:</p> <ul style="list-style-type: none"> • Introduction to forensic science and the different types of forensic evidence. • Introductory skeletal anatomy, post mortem change and the autopsy process • Serology and DNA profiling in forensic cases • Forensic toxicology – introduction and case studies • Fire investigation – introduction and case studies • Firearms investigation – introduction • Forensic psychology - introduction • Document analysis – introduction and case studies • Forensic entomology – introduction and case studies • Forensic geoscience - introduction
Teaching	Lectures, tutorials, workshops and practical sessions
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • 1 in-course MCQ test (30%) • Skeletal Anatomy Practical Test(30%) • 1 in-course MCQ test (30%) <p>Study Option 2:</p> <ul style="list-style-type: none"> • MCQ test (50%) • Practical Test (50%) <p>Study Option 3:</p> <ul style="list-style-type: none"> • MCQ test (50%) • Practical Test (50%)

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

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Module Code	LS4006
Module Title	Food and Nutrition 1 – An Introduction
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	4
Prerequisites	Successful completion of introductory university level biology useful
Suitability	<ul style="list-style-type: none"> Open to suitably qualified Study Abroad/International Exchange students enrolled at KU for Study Option 1 or 2 or 3 Not open to Erasmus students (as Level 4)
Content	<p>This module introduces students to the study and practice of human nutrition, and focuses primarily on macronutrients and micronutrients but will also include water and alcohol. Other topics introduced as part of this module include the basic concepts that underpin energy and nitrogen balance, the derivation and application of dietary reference values, the study of food composition and food science.</p> <p>Students will also be introduced to the social functions of food and nutrition in society as well as basic applications of food science in everyday life.</p> <p>Autumn Semester content summary: <i>social functions of food and nutrition, macronutrients, dietary energy, an introduction to body composition.</i></p> <p>Topics covered:</p> <ul style="list-style-type: none"> Introduction to the study of human nutrition and the role of a nutritionist Factors which determine food choice in a variety of settings; e.g. historical, cultural, religious, practical, economical, psychological, habitual within different social groups; e.g. individuals, families, older people, institutions Food availability - investigation of types of food available, how food is sold in the UK and changing shopping and cooking practices Energy content of food, measurement of energy expenditure, concept and determinants of energy balance Dietary carbohydrates, lipids and proteins: Classification, structure, sources, function, metabolic disposal Alcohol: nutrient value; metabolism; interaction with other nutrients Contribution of the structures of macronutrients to the properties and behaviour of food

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<p>Spring Semester content summary: <i>micronutrients, food tables, dietary reference values, introduction to food science.</i></p> <ul style="list-style-type: none"> ▪ The application of food science to food preservation, processing, packaging and distribution ▪ Influence of cooking procedures on the nutrient value, texture and flow of foodstuffs ▪ The sensory properties of food, the principles of sensory evaluation and their applications in laboratory and consumer settings ▪ Dietary Reference Values for macronutrients and micronutrients: definitions, derivation and interpretation in population groups ▪ Dietary analysis using food composition tables and computer software ▪ Body composition compartments and measurement ▪ Measurement of energy and nitrogen balance ▪ Water and fat soluble vitamins, minerals and trace elements ▪ Changing patterns of agriculture and food supply
Teaching	Lectures and online lectures, group tutorials, workshops, practical sessions and fieldwork
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • Assignment (30%) • Practical portfolio (30%) • Exam (40%)
	<p>Study Option 2:</p> <ul style="list-style-type: none"> • Assignment (50%) • Practical (10%) • Test (40%)
	<p>Study Option 3:</p> <ul style="list-style-type: none"> • Portfolio 1 (50%) • In-Class test B (50%)
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Module Code	LS4007
Module Title	Essentials for Sport and Exercise Science
Credits	Full Year: 8 (US) 15 (ECTS)

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	Single Semester: 4 (US) 7.5 (ECTS)
Level	4
Prerequisites	None
Suitability	<ul style="list-style-type: none"> • Open to suitably qualified Study Abroad/International Exchange students enrolled at KU for Study Option 1 or 2 or 3 • Not open to Erasmus students (as Level 4)
Content	<p>The module provides an essential introduction to the skills required for undergraduate study and scientific research. The key and transferable skills for effective study are provided so that all students, irrespective of previous qualifications can approach higher-level modules adequately equipped to undertake learning and assessments.</p> <p>The module has been further designed to allow the student to understand the principles of qualitative and quantitative experimental research and elementary data analysis.</p> <p>Autumn Semester content summary: Generic Study Skills: Including time management and planning, independent study, referencing, feedback and how to use it, exam preparation, key and transferable skills, employability skills and personal development portfolio</p> <p>Spring Semester content summary: Experiment Design and Analysis</p> <ul style="list-style-type: none"> ▪ The historical foundation of sport research: renaissance scholars, empiricism, logic and determinism Introduction to Research methodologies ▪ Ethics, morals and misconduct in research and scholarship -considerations for research on human participants, informed consent, Par-Q & CRB, cheating and plagiarism, hypothesis setting and defining variables ▪ Proposal of a small quantitative or qualitative research project: aim and rationale (providing a context for your research), research question or theory, experimental methodology, hypothesis, Independent and Dependant variables, parametric and non-parametric tests, seeking relationships or differences, statistical inference – sample and populations, statistical significance, confidence intervals. Proposed testing procedures, Health and Safety, legal and ethical issues ▪ Descriptive statistics - summarising data, measures of location and dispersion. The normal distribution. ▪ Tests of correlation; rank correlation; regression analysis; bivariate analysis. ▪ Tests of difference – one sample tests; two sample tests (independent and related design), One-way ANOVA and Factorial Analysis of Variance, Multivariate Analysis of

	Variance and Analysis of Covariance, Within subject and mixed design, repeated measures and mixed design ANOVA.
Teaching	Lectures, seminars, workshops and personal tutorials
Assessment	Study Option 1: <ul style="list-style-type: none"> • Oral presentation (20%) • Coursework: PDP/Research coursework (40%) • Coursework: data analysis (40%)
	Study Option 2: <ul style="list-style-type: none"> • Personal development portfolio (comprises logbook, essay and CV) (100%)
	Study Option 3: <ul style="list-style-type: none"> • SPSS data analysis (100%)
Last updated:	11/04/21 PJW

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Module Code	LS4008/LS5017
Module Title	Sport and Exercise Psychology
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	4
Prerequisites	Introductory university level psychology/biology useful
Suitability	<ul style="list-style-type: none"> • Open to suitably qualified Study Abroad/International Exchange students enrolled at KU for Study Options 1 or 2 or 3 • Not open to Erasmus students (as Level 4)
Content	<p>The module seeks to introduce fundamental psychological constructs and how they impact upon our understanding of human behaviour and learning in sport and exercise environments. Such constructs include personality, motivation, anxiety, stress as well as the learning and performance process.</p> <p>Autumn Semester content summary: an introduction to theories of motor control and motor learning. Measurement and testing in sport and exercise psychology with regards to skill acquisition- focusing on Perception and attention, neurological bases of human movement, memory and learning.</p>

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<p>Spring Semester content summary: an introduction to the theories of sport and exercise psychology, discussing how psychological variables influence behaviour with focus on personality, the self, motivation, anxiety and stress.</p> <p>Topics:</p> <ul style="list-style-type: none"> • The growth and development of sport and exercise psychology as a discipline • Methods used to conduct sport and exercise psychology research • The role of the self in sport and exercise, how this develops and impacts upon wellbeing and performance • The differing theories of personality development and the role it plays in sport and exercise • The different perspectives on the motivation in sport and exercise and the influences this has on individuals and groups • Theories of arousal, stress and anxiety and how they might impact upon sport/exercise environments • The role of psychology in the uptake and maintenance of physical activity • The role of exercise in maintaining/improving psychological health • Competing perspectives pertaining to motor control and skill acquisition • The role of perception and attention in the ability to learn and perform motor skills • Types and classifications of different types of motor skills • The role and functionality of memory and its impact on acquiring and performing sport skills • The role of neurological systems in the control of human movement • Differing approaches to understanding learning in the sports environment.
Teaching	Lectures, seminars and practical sessions
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • in-class online MCQ test (30%) • Coursework: research article (35%) • Essay (35%)
	<p>Study Option 2:</p> <ul style="list-style-type: none"> • Lab Report (100%)
	<p>Study Option 3:</p> <ul style="list-style-type: none"> • Essay – 1,500 words (100%)
Last updated:	11/04/21 PJW

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Module Code	LS4009
Module Title	Functional Anatomy and Exercise Physiology
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	4
Prerequisites	Successful completion of introductory university level biology.
Suitability	<ul style="list-style-type: none"> - Open to suitably qualified Study Abroad/International Exchange students enrolled at KU for Study Option 1 or 2 or 3 - Not open to Erasmus students (as Level 4)
Content	<p>The module is designed to introduce the student to the fundamentals of functional anatomy and physiology, particularly the skeletal, neural, muscular, metabolic, respiratory and cardiovascular systems. The focus will be on the understanding of the biomechanics of movement and the physiological adjustments in response to the demands of sport and exercise.</p> <p>Autumn Semester content summary: <i>the fundamentals of functional anatomy, particularly the skeletal, articular and muscular systems. The focus is on understanding of the biomechanics of movement.</i></p> <ul style="list-style-type: none"> ▪ The functional anatomy of the human body, its major regions and their surface landmarks. ▪ Types of joint found in the body, their structure and function. ▪ Relationship between joint stability and flexibility. ▪ Methods for assessing flexibility and use of data in exercise prescription. ▪ Bone and muscle structure at the microscopic level and how skeletal muscle is innervated to act. ▪ Functional anatomy of the neurological, muscular, cardiovascular and respiratory systems. ▪ The biomechanics of movement. <p>Spring Semester content summary: <i>the fundamentals of exercise physiology, particularly the neural, muscular, metabolic, respiratory and cardiovascular systems. The focus will be on the understanding of physiological adjustments in response to the demands of sport and exercise.</i></p> <ul style="list-style-type: none"> ▪ Adjustments needed by the neurological, muscular, cardiovascular and respiratory systems to deliver demands made by exercise. ▪ Energy pathways/Acid/base balance, role of buffers.

