
BSc Degree Program (3 Years)
Subject: Biochemistry (BIOC)

Faculty of Science
University of Kelaniya
BSc Degree Program

Subject: Biochemistry¹ (BIOC)					
Level	Course Units		Status	Pre-requisite	Co-requisite
University Level 1- Semester 1	BIOL11532	Basic Biochemistry (Lecture cum Laboratory- for biological science stream)	C	G C E A/L Chemistry and Biology	
University Level 1- Semester 2	BIOC 12612	Functional Biochemistry	C	BIOL 11532	BIOC 12632
	BIOC 12622	Metabolism of Biomolecules	C	BIOL11532	BIOC 12632
	BIOC 12632	Academic Research and Analytical Skills	C	BIOL 11532	BIOC 12612, BIOC 12622
University Level 2- Semester 1	BIOC 21612	Molecular Biology	C	BIOC 12612	BIOC 21631
	BIOC 21622	Analytical Biochemistry	C	BIOC 12612	BIOC 21631
	BIOC 21631	Molecular Biochemistry Laboratory	C	BIOC 12632	BIOC 21612, BIOC 21622
University Level 2- Semester 2	BIOC 22642	Biotechnology	C	BIOC 21612	BIOC 22661
	BIOC 22652	Environmental and Agricultural Biochemistry	C	BIOC 21612	BIOC 22661
	BIOC 22661	Environmental and Agricultural Biochemistry Laboratory	C	BIOC 21631	BIOC22642, BIOC 22652
University Level 3- Semester 1	BIOC 31611	Seminar	C	BIOC 22652	-
	BIOC 31622	Immunochemistry & Neurochemistry	C	BIOC 22642	-
	BIOC 31632	Pharmaceutical Chemistry	C	BIOC 31622	BIOC 31641
	BIOC 31641	Pharmaceutical Chemistry Laboratory	C	BIOC 21631	BIOC 31632
	PRPL 31992	Professional Placement	O	All BIOC compulsory course units offered in levels 1 and 2	-
University Level 3- Semester 2	BIOC 32652	Food and Nutritional Biochemistry	O	BIOC 12612	BIOC 32661
	BIOC 32661	Food and Nutritional Biochemistry Laboratory	O	BIOC 12612	BIOC 32652

¹Restricted enrolment

University Level 1

Semester	1		
Course Code	BIOL 11532		
Course Name	Basic Biochemistry (Lecture cum laboratory)		
Credit Value	2		
Compulsory/ Optional	Compulsory		
Pre-requisites	G. C. E. A/L Chemistry and Biology		
Co-requisites	-		
Hourly Breakdown	Theory	Practical	Independent Learning
	20	30	50
Course Aim/ Intended Learning Outcomes: Upon successful completion of this course unit, the student should be able to, • understand the structure and properties of the four major classes of biomolecules and catalytic properties of enzymes • explain major metabolic pathways • describe the nature of genetic materials and their molecular processes • apply basic biochemistry laboratory procedures used in biomolecule analysis			
Course Content: Chemical properties of amino acids, formation of peptides, folding of peptide chains to spatial structures, structure and function of carbohydrates, chemical properties of nucleic acids and lipids, nucleotides and coenzymes, enzymes nomenclature and kinetics, bioenergetics, general outline of metabolic pathways for carbohydrates, amino acids, nucleic acids and lipids. <i>Laboratory:</i> Qualitative and quantitative analysis of amino acids, proteins, carbohydrates, lipids and physical properties of nucleic acids.			
Teaching/ Learning Methods: A combination of lectures, tutorial discussions (supporting materials will be provided via Computer Assisted Learning (CAL)) and laboratory experiments			
Assessment Strategy: Continuous assessment and end of semester examination.			
Continuous Assessment 20%		Final Assessment 80%	
Details: - Quizzes/ lab reports 20	Theory 40	Practical 40	Other -
Recommended Reading: 1. Nelson, D. L., and Cox, M. M., (2017), <i>Lehninger Principles of Biochemistry</i> , W. H. Freeman. 2. Stryer, L., Berg, J., Tymoczko, J., and Gatto, G., (2019), <i>Biochemistry</i> , W. H. Freeman			