	<ul style="list-style-type: none"> ▪ Introduction to a range of laboratory methods used for biomechanical and physiological analysis, e.g. spirometry, flexibility, ECG, body composition, respiratory exchange ratio, VO2 max; length-tension and force velocity relations.
Teaching	Lectures, seminars and workshops
Assessment	Study Option 1: <ul style="list-style-type: none"> • MCQ test (30%) • Practical Viva Voce exam (30%) • Lab manual/report (40%)
	Study Option 2: <ul style="list-style-type: none"> • In-class test (30%) • Practical exam (70%)
	Study Option 3: <ul style="list-style-type: none"> • Practical report (50%) • MCQ Test (50%)
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Module Code	LS4010
Module Title	The Science and Practice of Coaching
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	4
Prerequisites	Successful completion of introductory university level physical education studies.
Suitability	<ul style="list-style-type: none"> • Open to suitably qualified Study Abroad/International Exchange students enrolled at KU for Study Options 1 or 2 • Not open to Erasmus students (as Level 4)
Content	<p>This module introduces theories related to coaching and leadership roles in sport and exercise, and it aims to create environments where students can develop their own practical competencies in related coaching and leadership skills. It also aims to provide students with the experiential basis necessary for them to appreciate and understand sport as an academic subject.</p> <p>Topics covered:</p>

	<ul style="list-style-type: none"> • Overview of the coaching process, introducing the coaching cycle and its critical components. • Effective communication to individual and group. • Group management, maintaining control of a group of athletes to monitor adherence to a coaching session. • Planning and organisation of physical activity sessions. • Basic theories of human motor control and learning. • Basic principles of training. • Safety and first aid as an implicit part of running an effective coaching session. • The safety of the athletes and coaches must be shown in the planning process. • Structural, technical and tactical aspects of selected sports. • Practical sport and exercise leadership.
Teaching	Lectures, seminars and coaching practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> • Coaching theory essay – 1000 words (10%) • Coaching portfolio – 2,300 words max (40%) • Practical coaching session (50%)
	Study Option 2: <ul style="list-style-type: none"> • Coaching theory essay – 1000 words (50%) • Practical coaching session (50%)
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LEVEL 5 – INTERMEDIATE

Module Code	LS5001
Module Title	Molecular Biology of the Cell
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	<ul style="list-style-type: none"> • Successful completion of introductory university-level module in cell biology such as LS4001 or similar. • For Study Option 3, completion of introductory cell and molecular biology.
Suitability	Open for students enrolled at KU for Study Options 1 or 2 or 3

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

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The University makes every effort to ensure that module availability & content is correct at the time of publishing, but it cannot accept responsibility for subsequent changes, as part of the University's policy of continuous improvement & development.

Content	<p>The module builds on topics covered in LS4001 (Genes, Cells and Tissues) and explores more advanced concepts in cell and molecular biology.</p> <p>The module provides insight into the structure and functions of cells, and takes an integrated approach to looking at how cells respond to changes in their environment – from receptor interactions and intracellular signalling pathways through to the regulation of gene expression and changes in cellular processes.</p> <p>Autumn Semester summary: <i>cell biology and intracellular signalling.</i></p> <ul style="list-style-type: none"> • An overview of cellular and molecular processes in the cell • Cell structure, adhesion and motility • Intracellular trafficking and molecular motors • Cell cycle and cell death • An introduction to receptor activation and intracellular signalling pathways. • DNA packaging, chromatin modification and epigenetic regulation <p>Spring semester summary: <i>molecular genetics</i></p> <ul style="list-style-type: none"> • DNA replication, transcription, translation and the regulation of gene expression • Mutation and the genetic code • Drugs that interfere with genetic processes • Practical methods relevant to cell and molecular biology, for example fluorescence microscopy, RT-PCR • Data analysis and interpretation relevant to topics covered throughout the module.
Teaching	Lectures, tutorials, workshops and practical sessions/demonstrations
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • 2-hour exam (40%) • Practical: In-course test of practical techniques and data-handling (30%) • group poster presentation (30%) <p>Study Option 2:</p> <ul style="list-style-type: none"> • Poster assessment (50%) • Essay (50%) <p>Study Option 3:</p> <ul style="list-style-type: none"> • Data-handling assessment (50%) • Essay (50%)
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Module Code	LS5002
Module Title	Proteins and Metabolism
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	Successful completion of introductory university-level module such as LS4002 or similar
Suitability	Open for students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>The module provides students with knowledge of the structure and methods of analysis of proteins, with particular emphasis on enzymes. This is followed by the study of the major catabolic and anabolic pathways and investigates how organisms obtain and use energy. These processes, and their regulation in health and disease, are considered at the molecular level, which involves many proteins including enzymes.</p> <p>Autumn Semester summary: the structure and methods of analysis of proteins, with particular emphasis on enzymes. Brief introduction of Bioenergetics.</p> <p>Spring Semester summary: the study of the major catabolic and anabolic pathways and how organisms obtain and use energy. Regulation of these in health and disease, are considered at the molecular level, which involves many proteins including enzymes.</p> <p>Topics covered:</p> <ul style="list-style-type: none"> • Amino Acids - Revision of basic structure and chemical properties. Structure of side chains. • Protein Structure - Structure and properties of the peptide bond, levels of protein structure relating to primary structure and function of proteins. • Enzymes - Structural features of enzymes relating to function. Measurement of enzyme activity, including calculation of kinetic parameters and enzyme inhibition. • Spectroscopy - Outline of principles of UV/visible spectroscopy, fluorescence techniques and applications to protein structure and enzyme assays. • Protein Purification Techniques: Ultracentrifugation, chromatography, electrophoresis as applied to the purification of proteins. • Bioenergetics & Oxidative Phosphorylation: Free energy changes, reduction potentials, coupled reactions and electron transport. Organisation of the inner mitochondrial membrane and its relationship to the chemiosmotic theory. • Carbohydrate Metabolism: Integration and regulation of glycolysis/ gluconeogenesis, glycogen metabolism, pentose phosphate pathway and the citric acid cycle. • Amino Acid Metabolism: Integration and regulation of amino acid metabolism. • Lipid & Cholesterol Metabolism: Integration and regulation of oxidation, ketone body metabolism, fatty acid synthesis, triglyceride metabolism and cholesterol synthesis. Classification and roles of serum lipoproteins.

Teaching	Lectures, tutorials, workshops and practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> • 3 hour Exam (40%) • Portfolio of laboratory reports (30%) • Workbook (30%)
	Study Option 2: <ul style="list-style-type: none"> • Practical report (50%) • Continuous assessment portfolio (50%)
	Study Option 3: <ul style="list-style-type: none"> • Practical report (50%) • Continuous assessment portfolio (50%)
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Module Code	LS5003
Module Title	Principles of Pharmacology with Research Methods
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	<ul style="list-style-type: none"> • For Study Options 1 and 2, successful completion of level 4 introductory study of life sciences. • For Study Option 3, previous experience of pharmacology and aspects of drug disposition relating to drug absorption/distribution.
Suitability	Open for students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>This module aims to develop the scientific, academic and research skills that were introduced at level 4 (introductory level), and to relate applications of these skills to study and research in pharmacology. Research methods and employability skills are taught within the context of pharmacological research and associated industries.</p> <p>Students are introduced to the basic concepts of pharmacodynamics (how drugs take their effect at given targets) and drug disposition/pharmacokinetics (the effect the body has on administered drugs), whilst considering the factors which influence such parameters and thus lead to individual variability in drug response. The module goes on to discuss the principles of toxicology, how drugs are discovered and developed, and the role of pharmaceutical sector / regulatory bodies in this process.</p>

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<p>Autumn Semester summary: <i>Pharmacodynamics, Drug disposition (absorption, distribution) Pharmacokinetics; research skills & statistics.</i></p> <ul style="list-style-type: none"> ▪ Research Methods: further statistics, experimental design & SPSS; use of research literature; scientific communication and presentation; ethical issues ▪ Employment skills: career options; investigation of business industry; self- reflection; teamwork/project management ▪ Introductory Pharmacology: <ul style="list-style-type: none"> ○ Pharmacodynamics: Basic pharmacological definitions ○ Targets for drug action ○ Pharmacological definition of receptors and receptor superfamilies ○ Drugs acting at receptors both as agonists (full and partial) and antagonists (competitive and non-competitive) ○ Concept of the dose-response relationship. Phenomena of tachyphylaxis and desensitisation to drugs. <p>Spring Semester summary: <i>Drug disposition (metabolism, excretion) Pharmacokinetics, Drug Development & Clinical Trials, Toxicology.</i></p> <ul style="list-style-type: none"> ▪ Introduction to the concept of toxicology: Mechanistic targets of toxicant action; Measurement of toxicological parameters. ▪ Drug/toxicant disposition and kinetics: Routes of administration of drugs; Mechanisms of, and factors influencing, drug/toxicant absorption, distribution, metabolism and excretion; ▪ Pharmacokinetics: One compartment models; concept of volume of distribution, half-life, elimination, clearance and steady state. Differences between intravenous and oral dosing. ▪ Individual variability in drug and toxicant response: Classification of response variability (dynamic or kinetic); Effect of age, environment, diet, disease, genomics and differing physiological states on the response to drugs and toxicants; Adverse drug reactions. ▪ Drug development and clinical trials: Overview of the pharmaceutical industry; Drug design and identification of a target site; Animal usage and the law; Preliminary drug screening using in vitro and in vivo models; Concept of risk assessment and preclinical safety testing including the validity of using animal data; Clinical trials; phase I - IV trials, trial design and the information gained at each phase; The role of the ethics committee in the clinical trial process and the relevant regulatory bodies in product licensing and post- market monitoring.
<p>Teaching</p>	<p>Lectures, seminars, workshops and laboratory practical sessions</p>

Assessment	Study Option 1: <ul style="list-style-type: none"> • Exam (50%) • Online statistical test (20%) • Essay - 1,500 words (30%)
	Study Option 2: <ul style="list-style-type: none"> • 2 practicals • Group oral presentation
	Study Option 3: <ul style="list-style-type: none"> • 1 practical • Modified examination.
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Module Code	LS5004
Module Title	Research Methods and Concepts in Molecular Ecology and Evolution
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	<ul style="list-style-type: none"> • For Study Options 1 and 2, successful completion of introductory-level life sciences modules. • For Study Option 3, knowledge of animal phyla, genetics, basic statistics.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>Students are introduced to the basic concepts of population genetics, the role of molecular biology to investigate natural populations and biodiversity, evolutionary biology, molecular basis of speciation, phylogenetics and the application of molecular ecology techniques.</p> <p>These subjects are further examined in terms of the latest knowledge, techniques and research in molecular ecology and evolution. Students gain a range of practical skills including taxonomic techniques, molecular laboratory methods and bioinformatics.</p> <p>Autumn Semester summary: <i>Molecular ecology & genetics; research skills & statistics.</i></p> <p>Spring Semester summary: <i>Natural selection, molecular ecology & evolution, phylogenetics; lit reviews, statistics.</i></p> <p>Topics covered include:</p> <ul style="list-style-type: none"> ▪ Research Methods: further statistics, experimental design & SPSS; use of research literature; scientific communication and presentation; ethical issues

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<ul style="list-style-type: none"> ▪ Employment skills: career options; investigation of business industry; self- reflection; teamwork/project management ▪ Concepts in Molecular Ecology and Evolution: <ul style="list-style-type: none"> ○ Concepts in population biology in relation to genes and inheritance ○ Molecular systematics and phylogenetics ○ Molecular genetics of populations ○ Basis of Genetic variation ○ Natural selection and adaptation ○ Speciation and extinction ○ Speciation genes and introgression ○ Applications of molecular ecology
Teaching	Lectures, seminars, workshops and laboratory practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> • 1,500-word essay (30%) • Biostatistics test (20%) • Exam (50%)
	Study Option 2: <ul style="list-style-type: none"> • 2 practicals • Group oral presentation
	Study Option 3: <ul style="list-style-type: none"> • 1 practical • 1 literature review • 1 statistics test
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Module Code	LS5005
Module Title	Medical Physiology with Research Methods
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	<ul style="list-style-type: none"> • For Study Option 1 and 2, successful completion of introductory university level human physiology (such as LS4004 or similar). • For Study Option 3, study of intermediate level physiology (specifically cardiovascular & sensory), basic statistics.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

<p>Content</p>	<p>The module is designed to enhance students' understanding of the recurring physiological themes in non-communicable diseases, relating physiological systems to common chronic diseases and likely mechanisms involved. The module will further develop the study of human physiology from level 4, covering topics such as endocrinology, neurophysiology, cardiovascular, reproductive and respiratory physiology.</p> <p>Autumn Semester content summary: <i>physiology; research skills & statistics</i></p> <p>Spring Semester content summary: <i>practicals on cardiovascular and sensory physiology; literature reviews, statistics.</i></p> <p>Topics covered may include:</p> <ul style="list-style-type: none"> ▪ Research Methods: further statistics, experimental design & SPSS; use of research literature; scientific communication and presentation; ethical issues ▪ Employment skills: career options; investigation of business industry; self- reflection; teamwork/project management ▪ Medical Psychology ▪ Cardiovascular physiology: techniques used to assess cardiovascular function, cardiac arrhythmias, factors affecting cardiac output in health and disease, the nature of vascular smooth muscle. Intrinsic and extrinsic control of arteriolar tone, specialised circulations, hypertension, central control of blood pressure, integrated cardiovascular responses in health and disease. ▪ Respiratory physiology: physical principles of gas exchange, ventilation & alveolar pressure changes, effects of blood pCO₂ & pH on ventilation, loading & unloading reactions, physical principles of gas exchange, factors that affect the oxygen-haemoglobin dissociation curve. ▪ Renal and Acid/Base physiology: Body fluids haemodynamics, shifts of body water and body fluids; Regulation of sodium and water balance: preservation of the volume /pressure reservoir required for tissue perfusion, anion gap & base deficit, challenges to salt & water homeostasis, electrolyte balance; Acid – base homeostasis, buffer systems. ▪ Neurophysiology: Motor control and motor neurons, control of motor function by the brain; maintenance of posture and balance. Selected examples of pathology of motor control. ▪ Endocrine physiology: The concept of homeostasis and ageing, concepts related to control of hormone secretion, specificity of hormone action, concepts related to target cells responsiveness and integration, regulation of metabolism, energy balance and body temperature regulation, endocrinology of pregnancy, the anterior & posterior pituitary gland, and endocrine pancreas. ▪ Reproductive physiology: Sex determination and differentiation; gametogenesis; hormonal control of reproductive function. The chronology of reproductive function. Female reproductive physiology; puberty, the menstrual cycle and the menopause; pregnancy, parturition and lactation. Male reproductive physiology; puberty, spermatogenesis and endocrine functioning of the testes. Selected examples of reproductive system abnormalities.
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	<ul style="list-style-type: none"> ▪ Gastrointestinal physiology: regulation of gastrointestinal function, motility (mass movement), secretion, internal electrolyte & water transport, gut microflora, examples of GI diseases (e.g., gastro-oesophageal reflux disease (GORD), pancreatitis, gastric & pyloric ulcers and cancers).
Teaching	Lectures, seminars, workshops and laboratory practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> • Exam (50%) • Biostatistical test (20%) • Essay 1,500 words (30%)
	Study Option 2: <ul style="list-style-type: none"> • Group presentation • Physiology exam-type questions
	Study Option 3: <ul style="list-style-type: none"> • 2 practicals • 1 literature review • 1 statistics test
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Module Code	LS5006
Module Title	Research Methods and Topics in Forensic Biology
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	<ul style="list-style-type: none"> • For Study Options 1 or 2, successful completion of an introductory level 4 Forensic Science or Forensic Biology module. • For Study Option 3, some level 4 forensic biology knowledge, basic statistics.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

Content	<p>The module develops students’ knowledge of forensic biology with a particular focus on key methods of human identification and trace and contact evidence associated with the human skeleton, tissues and fluids. The development of these methods through scientific research and case practice is also addressed to foster a critical evaluation of the applicability and reliability of key forensic techniques.</p> <p>Autumn Semester content summary: <i>Hair analysis, ageing, genetics, research skills & statistics.</i></p> <p>Spring Semester content summary: <i>Fingerprinting, sex determination, stature and ageing; lit reviews, statistics.</i></p> <p>Topics covered include:</p> <ul style="list-style-type: none"> ▪ Research Methods: further statistics, experimental design & SPSS; use of research literature; scientific communication and presentation; ethical issues ▪ Employment skills: career options; investigation of business industry; self- reflection; teamwork/project management ▪ Forensic Biology: <ul style="list-style-type: none"> ○ Techniques in human identification including fingerprints and DNA analysis ○ Introductory Forensic Anthropology including the determination of age, sex and stature from skeletal remains ○ Biological trace and contact evidence including DNA analysis and human hair ○ The forensic use of relevant reference material and databases, including those for DNA and fingerprints ○ The research and case practice base for these techniques, their progressive development, applicability and reliability.
Teaching	Lectures, workshops and practical laboratory sessions
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • Exam: Timed essay (20%) • Practical: Group oral presentation (20%) • Coursework: Critical review of research papers (30%) & laboratory practical report (30%) <p>Study Option 2:</p> <ul style="list-style-type: none"> • Group presentation • 2 practicals <p>Study Option 3:</p> <ul style="list-style-type: none"> • 3 practicals • 1 Literature Review • 1 statistics test
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Module Code	LS5007
Module Title	Food and Nutrition 2 – Applied Nutrition
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	Successful completion of introductory university-level module in food and nutrition such as LS4006 or similar.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2
Content	<ul style="list-style-type: none"> • The module applies basic nutrition delivered at Level 4 (Food and Nutrition 1: An Introduction – LS4006) to introduce students to dietary assessment methodology and how they are used depending on nutrients, groups and populations, and the role of nutrition across the lifespan. • Autumn Semester content summary: <i>dietary assessment methodology + Nutrition across the lifespan (preconception, pregnancy and infant feeding, pre-school child and school child).</i> • Topics covered include: <ul style="list-style-type: none"> • Aims and purposes of dietary assessment • Methods used to measure dietary intake: recall methods, food diaries, weighed food intakes, duplicate diets • Review of dietary survey methods used in nutritional surveys and in the nutritional assessment of groups throughout the lifespan, and the validity of these methods • The use of food portion sizes, food tables and computerised food composition databases in dietary surveys • Pre-conceptual nutrition - current guidelines and recommendations • Nutritional considerations during pregnancy - dietary reference values, alcohol, use of supplements, effects of malnutrition on birth outcome and maternal health, diabetes, obesity • Infant feeding • Nutritional needs during childhood • Nutritional considerations during adolescence and adulthood - eating disorders, iron nutrition, teenage pregnancy, overweight, obesity, osteoporosis, inequalities of health, needs of ethnic minority groups, salt intakes and hypertension

	<ul style="list-style-type: none"> Nutrition and the elderly - factors affecting nutritional status: physiological, psychological, practical and social, nutrition and dementia
Teaching	Lectures and online lectures, online discussion forums, group tutorials, workshops, practical sessions, and feedback/feed forward sessions
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> Assignment 1: 2 tasks: data analysis and 1,200-word analysis/evaluation of the literature (30%) Exam (50%) 1,500 word essay (20%) <p>Study Option 2:</p> <ul style="list-style-type: none"> Portfolio 1 (75%) 1,500 word essay (25%)
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Module Code	LS5008
Module Title	Infection and Immunity
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	<ul style="list-style-type: none"> For Study Options 1 and 2, successful completion of introductory university-level module about genes/tissues such as LS4001 or similar. For Study Option 3, in addition to LS4001 or similar, study of microbiology (equivalent to the Autumn semester content show below.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>This module provides an opportunity to learn more about the structure and function of microbiological agents in health and disease and the immunological responses raised as a consequence by the human body.</p> <p>Through the lectures a number of microbiological processes will be examined along with methods of controlling the organisms responsible in the laboratory environment as well as within a patient.</p> <p>Students will also become familiar with the different cells and organs of the immune system and how these function and interact to protect the body from infection. The module also</p>

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<p>introduces some of the molecular processes and signalling events that are important in communication between cells of the human immune system.</p> <p>Autumn Semester content summary: <i>General properties of microorganisms including safe working practices/genetic manipulation. Normal flora, viral agents, sources and routes of infection plus virulence factors. Control through disinfection, sterilisation, chemotherapy and vaccination.</i></p> <ul style="list-style-type: none"> ▪ Review of the general physical properties of micro-organisms ▪ Safe working practices and current legislation including that relating to genetic manipulation ▪ The normal microbial flora of man and animals; it's potential to act as a source of human infection ▪ Viral agents of infection; an introduction to viral infections in humans ▪ Transmission of infection ▪ Virulence factors of micro-organisms: <ul style="list-style-type: none"> ○ adhesion to the host, overcoming immunity, exotoxins ○ endotoxins, immunopathological damage ▪ Control of micro-organisms: asepsis, disinfection, sterilisation, chemotherapy, vaccination. <p>Spring Semester content summary: <i>Organs, cells and tissues in the human immune system; innate and acquired immunity (cell types involved, their production, inflammation, cytokines, inflammatory mediators) antibody structure and function. Serological techniques, concept of HLA.</i></p> <ul style="list-style-type: none"> ▪ Organs, tissues and cells involved in the human immune system ▪ Innate Immunity – Granulocytes, macrophages, and phagocytosis; complement and complement mediated defences. Inflammation and role of cytokines, chemokines and inflammatory mediators in this response ▪ Acquired immunity – Function, maturation and activation of B and T lymphocytes. Mechanisms underlying specific lymphocyte activation. Antibody structure and function. The role of immunoglobulin and cell mediated immune mechanisms ▪ The immunology laboratory – Standard serological techniques involving precipitation, agglutination, enzyme linked assays, antibody-based techniques and cellular techniques.
Teaching	Lectures, tutorials, workshops and practical sessions
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • Exam: short essay style questions (50%) • Practical: MCQ test based upon a microbiology practical (25%) • Coursework: written report from an immunological practical (25%) <p>Study Option 2:</p>