Semester	2		
Course Code	BIOC 12612		
Course Name	Functional Biochemistry		
Credit Value	2		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOL 11532		
Co-requisites	BIOC 12632		
Hourly Breakdown	Theory	Practical	Independent Learning
	30	-	70
Course Aim/ Intended Learning Outcomes: Upon successful completion of this course unit the student should be able to, • explain DNA replication, transcription and translation as molecular processes of accurate transmission and expression of genetic message • understand the importance of structural organization of proteins to its function • explain the role of pH, temperature and electrolyte concentration on the function of proteins • explain the methods of enzyme regulation			
Course Content: DNA replication and cell cycle, transcription in prokaryotic and eukaryotic systems, operon principle, translation, post translational modifications, protein function, antibodies, enzyme regulation and mechanism, translocation, biological membrane and membrane transport and receptor function, sequencing proteins and peptide synthesis.			
Teaching/ Learning Methods: A combination of lectures, tutorial discussions (supporting materials will be provided via CAL)			
Assessment Strategy: Continuous assessment and end of semester examination.			
Continuous Assessment 20%		Final Assessment 80%	
Details: - Quizzes/ assignments 20		Theory 80	Practical - Other -
Recommended Reading: 1. Nelson, D. L., and Cox, M. M., (2017), <i>Lehninger Principles of Biochemistry</i>, W.H. Freeman.			

Semester	2		
Course Code	BIOL 12622		
Course Name	Metabolism of Biomolecules		
Credit Value	2		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOL 11532		
Co-requisites	BIOC 12632		
Hourly Breakdown	Theory	Practical	Independent Learning
	30	-	70
Course Aim/ Intended Learning Outcomes:			
Upon successful completion of this course unit, the student should be able to, - explain the diversity of metabolic regulation and how this is specifically achieved in different cells - describe how these biochemical processes are tightly integrated with specific control sites and key junctions			
Course Content:			
Regulation of carbohydrate metabolism; Gluconeogenesis, Pentose Phosphate Pathway Regulation of glycogen metabolism; glycogen synthesis, glycogen breakdown, control of glycogen metabolism, metabolic disorders and their biochemical assessment. Regulation of fatty acid metabolism; biosynthesis of lipids, fatty acid oxidation, ketone bodies, cholesterol metabolism, phospholipid and glycolipid metabolism. Regulation of amino acids and nucleotides biosynthesis; amino acid oxidation and production of urea. Interrelations between metabolic pathways.			
Teaching/ Learning Methods: A combination of lectures, tutorial discussions (supporting materials will be provided via CAL)			
Assessment Strategy:			
Continuous assessment and end of semester examination.			
Continuous Assessment 20%		Final Assessment 80%	
Details: - Quizzes/ assignments 20	Theory 80	Practical -	Other -
Recommended Reading:			
1. Nelson, D. L., and Cox, M. M., (2017), <i>Lehninger Principles of Biochemistry</i> , W. H. Freeman.			