	<ul style="list-style-type: none"> • Assessment of practical (50%) • Subject MCQ (50%)
	<p>Study Option 3:</p> <ul style="list-style-type: none"> • Assessment of practical (50%) • Subject MCQ (50%)
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Module Code	LS5009
Module Title	Pathobiology
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	Successful completion of introductory university-level module in cell biology such as LS4001 or similar
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>The module discusses cellular mechanisms of disease. In addition it considers the role of cellular pathology in the context of other pathology disciplines such as clinical pathology. Particular emphasis is given to laboratory aspects of cellular injury and their application in routine diagnosis.</p> <p>Autumn Semester content summary: <i>Pathogenesis and structural/functional changes which take place in tissues/organs in diseases.</i></p> <p>Spring Semester content summary: <i>Applications of light and electron microscopy in the diagnosis of disease. Study Histochemical techniques, image analysis, and applications of cytological methods for population screening and disease diagnosis.</i></p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • Pathogenesis of cell injury: Morphological features of cell injury, acute cellular oedema, fatty change, storage diseases, necrosis and apoptosis. Genetic and acquired disease, inflammation and cancer. • Definition of epidemiology, its role in public health, application of basic statistical methods in epidemiology.

	<ul style="list-style-type: none"> • Review of histological and cytological methods, including sources and types of specimen, tissue treatments and processing and staining. Applications of light and electron microscopes in disease diagnosis. • Histochemistry and immunocytochemistry and its use in diagnostic pathology. • Image capture, image processing and image analysis techniques and their use in cellular pathology including quantification and histomorphometry. • Diagnostic cytopathology - including gynaecological cytology (screening and disease diagnosis), non-gynaecological cytology, and fine needle aspirates. • Medical genetics-including chromosomal and monogenic disorders, complex diseases, genomic medicine, pharmacogenomics and ethical issues.
Teaching	Lectures, tutorials and laboratory practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> • 2 hour Exam (60%) • laboratory practical assessment (20%) • Poster presentation (20%)
	Study Option 2: <ul style="list-style-type: none"> • Coursework (40%) • Written exam (60%)
	Study Option 3: <ul style="list-style-type: none"> • Coursework (40%) • Written exam (60%)
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Module Code	LS5010
Module Title	System Pharmacology
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	Successful completion of introductory university level pharmacology such as LS5003 or similar.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

<p>Content</p>	<p>The module complements concepts delivered in Principles of Pharmacology with Research Methods (LS5003) and applies them to a number of physiological system disorders. The main feature of this module is, in each case, to study and discuss the disease pathophysiology and the types of drugs used in therapy of such disorders, alongside a rationale for their usage and any associated side effects.</p> <p>Autumn semester content summary: <i>study of the major disease states associated with the cardiovascular, respiratory, renal and gastrointestinal, systems and drugs used to treat them.</i></p> <p>Spring semester content summary: <i>study of the major disease states associated with the endocrine and nervous systems and drugs used to treat them.</i></p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • Mediator Pharmacology: Role of chemical mediators in the inflammatory response. Anti-histamines and treatment of allergic disease. Drugs affecting eicosanoid action including non-steroidal anti-inflammatory drugs i.e. cyclo-oxygenase (COX-1 and COX-2) inhibitors, 5-lipoxygenase inhibitors 5-FLAP inhibitors and leukotriene receptor antagonists. Platelet activating factor antagonists. • Cardiovascular Pharmacology: vasodilators, diuretics and inotropic agents in the treatment of congestive heart failure with an emphasis on new therapies for heart failure e.g. adrenoceptor blockers, ACE inhibitors, neutral endopeptidase inhibitors, angiotensin II type I receptor blockers, vasopeptidase inhibitors, endothelin receptor antagonists, aldosterone receptor antagonists. • Drugs used in the treatment of arrhythmias which include sodium channel blockers, adrenoceptor blockers, potassium channel blockers, calcium channel blockers and other anti-arrhythmic agents. Use of drugs for the treatment of angina, organic nitrates, adrenoceptor blockers and calcium channel blockers. Antihypertensive drugs, to include diuretics, ACE inhibitors, angiotensin II type I receptor blockers and, β-adrenoceptor blockers. Drugs affecting blood, for example thrombolytics, lipid lowering agents and anti-coagulants. • Respiratory Pharmacology: drugs used in the treatment of asthma which includes β-adrenergic agonists, corticosteroids and other agents such as theophylline. Use of drugs to treat and manage chronic obstructive pulmonary diseases e.g. corticosteroids and β-adrenergic agonists. Treatment of other respiratory disorders such as rhinitis and cough • Renal and Urogenital Pharmacology: Description of agents which cause natriuresis and diuresis. Drugs to be studied include loop diuretics, thiazide diuretics, potassium sparing diuretics, osmotic diuretics and carbonic anhydrase inhibitors. Drugs acting on urogenital smooth muscle which are used in the treatment of benign prostatic hypertrophy, impotency and overactive bladder
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	<ul style="list-style-type: none"> • Gastrointestinal Pharmacology: Treatment of peptic ulcers with antimicrobial agents, histamine H2 receptor blockers, prostaglandins and proton pump inhibitors as well as more recent developments in the study of <i>Helicobacter pylori</i>. Therapies for other medical conditions involving the GI tract to include agents to combat diarrhoea and constipation as well as control of chemotherapy- induced emesis, Crohn’s disease and ulcerative colitis. • Endocrine pharmacology: anti diabetic drugs, drugs acting on the thyroid, corticosteroids, sex hormones and their analogues. • Neuropharmacology: autonomic pharmacology, introduction to techniques relevant to the study of neuropharmacology, anti-Parkinsonian drugs, antidepressants, antipsychotics, anticonvulsants, hypnotics and sedatives, drugs of dependence and abuse.
Teaching	Lectures, tutorials, workshops, presentation sessions and practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> • Exam: MCQ and essay (60%) • 2 practical reports (20%) • Oral presentation (20%)
	Study Option 2: <ul style="list-style-type: none"> • Practical report (50%) • Presentation (50%)
	Study Option 3: <ul style="list-style-type: none"> • Practical report (50%) • Presentation (50%)
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Module Code	LS5012
Module Title	Research Methods in Exercise Science
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	Successful completion of LS4007 (or equivalent)
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Option 1 only

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

<p>Content</p>	<p>The module’s main focus is on the approaches to research design, data collection and statistical analysis. It further discusses quantitative and qualitative research methods introduced at Level 4 and introduces students to advanced statistical techniques. The module provides an essential introduction to research ethics and the ethical approval procedures that are required when using human participants for research.</p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • Employment skills • Further Research Methods and Analysis • Quantitative and Qualitative methodologies, research designs and analysis. • The ontological and epistemological underpinnings of qualitative and quantitative research. • Qualitative research strategies including ethnography, grounded theory, IPA, and action research. • Methods of qualitative data collection and analysis including interviews, observation and focus groups. • Assessing methods of establishing trustworthiness of qualitative data including member checking, triangulation and credibility checking. • Mixed method research. • Quantitative research strategies including research design, validity and reliability. • Assessing validity and reliability of experimental data including power calculations, intra-class correlation coefficient, coefficient of variation, Cronbach’s alpha and Bland and Altman-analysis. • Calculating values of central tendency and dispersion and testing the distribution of a data set. • Parametric and non-parametric statistics including tests of difference (ANOVA) and tests of association (regression) using appropriate software packages. • Producing figures for presenting visual displays of experimental data. • Identifying areas for research, developing a rationale and research question and writing a literature review. • Critical analysis in research. • Research ethics. • Writing a research proposal for level 6 independent study. • Pilot testing. • Key and transferable employability skills – Self management, preparation for independent study, creative thinking and problem solving, networking, communication for recruiting participants
<p>Teaching</p>	<p>Lectures, seminars, workshops and tutorials</p>

Assessment	Coursework: Data analysis and Research proposal (100%)
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Module Code	LS5013
Module Title	Sport and Exercise Psychology II
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	Successful completion of LS4008 introductory sport and exercise psychology (or equivalent)
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>In building upon the psychological concepts mentioned at introductory level (LS4008), this Module extends knowledge of some of these existing topics, and complement these with additional topics. The module content will be broadly divided into those aspects that deal with social psychology in sport and exercise, the psychology (and development) of the individual in sport and exercise settings and exercise psychology. These areas will typically include the topics shown below.</p> <p>Autumn Semester content summary: <i>motivation and team cohesion.</i></p> <p>Spring Semester content summary: <i>promotion of physical activity behaviour, and the psychological effects of participation in sport and exercise.</i></p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • The role of motivation in sport and exercise settings and the developments of differing perspectives in this area. • Leadership in sports and exercise contexts. • The role played by group dynamics in sport and exercise settings and how this might influence group satisfaction and performance. • The development of aggression in sport contexts, incorporating different theoretical perspectives. • The mechanisms and experience of burnout in athletes, and the psychological components of this process. • Career transitions for sport performers, and the role sport psychology may play in assisting such transitions. • Moral development in young athletes, and the role of morality in competitive sports contexts.

	<ul style="list-style-type: none"> • The role of emotions experienced on an inter- and intra-personal level in sport and exercise environments. • The benefits of exercise in the maintenance of psychological health and wellbeing, and the mechanisms by which this occurs. • Theories of exercise adoption and maintenance. • Measurement and theoretical issues in sport and exercise psychology research
Teaching	Lectures, seminars and practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> • Exam (40%) • Group presentation (30%) • Executive summary (30%)
	Study Option 2: <ul style="list-style-type: none"> • Executive summary (100%)
	Study Option 3: <ul style="list-style-type: none"> • 50% presentation (50%) • 50% written report (50%)
Last updated:	11/04/21 PJW

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Module Code	LS5014/LS6016
Module Title	Health and Exercise Physiology
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	Successful completion of LS4004 or LS4009 (or equivalent)
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2
Content	<p>This module covers the acute and chronic physiological changes induced by exercise and an understanding of cardio-respiratory health. This module will develop the students' application of exercise physiology to performance.</p> <p>The module will also enable students to apply the role of exercise and physical activity as a prescription therapy to clinical diseases. This module will further develop the student understanding by equipping them with the scientific skills to monitor and assess health, fitness and performance.</p>

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<p>Autumn semester content: the acute and chronic physiological changes induced by exercise and an understanding of cardio-respiratory health with application of exercise physiology to performance, equipping them with the scientific skills to monitor and assess health, fitness and performance.</p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • The effects of exercise on selected physiological systems (endocrine, immune, cardiovascular, respiratory). • Physiological adaptations to exercise and training. • Measurement of health and exercise aspects of selected physiological systems (endocrine, immune, cardiovascular, respiratory). • Health Screening and Risk Stratification procedures used by the industry. • Clinical and physiological assessment tools - protocols, validity and reliability (anthropometric, body composition). • Vocational practical competency in the evaluation of fitness assessment and clinical exercise testing. • Evidence for the promotion of physical activity and exercise to improve health and fitness. • Limits to performance and underlying causes of fatigue and exercise participation. • Issues/implications/benefits of exercise prescription for special populations and diseases.
Teaching	Lectures, seminars and practical sessions
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • Exam (40%) • Practical competency 1 (20%) • Practical competency 2 (20%)
	<p>Study Option 2:</p> <ul style="list-style-type: none"> • Practical Competency test (100%)
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Module Code	LS5015
Module Title	Analysis in Sport and Exercise
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

Level	5
Prerequisites	Successful completion of LS4009 Functional Anatomy and Exercise Physiology or an equivalent introductory modules.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>This module introduces technical and tactical analysis of sport performance.</p> <p>The technical aspect introduces the key mathematical and physical concepts underlying the biomechanical analysis of sport and exercise and provides students with an appreciation of how the application of biomechanics may be used to explain and enhance sporting and exercise movements, with practical analytical experience.</p> <p>The tactical aspect provides an appreciation of the application of notational analysis to enhance the coaching process. Students gain experience in various hand notation systems as well as using a computer based system.</p> <p>Autumn Semester content summary: introduction to concepts underlying the notational analysis of sports behaviour and strategy and its role in the coaching process. Evaluation of data collection systems in notational analysis and their use in different sports.</p> <p>Spring Semester content summary: application of the mathematical and physical concepts underlying biomechanical analysis of sport and exercise. Evaluate and analyse sporting movements through the application of biomechanical theory.</p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • Kinematic analysis of motion – physical concepts and theory relating to linear and angular motion, the equations of motion and projectile motion with reference to application in analysis of sport and exercise • Kinetic analysis of motion – The effects of forces in sport and exercise, Newton’s laws of motion, physical concepts and theory relating to linear and angular kinetics, conservation of momentum and the influence of fluids on movement • Analysis of sport and exercise movements – practical measurement of movement using video analysis, including setting up, capture, use of software and application of theory • Theory and methods of manual sports notation for both team and individual sports, with practical application of notational skills • Theory and methods of automated sports notation for a range of sporting situations using computer based systems, with practical application of notational skills • Application of notational analysis to coaching theory - analysis of coaching behaviour and feedback • Interpretation of biomechanical and notational data, through collected data and review of scientific literature • Enhancement of practical research skills and interpersonal skills through group-based practical data collection and analysis.

Teaching	Lectures, tutorials and practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> • Exam (40%) • Notational analysis group poster presentation (30%) • Biomechanics coursework (30%)
	Study Option 2: <ul style="list-style-type: none"> • Notational analysis group poster presentation (100%)
	Study Option 3: <ul style="list-style-type: none"> • Written practical report.
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Module Code	LS5016
Module Title	Sport Coaching Theory and Reflective Practice
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	5
Prerequisites	Successful completion of LS4010 (or equivalent).
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>This module seeks to highlight the importance of examining sport and sport coaching from a sociological and cultural perspective, and to introduce key concepts of sociological and cultural studies and their relationship to sport. The module will also examine theories, methodologies and technologies associated with sport coaching and contemporary issues that are emerging within the sport and coaching environments.</p> <p>Autumn topics:</p> <ul style="list-style-type: none"> • Coaching in the UK • Coach Education - Fit for Purpose • Leadership & Management • Role of the Coach • Professionalism of Sport Coaching • Gender Roles in Coaching • Ethnicity in Coaching

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

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The University makes every effort to ensure that module availability & content is correct at the time of publishing, but it cannot accept responsibility for subsequent changes, as part of the University's policy of continuous improvement & development.

	<ul style="list-style-type: none"> Coaching Research <p>Spring topics:</p> <ul style="list-style-type: none"> Socialisation in Sport - Impact on Coaching Class and Sport - Coaching and Participation Sub Cultures in Sport Coaching Practice Globalisation of Sport Commercialism & Consumerism: Impact on Sport
Teaching	Lectures and seminars
Assessment	Study Option 1: <ul style="list-style-type: none"> Exam (40%) Assignment 1: 2,000 word essay (30%) Assignment 2: 2,000 word essay (30%)
	Study Option 2: <ul style="list-style-type: none"> 2,000 word essay (100%)
	Study Option 3: <ul style="list-style-type: none"> 2,000 word essay (100%)
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LEVEL 6 – ADVANCED

Module Code	LS6001
Module Title	Molecular Genetics and Bioinformatics
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	<ul style="list-style-type: none"> For Study Options 1 or 2, successful completion of intermediate university-level module in cell biology such as LS5001 or equivalent. For Study Option 3, in addition to LS5001 or equivalent, a willingness to undertake self-directed study of some material covered in the autumn semester.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

<p>Content</p>	<ul style="list-style-type: none"> • This module introduces students to the processes involved in maintaining genome stability, causing genome variability and controlling the coding potential of the genome. This strand of the module gives an introduction to an area of increasing importance in many areas of bioscience research, including molecular diagnostics and drug development. • Autumn Semester content summary: Bioinformatics techniques [databases and their interrogation, pairwise and multi-sequence alignments, alignment profiles, alignment profiles, phylogenetics, gene prediction, bacterial genome alignment], Molecular Evolution, DNA repair, recombination and bacterial gene transfer mechanisms. • Spring Semester content summary: the 3D genome, Regulatory RNA and Transposons. • Topics covered include: <ul style="list-style-type: none"> • Mechanisms of DNA damage and repair. Types and mechanisms of mutations. • Responses to DNA damage. • General recombination. Significance and proposed mechanisms of recombination. • Role of rec genes and their products. • Mobile genetic elements and transposition. Transposable DNA, mechanisms and uses. • Regulation of gene expression. Points of control. Selected examples of prokaryotic and eukaryotic systems of gene regulation. • The historical and scientific context of data mining the Genome projects. • Internet resources: Databases and sites; www advantages and disadvantages; Internet vs. Intranet; Databases: The principal primary databases, their structure, function and inter-relationships; derived and specialised databases; database interrogation by Entrez and Sequence Retrieval System (SRS). • Pairwise alignment methods: Needleman-Wunsch, Smith Waterman and derivatives; dotplots. • Database homology searching: theory, statistics and pitfalls; BLAST and FASTA algorithms. • Multiple sequence alignments; Progressive alignment methods; ClustalW; phylogenetic trees; profile building and Hidden Markov Models. • Predicting protein structure/function relationships with the help of alignments, identification of known protein domains; use of structural databases to predict protein structure from alignments. • Gene prediction in prokaryotic and eukaryotic genomes; whole genome alignment.
<p>Teaching</p>	<p>Lectures, tutorials, practical sessions and computer sessions</p>

Assessment	Study Option 1: <ul style="list-style-type: none"> • 3 hour Exam (50%) • Practical: Presentation (15%) • Coursework: Report on an individual bioinformatics study (35%)
	Study Option 2: <ul style="list-style-type: none"> • Essay (50%) • Sequence analysis report (50%)
	Study Option 3: <ul style="list-style-type: none"> • Essay (50%) • Examination (50%)
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Module Code	LS6002
Module Title	Current Concepts in Biomolecular Science
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	Successful completion of intermediate university level study in biosciences.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Option 1 only
Content	<p>The main features of this module are to provide students with insights into the scientific basis of recent technological advances in biomolecular science through selected examples of contemporary scientific research and their impact on society.</p> <p>The interaction of science and the media, public engagement, and how these can guide scientific policy will also be discussed together with the challenges facing today's bioindustry including the role of intellectual property rights, bioethics and enterprise.</p> <p>Topics covered may include:</p> <ul style="list-style-type: none"> ▪ Review of selected topics demonstrating recent advances in biomolecular science. These topics may include recombinant DNA technology, genomics, transcriptomics, protein purification, proteomics, antibodies, immunoassays, pharmacogenomics, cell culture, techniques in cell biology, stem cells, gene therapy, natural products, aging and cell death.

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<ul style="list-style-type: none"> ▪ Awareness of how recent advances in biomolecular science impinge on society in general with consideration to the interaction of science and the media, public engagement, bioethics and how these can guide scientific policy. ▪ The role of research and enterprise in biomolecular science and the challenges facing today's bio industry including intellectual property rights and the development of translational research.
Teaching	Lectures, seminars, and practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> • 2 hour Exam (40%) • Coursework: Portfolio that may include a group work presentation, short written report and laboratory reports (60%)
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Module Code	LS6003
Module Title	Chemotherapy of Infectious & Neoplastic Disease
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	Successful completion of intermediate level modules LS5008 or LS5001 plus LS5003 , or equivalent.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>This module provides an opportunity to learn about the various chemotherapeutic agents used in the treatment of both infectious and neoplastic disease. Treatments for infectious diseases will cover drugs that have actions on bacteria, viruses, fungi and parasites, while the neoplastic disease therapy will include a range of different cancers, including both solid and blood cancers.</p> <p>Autumn Semester content summary: the mode of action of antimicrobial agent and mechanisms of resistance seen to these agents.</p> <p>Spring Semester content summary: the mode of action and side effect of chemotherapeutic agent used against neoplastic disease.</p> <p>Topics covered include:</p>