Semester	2		
Course Code	BIOC 12632		
Course Name	Academic Research and Analytical Skills		
Credit Value	2		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOL 11532		
Co-requisites	BIOC 12612, BIOC 12622		
Hourly Breakdown	Theory	Practical	Independent Learning
	20	30	50
Course Aim/ Intended Learning Outcomes:			
Upon successful completion of this course unit, the student should be able to, • explain the designing of biochemical experiments with appropriate controls • collect data • utilize appropriate statistical analysis for data interpretation • analyze the data • interpret the data • explain techniques in isolation and purification of proteins and enzymes • explain the rates of enzymatic reactions and calculate kinetic parameters • explain the factors affecting glycolysis and transamination			
Course Content:			
Literature review. Experimental design and; sampling techniques in clinical samples and data collection, controls, method validation, data analysis and interpretation, data reporting, scientific report writing. Biostatistics; statistical experimental design. Types of data. Descriptive statistics; sample variance, standard deviation, significance. Biosafety; risk assessment. Protein purification techniques, properties of enzymes, enzyme kinetics, calculation of K_m and V_{max}, enzyme inhibition methods to study transamination, role of enzymes in metabolic reactions. Statistical tests for significance; students t-test, paired sample test, one-way ANOVA, two-way ANOVA, chi square test, multiple comparisons, non-parametric statistics. Correlation coefficient and regression analysis.			
Teaching/ Learning Methods: A combination of lectures (1 h per week) and laboratory exercises (2 h per week) including sample collection, data reporting and analysis by Microsoft Excel and SPSS (supporting materials will be provided via CAL)			
Assessment Strategy:			
Continuous assessment and end of semester examination.			

Continuous Assessment 20%	Final Assessment 80%		
Details: -	Theory	Practical	Other
Quizzes/ assignments 20	60	20	-
Recommended Reading: 1. Gurumani, N., (2005), <i>An Introduction to Biostatistics</i> , MJP Publishers. 2. Plummer, D. T., (1987), <i>An Introduction to Practical Biochemistry</i> , McGraw Hill. 3. Minch, M. M. J., (1989), <i>Experiments in Biochemistry</i> , Prentice Hall.			

University Level 2

Semester	1		
Course Code	BIOC 21612		
Course Name	Molecular Biology		
Credit Value	2		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOC 12612		
Co-requisites	BIOC 21631		
Hourly Breakdown	Theory	Practical	Independent Learning
	30	-	70
Course Aim/ Intended Learning Outcomes: Upon successful completion of this course unit, the student should be able to, • recognize basic gene manipulation techniques • apply techniques in cloning genes and genome analysis • interpret sequencing data • explain the designing of primers for PCR amplification • understand the validation of PCR primers • apply PCR techniques for experimental design			
Course Content: Molecular cloning; restriction and DNA modifying enzymes, restriction mapping, cloning vectors, recombinants, DNA transfer into hosts, gene libraries and screening. DNA sequencing; Sanger sequencing. PCR and applications. Oncogenes and cancer.			
Teaching/ Learning Methods: A combination of lectures and tutorial discussions (supporting materials will be provided via CAL)			
Assessment Strategy: Continuous assessment and end of semester examination.			
Continuous Assessment 20%		Final Assessment 80%	
Details: - Quizzes/ assignments 20	Theory 80	Practical -	Other -
Recommended Reading: 1. Brown, T. A., (2016), <i>Gene Cloning and DNA Analysis: An Introduction</i>, Wiley-Blackwell.			

Semester	1		
Course Code	BIOC 21622		
Course Name	Analytical Biochemistry		
Credit Value	2		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOC 12612		
Co-requisites	BIOC 21631		
Hourly Breakdown	Theory	Practical	Independent Learning
	30	-	70
Course Aim/ Intended Learning Outcomes: Upon successful completion of this course unit, the student should be able to, - understand how chemical properties of biomolecules are used for separation - apply the principles of different techniques for separation and analysis of biomolecules			
Course Content: Electrophoretic techniques; agarose gel electrophoresis, PAGE, SDS-PAGE, 2D gel electrophoresis, applications of electrophoresis (EMSA). Blotting techniques; southern/ northern/ western hybridizations, applications of blotting techniques. Isotopic and non-isotopic labeling, autoradiography. Preparative and analytical techniques for macromolecules; Column chromatography (size exclusion, ion exchange, affinity and GLC, HPLC and FPLC), GC-MS/ LC-MS in determination of biomolecules, centrifugation/ ultracentrifugation, dialysis, ultrafiltration, lyophilization.			
Teaching/ Learning Methods: A combination of lectures, take-home assignments, group assignments (group presentations) and tutorial discussions (supporting materials will be provided via CAL)			
Assessment Strategy: Continuous assessment and end of semester examination.			
Continuous Assessment 20%		Final Assessment 80%	
Details: - Quizzes/ assignments 20	Theory 80	Practical -	Other -
Recommended Reading: 1. Boyer, R., (2010), <i>Biochemistry Laboratory: Modern Theory and Techniques</i> , Prentice Hall.			