	<ul style="list-style-type: none"> ▪ Basic principles of chemotherapy: Concept of selective toxicity. Molecular basis of chemotherapy. Types of biochemical reactions that act as potential targets for chemotherapeutic intervention. ▪ Antibacterial agents: Beta-lactam antibiotics (penicillin); agents interfering with action of, or synthesis of, folate; agents affecting bacterial protein synthesis; agents affecting nucleic acids; agents affecting topoisomerase II; antimycobacterial agents used in the treatment of tuberculosis and leprosy. ▪ Antifungal agents: Antifungal antibiotics (Amphotericin, Nystatin, Griseofulvin). ▪ Synthetic antifungal agents (Azoles, Terbinifines). ▪ Antiviral agents: Types of pathogenic viruses, strategies to invade host cells and evade host responses. HIV/ AIDS, Transcription inhibitors (DNA polymerase inhibitors and reverse transcription inhibitors), Inhibitors of post-translational events (protease inhibitors), Inhibitors of attachment/penetration of host cells, Immunomodulators. ▪ Antiprotozoal agents and antihelminthic agents: Host-parasite interactions, Lifecycle of protozoal infections. Drugs used to treat malaria, amoebiasis, Leishmaniasis, Trypanosomiasis, Trichomoniasis and Toxoplasmosis. Types of helminth infection and their treatment. ▪ Antibiotic resistance: Mechanisms of antibiotic resistance. Importance of monitoring antibiotic use and resistance. ▪ Introduction to Biology of cancer: Cancer epidemiology, aetiology, the process of carcinogenesis, benign and malignant tumours, classification of cancer and cancer metastasis, various therapeutic strategies against cancer. ▪ Chemotherapy of cancer: Point of action of phase-specific drugs, chemotherapy, cytotoxic chemotherapy, mechanisms of genetic resistance to cytotoxic drugs, cytotoxic antibiotics, mitotic inhibitors, mechanism of action of antimetabolites ▪ Anti-cancer drugs: Cytotoxic drugs and Targeted therapy of cancers using monoclonal antibodies and small molecule tyrosine kinase inhibitors ▪ Conventional chemotherapy for haematological cancers: Conventional chemotherapy (mainly combination chemotherapy) for common blood cancers such as leukaemia, myeloma and lymphoma. ▪ Novel therapeutic strategies for haematological cancers: The differentiation and apoptosis induction therapy for acute promyelocytic leukaemia, tyrosine kinase inhibitors for chronic myeloid leukaemia, monoclonal antibodies for chronic lymphocytic leukaemia, antiangiogenic therapy for multiple myeloma, other targeted therapies, etc. ▪ Hormone responsive cancers (prostate and breast) and angiogenesis inhibitors.
Teaching	Lectures, tutorials and practical sessions

Assessment	Study Option 1: <ul style="list-style-type: none"> • 3 hour Exam (50%) • Summative abstract based on a current research paper (20%) • Microbiology practical report (30%)
	Study Option 2: <ul style="list-style-type: none"> • Practical report (40%) • Written exam (60%)
	Study Option 3: <ul style="list-style-type: none"> • Abstract report (40%) • Written exam (60%)
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Module Code	LS6004
Module Title	Brain and Behaviour
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	Successful completion of intermediate university level study in pharmacology or biological sciences.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>This research-driven module will provide a thorough background in the fields of neurophysiology and neuropharmacology and introduce a range of current topics in neuroscience, selected from such areas as cellular and molecular neurobiology, sensory and motor systems, cognitive neuroscience and degenerative neuropathologies. Students will experience current research techniques and learn to critically evaluate and discuss different ways of studying the brain.</p> <p>Autumn Semester content summary: Cellular and molecular neurobiology: Transmitter /receptor interactions; mediation of long-term changes, plasticity, LTP & LTD; electrophysiology; selective drug targeting in the brain (e.g. SSRIs). Sensory systems: Special senses; nociception and analgesia; migraine.</p> <p>Spring Semester content summary: Control of action: Motor systems; principles of control systems; motivation and decision making; speaking, reading and writing; the frontal lobes, OCD and anxiety disorders; Cognition and behaviour: learning and conditioning; drug addiction;</p>

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<p>abnormal psychology and antipsychotics; sleep and hypnotics; Degenerative diseases of the brain: Alzheimer’s disease, Parkinson’s disease, prion disease (CJD), multiple sclerosis; growth factor and stem cells treatments for degenerative diseases; potential of gene therapy and pharmacogenetics in neurodegenerative disease.</p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • Cellular and molecular neurobiology: Transmitter/receptor interactions; mediation of long-term changes, plasticity, LTP & LTD; electrophysiology; selective drug targeting in the brain (e.g. SSRIs). • Sensory systems: Special senses; nociception and analgesia; migraine. • Control of action: Motor systems; principles of control systems; motivation and decision making; speaking, reading and writing; the frontal lobes, OCD and anxiety disorders. • Cognition and behaviour: learning and conditioning; drug addiction; abnormal psychology and antipsychotics; sleep and hypnotics. • Degenerative diseases of the brain: Alzheimer’s disease, Parkinson’s disease, prion disease (CJD), multiple sclerosis; growth factor and stem cells treatments for degenerative diseases; potential of gene therapy and pharmacogenetics in neurodegenerative disease.
Teaching	Lectures, tutorials, practical sessions and assessment briefings & events
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • Practicals x3 (30%) • ‘Journal club’ presentation – 10 mins (20%) • Exam (50%)
	<p>Study Option 2:</p> <ul style="list-style-type: none"> • Practical report x2 (15% each) • Essay (20%) • Examination (50%)
	<p>Study Option 3:</p> <ul style="list-style-type: none"> • Practical report x2 (15% each) • Journal club abstract & presentation (20%) • Examination (50%)
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Module Code	LS6005
Module Title	Clinical Chemistry and Haematology (Blood Sciences)
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

Level	6
Prerequisites	Successful completion of introductory university level modules in molecular biology /physiology such as LS4001 or LS4004 or equivalent
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>The module evaluates the contribution of laboratory investigations to the diagnosis, treatment and prevention of disease in key areas such as renal disease, diabetes, anaemia, and haematological malignancies. The module also considers the role of the transfusion laboratory in the treatment of selected disorders.</p> <p>Autumn Semester content: Haematology the principles of normal haemopoiesis and how dysregulation leads to anaemia are studied with a detailed account of diagnostic practices within the haematology laboratory. There is a focus on the role of the Clinical Chemistry laboratory in the diagnosis of myocardial infarction, renal disease and inherited metabolic disorders.</p> <p>Spring Semester content: Clinical chemistry exploration of the role of the Clinical Chemistry laboratory in the diagnosis of disorders in calcium metabolism, drugs and poisons, and vitamin D and iron status. Leukaemia, blood transfusion and haemostasis and thrombosis are explored with emphasis made to the diagnostic and therapeutic approaches to these disorders.</p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • Simple biochemical tests for liver and renal disease • Plasma proteins and paraproteinaemias • Lipid and carbohydrate metabolism • Calcium and phosphate homeostasis • Water, electrolyte and acid-base homeostasis • Simple examples of endocrine tests • Inherited metabolic disorders • Regulation of haemopoiesis through the bone marrow microenvironment, cytokines and growth factors, structure and function of normal haemoglobin, • Anaemias • Haemoglobinopathies • Haematological malignancies • Haemostasis • Blood transfusion (clinically important blood groups (abo, rh), introduction to laboratory practice and quality control, transfusion reaction and haemolytic disease of the fetus/newborn).
Teaching	Lectures, tutorials and practical sessions

Assessment	Study Option 1: <ul style="list-style-type: none"> • Exam (50%) • Practical: Individual laboratory report (25%) • Coursework: 'Continuous Assessment' of directed study using e.g. online and in class MCQs and EMQs, short answer questions, practice exam questions.
	Study Option 2: <ul style="list-style-type: none"> • Practical report (50%) • Continuous assessment portfolio (50%)
	Study Option 3: <ul style="list-style-type: none"> • Practical report (50%) • Continuous assessment portfolio (50%)
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Module Code	LS6006
Module Title	Clinical Immunology and Medical Microbiology
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	<ul style="list-style-type: none"> • For Study Options 1 or 2, completion of LS5008 or equivalent. • For Study Option 3, Immunology and Microbiology equivalent to LS5008.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>The module aims to apply immunological and microbiological principles to evaluate pathophysiology and to investigate immunological and microbiological disease processes. It also aims to critically review the theory and practice of modern diagnostic clinical immunology and medical microbiology.</p> <p>The module initially explores in detail diseases of: overactive immunity (e.g. autoimmune disease and hypersensitivity); and of immune deficiency (e.g. AIDS). It also explores other key areas of clinical immunology such as cancer immunology, monoclonal antibodies and laboratory diagnostics.</p> <p>The module then explores infectious diseases and the principles and practise of the Medical Microbiology. Selected Infectious diseases and their laboratory diagnosis shall be studied in</p>

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<p>depth using an organ system approach; for example, infections of the respiratory tract, gastrointestinal tract, and urinary tract.</p> <p>Autumn Semester summary: Diseases of Immune system, clinical immunology, diagnostic immunology.</p> <p>Spring Semester summary: Infectious diseases, their lab diagnosis and control.</p>
Teaching	Lectures, tutorials and practical sessions
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • 3-hour written exam (50%) • Practical exam – MCQ (25%) • Practical report (25%)
	<p>Study Option 2:</p> <ul style="list-style-type: none"> • Lab report (50%) • Test (50%)
	<p>Study Option 3:</p> <ul style="list-style-type: none"> • Lab test (50%) • End of semester MCQ (50%)
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Module Code	LS6007
Module Title	Clinical Applications of Biomedical Sciences
Credits	Full Year: 8 (US) 15 (ECTS)
Level	6
Prerequisites	Successful completion of intermediate university-level study in the biomedical sciences. CO-REQUISITES: LS6005 , LS6006 and LS6014
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Option 1 only
Content	This module is synoptic in nature, providing students with an opportunity to integrate the knowledge gained from all other modules on the Biomedical Sciences course. Case studies will be used to provide an overview of biomedical techniques and, more importantly, their applications in clinical diagnosis, prognosis and patient management, including drug interactions and the basis of individual variation in drug responsiveness.

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<p>The use of pertinent clinical cases encourages students to think 'outside the box' and realise that when dealing with a real patient, knowledge gained from seemingly unrelated modules is required simultaneously in order to make a rational diagnosis.</p> <p>The module will cover/review the following techniques and discuss their application in common diseases and clinical scenarios: immunoassay development and evaluation, infectious disease diagnosis and microbial identification, molecular and genetic approaches to disease diagnosis, biochemical analyses and histopathological examination of tissues.</p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • General approach to an 'incoming patient' in a clinical/hospital setting. • Significance of present and past medical history and the role of clinical examination. • Relevance of biomedical techniques & laboratory reports in diagnosis. • Review of techniques used in medical genetics, microbiology, immunology, clinical biochemistry and histopathology; their application and integration with other laboratory and clinical findings. • Specialist tests in biomedical laboratories and the role of such investigations in excluding or confirming various probable diagnoses and in the subsequent monitoring of the disease • Ethical issues in the biomedical laboratory and analysis of human samples. • Individual variability in drug response in the context of patient management (pharmacodynamic or pharmacokinetic). Effect of age, environment, diet, disease and differing physiological states on the response to drugs. Influence of pharmacogenetics in the response to drugs. Drug interactions and drug effects on laboratory test results.
Teaching	Lectures, tutorials and practical sessions
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • 2 hour Exam (50%) • Practical: Poster presentation (25%) • Coursework: Practical report (25%)
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Module Code	LS6008
Module Title	Medical Parasitology
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	Successful completion of intermediate university level study in biomedical sciences or

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	equivalent.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2
Content	<p>The module provides contemporary insight into human parasites of global importance, the diseases that they cause, and the role of vectors in transmission. Arthropod borne viruses (arboviruses) are also considered, particularly in the context of co-infection with human parasites. The epidemiology of parasitic disease, morbidity, mortality and socioeconomic impacts are discussed, with an emphasis on recent advances in control measures.</p> <p>Autumn Semester summary: <i>Trypanosomiasis; Leishmaniasis, Malaria, Filariasis.</i></p> <p>Topics covered may include:</p> <ul style="list-style-type: none"> • The scope of human parasitology and vector biology highlighted through discussion of a number of important parasitic diseases and arboviruses • Field and laboratory methods for detecting and identifying human parasites and arthropods • The structure of human parasites, typical life cycles and ecology involving vector and non-vector transmission • Epidemiology and pathology of parasitic diseases, mortality and morbidity • Control of parasitic diseases and vectors • Ecological and social considerations, problems of resistance • Chemotherapy and vaccine development in the treatment of parasitic diseases • Co-infection and its impact on disease
Teaching	Lectures, tutorials and practical sessions
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • Exam (60%) • Practical: In-class practical test (20%) • Poster presentation (20%) <p>Study Option 2:</p> <ul style="list-style-type: none"> • Essay (50%); • Practical write up or test (50%)
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Module Code	LS6009
Module Title	Food and Nutrition 3: Public Health Nutrition
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

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The University makes every effort to ensure that module availability & content is correct at the time of publishing, but it cannot accept responsibility for subsequent changes, as part of the University's policy of continuous improvement & development.

Level	6
Prerequisites	For all study options, successful completion of intermediate university-level module in food/nutrition such as LS5007 or equivalent.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>This module will develop students' understanding of the concepts, theories and practice of Health Promotion, focusing on diet & physical activity in developing and developed countries. It will examine theories of motivation, behaviour and strategies of health promotion. The role, influence and impact of policies on population and client groups will be examined. This module will also provide students with an understanding of nutritional issues in the developing world.</p> <p>Autumn Semester summary: <i>Health promotion in developed countries</i> Spring Semester summary: <i>Health promotion in developing countries</i></p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • Concept and Theories of Health and Health Promotion • Definitions, models and theories of health • Concepts and determinants of health and wellbeing. • Theories of motivation and behaviour change and their relevance to promoting physical activity, good nutrition and health. • Delivering health promotion - communication and counselling skills • Assessment of health needs and the use of epidemiological data to determine health needs and efficacy of interventions • National and International Health Promotion • Developing health promotion policies • Ethical issues, settings and evaluation in health promotion • Government role in food supply, production and development of policies • Nutrition and physical activity policies in the UK • Critical appraisal of research relating to health promotion and nutrition • Food and nutrition needs during emergencies (indicators of famine, food programmes, international aid) • Early nutritional intervention (including nutrition education, improving nutritional quality) • Planning and implication of community based strategies for tackling nutritional problems • Millennium Development Goals (MDGs) • Nutrition and Population Groups • Policy related to specific populations / groups • Inequalities in health including consideration of poverty and ethnicity • Interaction between malnutrition and immunity (with reference to Human Immunodeficiency Virus and Tuberculosis)

	<ul style="list-style-type: none"> • Undernutrition in developing countries (with specific reference to protein energy malnutrition, vitamin and mineral deficiency): causes and approaches to treatment in adults and children • Breastfeeding and infant health • Food security
Teaching	Lectures (including online lectures), seminars, group tutorials, and practical sessions
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • Portfolio 1: design a theory-based health promotion intervention programme aimed at a specific population group (50%) • Portfolio 2: developed country project (50%) <p>Study Option 2:</p> <ul style="list-style-type: none"> • Portfolio: <ul style="list-style-type: none"> - Part 1 is a health promotion proposal (20%) - Part 2 is a health promotion intervention based upon the proposal (80%). <p>Study Option 3:</p> <p>Portfolio based on developing countries (100%)</p>
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Module Code	LS6010
Module Title	Food and Nutrition 4: Contemporary Issues in Food and Nutrition
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	Successful completion of LS5003 or LS5007 or LS5002 or LS5008 or equivalent
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>This module introduces students to areas that have a significant impact on 21st century food and nutrition including food legislation and safety, novel and functional foods, nutraceuticals and the interaction between nutrition and pharmacology.</p> <p>Furthermore, it provides in-depth material on emerging and re-emerging topics such as malnutrition and food allergy as well as issues concerning nutrition and disease and the use of advanced body composition techniques and biochemical and biological analysis.</p>

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<p>Autumn Semester summary: <i>novel foods, food legislation, nutrient pharmacology, food safety, food fortification.</i></p> <p>Spring Semester summary: <i>the role of nutrition in the aetiology and management of disease.</i></p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • Novel foods: Food security and genetically modified foods; functional foods and the substantiation of health claims • Food Safety: Non microbiological safety of traditional and novel foods; microbiological safety of food: food preservation, minimising food contamination in the commercial and home setting, foods commonly associated with food poisoning and food borne-infection • Food legislation • Nutrient Pharmacology: Drug-nutrient interactions and classification; consideration of populations vulnerable to drug-nutrient interactions, effects of nutritional status on drug response, nutraceuticals (including legislation). • Dietary supplements: Vitamin and mineral supplements • Nutritional Genomics. • Food fortification (including ethical issues) • Advanced body composition techniques and biochemical and biological analysis and their use in the nutritional assessment of individuals and management of patients • Protein energy malnutrition: consequences of food insecurity; aetiology of marasmus and kwashiorkor • Cancer cachexia; the role of nutrition support in the management of cancer cachexia • Obesity: its aetiology and management • The impact of nutritional factors on and dietary management of, metabolic syndrome, diabetes and cardiovascular disease • The aetiology and nutritional management of selected inborn errors of metabolism and nontoxic adverse reactions to food • Nutrition and cancer risk: epidemiology of cancer; the role of diet (and other lifestyle factors) in the development of cancer • Ethical issues raised by, e.g., food fortification, novel foods, and treatment and management of selected disorders.
<p>Teaching</p>	<p>Lectures, tutorials, journal clubs and online discussion forums</p>
<p>Assessment</p>	<p>Study Option 1:</p> <ul style="list-style-type: none"> • Exam (50%) • Practical: Oral presentation (debate) (20%)

	<ul style="list-style-type: none"> • Essay, written assignment focussed on translating complex science for a lay audience, practicals OR critical analysis/evaluation of literature (30%)
	Study Option 2: <ul style="list-style-type: none"> • Practical Exam (50%) • Coursework (50%)
	Study Option 3: Coursework (100%)
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Module Code	LS6012
Module Title	Forensic Archaeology
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	Successful completion of intermediate university level study in forensic science.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Option 1 only
Content	<p>This module introduces students to the role of the forensic archaeologist and the broad range of cases in which archaeological techniques may be utilised. These techniques include aerial and geophysical survey, excavation and recording of burials and the outdoor crime scene, and the scientific dating of both questioned objects and human remains.</p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • The role of the forensic archaeologist and related disciplines in a forensic investigation • Search and location techniques including the use of aerial and geophysical survey • Excavation, processing and recording of clandestine burials and outdoor crime scenes including correct treatment of human remains and related evidence • Domestic and international investigations including single-victim and mass- fatality cases • Post mortem interval and the scientific dating of human remains • Scientific dating and authentication of art, antiques and antiquities • Taphonomy, evidence preservation and the burial environment
Teaching	Lectures, workshops and practical sessions

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

Assessment	Study Option 1: <ul style="list-style-type: none"> • Exam (50%) • Garden search practical report (25%) • 2000-word essay (25%)
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Module Code	LS6013
Module Title	Biological Evidence – Advanced Techniques
Credits	Full Year: 8 (US) 15 (ECTS)
Level	6
Prerequisites	Successful completion of intermediate university level study in forensic science such as LS5006 or equivalent.
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Option 1 only
Course	<p>This module content focuses on the detection, recording, analysis and evaluation of a broad range of biological evidence, particularly trace and contact evidence, body fluids and blood patterns.</p> <p>Topics covered may include:</p> <ul style="list-style-type: none"> • Blood pattern analysis and interpretation, including angle of impact, directionality, target surface and point of origin, velocity and cast-off • The use of forensic evidence in the investigation of interpersonal violence and sexual offences • Body fluid analysis, including presumptive and confirmatory testing for the presence of blood, saliva and semen • Forensic DNA analysis, particularly pertaining to violent and sexual offences • Collection, analysis and recording of trace and contact evidence • Case assessment and interpretation • Presentation of forensic evidence as an expert witness including relevant statistical models used in the assessment and presentation of evidence.
Teaching	Lectures and practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> • Exam (40%) • Practical: Oral Presentation (20%)

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<ul style="list-style-type: none"> Coursework: Laboratory report (20%) and in-class test (20%)
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Module Code	LS6017
Module Title	Exercise and Health Psychology
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	Successful completion of intermediate university level module such as LS5013 or equivalent
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2
Content	<p>This module covers the adoption and maintenance of physical activity/exercise a health behaviours. The module will develop the students' critical understanding of theories of behaviour prediction which were introduced at Levels 4 and 5.</p> <p>Students will also review and evaluate research surrounding the benefits of physical activity /exercise for psychological health and well-being. This module will further develop the students' understanding through the evaluation of interventions to promote physical activity and mental health.</p> <p>Autumn semester: focus on health behaviour change, as it applies to exercise/physical activity, sedentary behaviour, and other health behaviours such as smoking.</p> <p>Topics covered include:</p> <ul style="list-style-type: none"> The assessment and prediction of health behaviour, and identification of the antecedents of exercise and other health behaviours. A critical examination of theories of exercise behaviour and their application in health and exercise settings. An exploration of the benefits of exercise for mental health and well-being. The use of exercise and physical activity as a treatment for depression, anxiety and other clinical disorders. Physical activity across the lifespan; measurement and promotion of physical activity in children and youth, through to adulthood and old age. Exercise and mental health in clinical and non-clinical settings.