Semester	1		
Course Code	BIOC 21631		
Course Name	Molecular Biology Laboratory		
Credit Value	1		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOC 12631		
Co-requisites	BIOC 21612, BIOC 21622		
Hourly Breakdown	Theory	Practical	Independent Learning
	-	45	05
Course Aim/ Intended Learning Outcomes:			
Upon successful completion of this course unit, the student should be able to, • practice the basic techniques in gene manipulation competently and safely • apply techniques and methodologies in molecular biology			
Course Content:			
Buffer preparation. Sterilization techniques. Molecular cloning; preparation of plasmid DNA, restriction enzyme digestions, agarose gel electrophoresis and restriction mapping, ligation reactions, plasmid transformation, recombinant selection. Over expression of recombinant proteins. Blotting techniques; southern blotting. PCR. Bioinformatics.			
Teaching/ Learning Methods: A 3 h laboratory class per week (15 weeks)			
Pre-lab quizzes and assignments			
Assessment Strategy:			
Continuous assessment and end of semester examination.			
Continuous Assessment 30%		Final Assessment 70%	
Details: - Quizzes/ assignments/ lab reports 30	Theory	Practical	Other
	-	70	
Recommended Reading:			
1. Green, H., and Sambrook, J., (2012), <i>Molecular Cloning, A Laboratory Manual</i> , Cold Spring Harbor Laboratory Press.			

Semester	2		
Course Code	BIOC 22642		
Course Name	Biotechnology		
Credit Value	2		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOC 21612		
Co-requisites	BIOC 22661		
Hourly Breakdown	Theory	Practical	Independent Learning
	30	-	70
Course Aim/ Intended Learning Outcomes:			
Upon successful completion of this course unit, the student should be able to, • apply the concepts of modern cell and molecular biology to manipulate organisms and their products for human benefit • explain use of enzymes in industry • illustrate safety legislations concerning substances hazardous to health and the regulatory requirements of GMOs			
Course Content:			
Scope and importance of biotechnology. Genetic engineering for human welfare, livestock and crop improvement. Protein engineering. Metabolic engineering. Molecular tools in disease diagnosis. Gene therapy. Fermentation; bioreactors. Single cell protein and biomass production. Enzyme technology; industrial uses of enzymes, biosensors and biochips. Renewable sources of energy; biomass energy, biogas and biodiesel. Biosafety, intellectual property rights and protection, bioethics.			
Teaching/ Learning Methods: A combination of lectures, tutorial discussions (supporting materials will be provided via CAL)			
Assessment Strategy:			
Continuous assessment and end of semester examination.			
Continuous Assessment 20%		Final Assessment 80%	
Details: - Quizzes/ assignments 20		Theory 80	Practical - Other -
Recommended Reading:			
1. Smith J. E., (2012), <i>Biotechnology</i> , Cambridge university press.			