	<ul style="list-style-type: none"> • Self-esteem, body image and social physique anxiety, and the link with physical activity and exercise. • Eating disorders, theories and treatment, and an exploration of exercise addiction. • Intervention and behavioural strategies used to promote physically active and healthy lifestyles.
Teaching	Lectures and seminars
Assessment	Study Option 1: <ul style="list-style-type: none"> • Practical: an individual or group presentation (40%) • Written report – 2, 500 words (60%)
	Study Option 2: <ul style="list-style-type: none"> • Written report (50%) • Presentation (50%)
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Module Code	LS6018
Module Title	Extreme Environments and Ergogenic Aids
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	Successful completion of LS5014 or equivalent
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>This module provides coverage of the environmental influences that impact on humans when exercising or competing in sport. The physiological reactions to discrete environmental stresses are described and methods of acclimatisation or coping are explained.</p> <p>This module also examines nutritional supplementation and prohibited methods to enhance physical performance, including a focus on current regulation and policies and the attitudes, values and behaviours that may precipitate doping and the consequences of doping in sport.</p> <p>Autumn Semester summary: this environmental influences that impact on humans when exercising or competing in sport. The physiological reactions to discrete environmental stresses and methods of acclimatisation or coping.</p> <p>Spring Semester summary: the nutritional supplementation and prohibited methods to enhance physical performance, including a focus on current regulation and policies and the attitudes, values and behaviours that may precipitate doping and the consequences of doping in sport.</p>

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<p>Topics covered include:</p> <ul style="list-style-type: none"> • Physiological responses to hot, humid, cold, high altitude, underwater and microgravity environments. • Strategies to overcome environmental limitations, including acclimatisation and nutritional interventions. • Overview of ergogenic aids: For example, the use of creatine, HMB, caffeine, nitrates, amino acids, carbohydrate and protein supplementation in a variety of sports and the rationale for use. Problems associated with the use of natural products which contain banned substances. • The effect of drugs on sports performance: The use of anabolic steroids, peptide hormones such as growth hormone, analgesics, anti-inflammatory drugs, stimulants, anti-anxiety drugs and diuretics and the types of sports in which they may be used. • Recreational drug usage, such as alcohol, marijuana and nicotine, and the effects of such agents on sporting performance. • Interaction of performance-enhancing and recreational drugs and nutritional supplements; nature of interaction and thus rationale for avoidance. • Techniques used to boost blood levels. Process of erythropoiesis, usage of recombinant erythropoietin, blood doping and the effect of simulated altitude training. • Recreational drugs and performance enhancing substance use: co-morbidity and risk factors. • Social and psychological factors in doping: relationship between beliefs, attitudes, behavioural intention and behaviour; peer pressure and conformity, risk taking, decision making. • Current and alternative ways to doping control and prevention. • Role of stakeholders in performance enhancement. Doping policies, regulations and anti-doping movement: (Definition of doping and testing procedures with reference to UK Sport and the IOC. The role of WADA and the UNESCO Treaty of the 'International Convention against Doping in Sport', in advancing the anti- doping movement. Health concerns and ethical considerations.
<p>Teaching</p>	<p>Lectures, seminars and practical sessions</p>
<p>Assessment</p>	<p>Study Option 1:</p> <ul style="list-style-type: none"> • Exam (40%) • Individual report (25%) • Lab report 2000 words (35%) <p>Study Option 2:</p> <ul style="list-style-type: none"> • Laboratory report – 2,500 words (100%)

	Study Option 3: <ul style="list-style-type: none"> • Individual report (50%) • Exam (50%)
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Module Code	LS6019
Module Title	Applied Sport Psychology
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	Successful completion of LS5013 or equivalent
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2
Content	<p>Applied sport psychology involves the identification and understanding of psychological theories and techniques that can be applied in the field to enhance the performance, enjoyment, and personal growth of athletes, coaches, parents and other stakeholders in a sport setting. This module covers the processes involved in this application of sport psychology theory and research.</p> <p>This module aims to develop students' understanding of the application of psychology to sport, including the role of the sport psychologist, and the types of skills used by these professionals with individual athletes and teams.</p> <p>Students will build upon the knowledge of psychological theory gained at in prior study, by applying this knowledge to case studies and stories of professional athletes. They will develop an understanding of the frameworks use by sport psychologists working in the field, as well as having the opportunity to develop their applied skills through role play. This module will develop the students' critical understanding of sport psychology through the evaluation of interventions to promote athletic performance.</p> <p>Autumn semester: <i>Needs analysis in applied sports psychology</i> Spring semester: <i>Interventions in applied sports psychology</i></p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • The history of sport psychology and philosophical approaches in sport psychology; how sport psychology has been influenced by mainstream psychology.

	<ul style="list-style-type: none"> • The psychological demands of various sports, and the psychological skills required to cope with these demands. • The process of applied sport psychology; from needs analysis to intervention and evaluation. • Ethics in sport psychology: ethical guidelines and ethical dilemmas faced by sport psychologists. • The use of counselling and communication skills in sport psychology. • Interventions in sport psychology; the theory and practice of performance enhancement intervention in sport psychology. • The psychology of injury in sport; the role of psychological factors in the prediction of, and response to injuries in sport. • Assessment techniques and tools. • Current and future trends in sport psychology.
Teaching	Lectures and seminars
Assessment	Study Option 1: <ul style="list-style-type: none"> • group presentation (40%) • 3,000 word case study report 60%)
	Study Option 2: <ul style="list-style-type: none"> • Written report (50%) • Presentation (50%)
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Module Code	LS6020
Module Title	Biomechanics of Sport Performance and Injury
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	Successful completion of LS5015 or equivalent
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

<p>Content</p>	<p>The module provides a critical, theoretical and practical understanding of applied techniques used in the biomechanical analysis of human movement and sporting activity, and allows the student to identify how the application of biomechanics may be used to improve sports performance and reduce the risk of injury.</p> <p>The module also provides students with critical awareness of the mechanisms, prevention, assessment and treatment of injury associated with sport participation.</p> <p>Autumn Semester content summary: advanced measurement techniques for analysis of sports performance, developing critical awareness and applied practical skills. Interpretation of biomechanical data for performance enhancement or injury prevention.</p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • Applied kinematics – advanced kinematic theory and practical application of 2D and 3D motion analysis systems • Applied kinetics - application of measurement of external and internal forces through use of force plates, dynamometry and electromyography • Interpretation and critical evaluation of biomechanical data through practical measurement and engagement with scientific literature • Mechanisms of injury - biological tissue mechanics, mechanisms of specific injury within sporting contexts • Assessment, management and treatment of injury - pitch-side assessment, therapeutic intervention strategies, rehabilitation from injury • Evaluation of the biomechanical and physiological effects of sports participation at an elite level • Detailed consideration of ‘ideals’ of form and function relating to specific sport techniques • Ethical considerations for use of biomechanical measurement techniques within a laboratory or field environment • Practical research skills using a range of biomechanical measurement systems through group-based project work • Critical consideration of both clinical and performance-based biomechanical measurement techniques
<p>Teaching</p>	<p>Lectures, seminars and practical sessions</p>
<p>Assessment</p>	<p>Study Option 1:</p> <ul style="list-style-type: none"> • Exam (50%) • 2,500 word report (50%) <p>Study Option 2:</p> <ul style="list-style-type: none"> • 2,500 written report (100%)
<p>Last updated:</p>	<p>11/04/21 PJW</p>

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Module Code	LS6021
Module Title	Notational Analysis in Sport
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	Successful completion of LS5015 or equivalent
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Options 1 or 2 or 3
Content	<p>The module develops skills gained at intermediate level in LS5015 Analysis in Sport and Exercise and further enhances the role of notational analysis within sport. The module sees a much greater emphasis placed on the applied application on notational analysis and how this supports the coaching cycle within a variety of sports. Students are required to conduct computerised notational investigations to gain insight into performance.</p> <p>Autumn semester: <i>exploration of the academic theory underpinning notational analysis. The content of the module will critically evaluate the methods of data collection and the rigour in the academic research applied in the field of performance analysis.</i></p> <p>Spring semester: <i>additional focus on the applied nature of notational analysis and examine the role of the analyst and critically evaluate the work that is asked of an analyst in professional sport. Study of the additional roles associated with notational analysis in terms of exploring large data sets, analysis for media and the interpretation of third party data outputs.</i></p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • The rationale and themes within notational analysis to allow for the development of clear, academically driven research and research understanding. • Analysis and interpretation of sports performance notation data. With clear knowledge being demonstrated regarding normative profiling, and its importance; parametric and non-parametric statistical analysis of results. • Methods of reliability measures used within notational research and examine their functions and applicability to data sets. • Methods of manual and automated notational systems. Examining current technological developments and their impact upon future research and applied analysis of sport. • Gross sports statistical measures used by the media. Examine aspects of hyper- realism within sport reporting and the function of the data supplied by media outlets. Examine issues surrounding the true objectivity of data in the media. • The most effective methods of reporting data from a variety of sources to allow for quick and effective understanding of analysis by academics, coaches and athletes.

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

Teaching	Lectures, seminars and practical sessions
Assessment	Study Option 1: <ul style="list-style-type: none"> • Individual viva, defending assignment one with reflection (20%) • 2500 word Essay (50%) • Lab report (30%)
	Study Option 2: <ul style="list-style-type: none"> • Lab report (60%) • Presentation (40%)
	Study Option 3: <ul style="list-style-type: none"> • 2,500 word essay (100%)
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Module Code	LS6022
Module Title	Coaching Practice
Credits	Full Year: 8 (US) 15 (ECTS) Single Semester: 4 (US) 7.5 (ECTS)
Level	6
Prerequisites	Successful completion of LS5016 or equivalent
Suitability	Open for suitably qualified visiting students enrolled at KU for Study Option 1 only
Content	<p>This module allows the student to develop coaching experience whilst being more attuned and critically aware of the theory of sport science and best practice in coaching. The module will allow students to enhance their knowledge and ability to critically develop long and short term coaching strategies to aid in holistic athletic development.</p> <p>Topics covered include:</p> <ul style="list-style-type: none"> • Examine the use of periodization programmes for athlete development. Focus made on the content and structure of an annual programme from a multi-disciplinary approach. • Develop coaching competency when working with a variety of athletes with varying abilities, novice – elite; young – old. • Examine issues surrounding coaching behaviour, and a coach’s interaction with athletes. Issue relating to athlete centred – coach led practice.

Study Option 1 = Whole Year
Study Option 2 = Autumn
Study Option 3 = Spring

	<ul style="list-style-type: none"> • Examine the academic and practical consideration relating to the coach-athlete relationship. • Examine ethical practice in sport coaching alongside guidance from NGB's and SportsCoach UK. • Critically examine developments in the coaching environment with a focus on coach education development, increasing knowledge base available to coaching staff and increasing use of technology to support coaching. • Take charge of coaching sessions, demonstrating where aspects of safety, session applicability, progression and examining athlete learning have been addressed.
Teaching	Lectures, seminars and practical coaching sessions
Assessment	<p>Study Option 1:</p> <ul style="list-style-type: none"> • Coaching practical (30%) • Written assignment – 2,000 words (30%) • 2,000 word assignment (40%)
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