Semester	2		
Course Code	BIOC 22652		
Course Name	Environmental and Agricultural Biochemistry		
Credit Value	2		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOC 21612		
Co-requisites	BIOC 22661		
Hourly Breakdown	Theory	Practical	Independent Learning
	30	-	70
Course Aim/ Intended Learning Outcomes: Upon successful completion of this course unit, the student should be able to, • explain the biochemical and genetic mechanisms of exchanging signals between plant and soil microorganisms • illustrate bio-fertilizers and bio-pesticides as valuable tools to achieve future food security through sustainable agriculture • practice eco-friendly techniques in controlling pollution and waste management			
Course Content: Biochemistry of soil and rhizosphere; biochemical and genetic processes involved in plant- microbe interactions, biological nitrogen fixation. Biofertilizers. Biopesticides and biological control. Cleaner technology; control of pollution, degradation pathways of industrial and agricultural wastes, bioremediation, use of genetically modified organisms in bioremediation, phytoremediation. Waste management. Bioleaching and biosorption processes.			
Teaching/ Learning Methods: A combination of lectures, tutorial discussions (supporting materials will be provided via CAL)			
Assessment Strategy: Continuous assessment and end of semester examination.			
Continuous Assessment 20%		Final Assessment 80%	
Details: - Quizzes/ assignments 20	Theory 80	Practical -	Other -
Recommended Reading: 1. Lynch, J. M., (1990), <i>Soil Biotechnology</i>, Blackwell. 2. Lynch, J. M., (1990), <i>The Rhizosphere</i>, John Wiley. 3. Kumar, H. D., (2000), <i>Modern Concepts of Biotechnology</i>, Vikas Publishing. 4. Haug, G., and Hoffmann, H., (1985), <i>Chemistry of Plant Protection</i>, Springer. 5. Hassal, K.A., (1990), <i>The Biochemistry and Uses of Pesticides</i>, McMillan. 6. Bunce, N., (1998), <i>Environmental Chemistry</i>, Wuerz.			

Semester	2		
Course Code	BIOC 22661		
Course Name	Environmental and Agricultural Biochemistry Laboratory		
Credit Value	2		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOC 21631		
Co-requisites	BIOC 22642, BIOC 22652		
Hourly Breakdown	Theory	Practical	Independent Learning
	-	45	05
Course Aim/ Intended Learning Outcomes: Upon successful completion of this course unit, the student should be able to, • demonstrate skills required to practice techniques in soil biochemical analysis • apply the chemical methods to analyze manure, animal feeds, and plant material • demonstrate methods to develop bio-fertilizers and bio-pesticides • demonstrate methods to evaluate bio-fertilizers and bio-pesticides • demonstrate skills required to practice eco-friendly techniques to control pollution • demonstrate methods to solve pollution related problems in industry			
Course Content: Chemical analysis of fertilizer and organic manure, biochemical analysis of soil. Qualitative and quantitative analysis of stock feeds and plant material. Methods to develop and evaluate bio-fertilizers and bio-pesticides. Estimation of pesticide residues in food/soil. Bacterial degradation of various industrial dyes. Monitoring bioremediation, Bioassays for genotoxicity. Development of biofuels.			
Teaching/ Learning Methods: A 3 h laboratory class per week (15 weeks), Pre-lab quizzes and assignments, Group project and presentation.			
Assessment Strategy: Continuous assessment and end of semester examination.			
Continuous Assessment 30%		Final Assessment 70%	
Details: - Quizzes/ assignments/ lab reports 30		Theory -	Practical 70 Other
Recommended Reading: 1. Baruah, T. C., and Barthakur, H. P., (1999), <i>A Textbook of Soil Analysis</i>, Vikas. 2. Chopra, S. L., and Kanwar, J. S., (2002), <i>Analytical Agricultural Chemistry</i>, Kalyani Publishers. 3. Radojevic, M., and Bashkin, V. N., (1999), <i>Practical Environmental Analysis</i>, RSC.			

University Level 3

Semester	1		
Course Code	BIOC 31611		
Course Name	Written and Oral Communication		
Credit Value	1		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOC 22652		
Co-requisites	-		
Hourly Breakdown	Theory	Practical	Independent Learning
	15	-	35
Course Aim/ Intended Learning Outcomes: Upon successful completion of this course unit, the student should be able to, • demonstrate the ability to search, extract, and present appropriate biochemical information from various resources • apply communication skills effectively to relate ideas both verbally and in writing to specialized and general audiences			
Course Content: Selected topics in current fields of biochemistry and molecular biology.			
Teaching/ Learning Methods: Self-studies, small group discussions, and through feedback on reports and oral presentations.			
Assessment Strategy: Oral examination and report percentage given for each subcomponent indicates the percent contribution to the final marks.			
Continuous Assessment 20%		Final Assessment 80%	
Details: - Assignments 20		Theory -	Practical - Other Oral presentation 80
Recommended Reading: 1. Review papers from current biochemical literature.			

Semester	1		
Course Code	BIOC 31622		
Course Name	Immunochemistry and Neurochemistry		
Credit Value	2		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOC 22642		
Co-requisites	-		
Hourly Breakdown	Theory	Practical	Independent Learning
	30	-	70
Course Aim/ Intended Learning Outcomes:			
Upon successful completion of this course unit, the student should be able to, - describe components of the immune system - illustrate the defense mechanism of human body focusing the body's response to invading microorganisms - evaluate the immunochemical techniques - illustrate how the nervous system helps to sense the changes in the environment and respond to them - rationalize the chemical nature of human behavior			
Course Content:			
Immunochemistry (15 h)			
Cell and the molecules of the immune system, Innate and acquired immunity, antigens, antibodies, antibody and antigen recognition, antibody diversity, complement system, T cells and classes of T cells, T cell receptors, Major Histocompatibility Complex (MHC) proteins and their role in antigen recognition, immunohematology, detection of antibodies. Immunochemical techniques and immunopathology.			
Neurochemistry (15 h)			
Molecular mechanism of synaptic transmission, receptor subtypes; function and mechanism, excitatory and inhibitory neurotransmitters; structure, function and metabolism, signal transduction pathways, biochemistry of neuropathy in ischemia and hypoxia, molecular targets of abused drugs and their effects on the nervous system.			
Teaching/ Learning Methods: A combination of lectures, tutorial discussions (supporting materials will be provided via CAL)			
Assessment Strategy:			
Continuous assessment and end of semester examination.			

Continuous Assessment 20%	Final Assessment 80%		
Details: - Quizzes/ assignments 20	Theory 80	Practical -	Other -
Recommended Reading: 1. Delves, P. J., Martin, S. J., Burton, R. D., and Roitt, I. M., (2016), <i>Roitt's Essential Immunology</i> , Wiley-Blackwell. 2. Brady, S., Siegel, G., Albers, R. W., and Price, D., (2011), <i>Basic Neurochemistry</i> , Elsevier.			

Semester	1		
Course Code	BIOC 31632		
Course Name	Pharmaceutical Chemistry		
Credit Value	2		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOC 31622		
Co-requisites	BIOC 31641		
Hourly Breakdown	Theory	Practical	Independent Learning
	30	-	70
Course Aim/ Intended Learning Outcomes:			
Upon successful completion of this course unit, the student should be able to, • evaluate processes involved in the drug discovery and optimization • illustrate the importance of SAR and QSAR approaches in modern-day rational drug design and development • analyze common drug metabolic pathways and their importance in designing effective drugs • illustrate the importance of biotechnology in drug industry			
Course Content:			
Classification of drugs. Therapeutic index and safety of drugs. Drug action with proteins, lipids and nucleic acids. Drug development; traditional approaches, structure activity relationships and strategies used to improve activity and reduce side effects, quantitative structure activity relationships, target based drug designing. Drug metabolism; absorption and distribution, pharmacokinetics, strategies to overcome pharmacokinetic problems in drugs. Molecular biology and biotechnology in drug development. Pre-clinical trials and clinical trials. Introduction to specifications and regulations on drugs. Pharmaceutics companies, priorities and ethics in drug development. Importance of maintaining good laboratory practices, good manufacturing practices and good clinical practices in drug development. Development of selected drugs to demonstrate application of principles.			
Teaching/ Learning Methods: A combination of lectures, tutorial discussions (supporting materials will be provided via CAL)			
Assessment Strategy:			
Continuous assessment and end of semester examination.			

Continuous Assessment 20%	Final Assessment 80%		
Details: - Quizzes/ assignments 20	Theory 80	Practical -	Other -
Recommended Reading: 1. Patrick, G. L., (2017), <i>An Introduction to Medicinal Chemistry</i> , Oxford University Press.			

Semester	1		
Course Code	BIOC 31641		
Course Name	Pharmaceutical Chemistry Laboratory		
Credit Value	1		
Compulsory/ Optional	Compulsory		
Pre-requisites	BIOC 21631		
Co-requisites	BIOC 31632		
Hourly Breakdown	Theory	Practical	Independent Learning
	-	45	05
Course Aim/ Intended Learning Outcomes:			
Upon successful completion of this course unit, the student should be able to, • practice standard techniques in identifying, quantifying, and synthesizing pharmaceutical drugs • apply standard techniques to isolate bioactive compounds from natural sources and to evaluate their bioactivity • analyze techniques and methodologies in pharmaceutical chemistry to solve related problems			
Course Content:			
Methods of qualitative identification of drugs, color tests, TLC, use of titrimetry, colorimetry, HPLC for quantitative estimation of active drug ingredients. Synthesis and purification of drugs. Analysis of drug metabolites. Methods of isolation of bioactive compounds from natural sources, bioassays to determine their biological activity.			
Teaching/ Learning Methods: A 3 h laboratory class per week (15 weeks) Pre-lab quizzes and assignments			
Assessment Strategy:			
Continuous assessment and end of semester examination.			
Continuous Assessment		Final Assessment	
30%		70%	
Details: -		Theory	Practical
Quizzes/ assignments/ lab reports 30		-	70
			Other
			-
Recommended Reading:			
1. Plummer, D. T., (1987), <i>An Introduction to Practical Biochemistry</i> , McGraw Hill.			

Semester	1		
Course Code	PRPL 31992		
Course Name	Professional Placement		
Credit Value	2		
Compulsory/ Optional	Optional		
Pre-requisites	All BIOC compulsory units offered in levels 1 & 2		
Co-requisites	-		
Hourly Breakdown	Theory	Practical	Independent Learning
	-	-	100
Course Aim/ Intended Learning Outcomes: Upon successful completion of this course unit, the student should be able to, • apply creative thinking • develop skills needed to work in an industry • use of initiative and personal organization • adapting to an unfamiliar environment • apply time management			
Course Content: An industrial training on application of principles of the biochemistry at a biochemistry resources based industry to improve their laboratory and generic skills			
Teaching/ Learning Methods: Training under the supervisor and guidance of academic staff and relevant industry for six weeks			
Assessment Strategy: Evaluation of the progress report submitted by the trainee. Percentage given for each subcomponent indicates the percent contribution to the final marks.			
Continuous Assessment 20%		Final Assessment 80%	
Details: - Daily diary 10, daily assessment 10		Theory -	Practical - Other Report 80
Recommended Reading: -			

Semester	2		
Course Code	BIOC 32653		
Course Name	Food and Nutritional Biochemistry		
Credit Value	3		
Compulsory/ Optional	Optional		
Pre-requisites	BIOC 12612		
Co-requisites	BIOC 32661		
Hourly Breakdown	Theory	Practical	Independent Learning
	45	-	105
Course Aim/ Intended Learning Outcomes:			
Upon successful completion of this course unit, the student should be able to, • illustrate the structure and chemical composition of main food groups and chemistry of food deterioration • evaluate the array of processes in food industry • illustrate the biochemical and nutritional quality of food • analyze changes during processing • examine the effect of major and micro nutrients relevant to human health			
Course Content:			
Food Chemistry (15 h)			
Occurrence, structure, properties and analysis of food carbohydrates, lipids and proteins. Chemical changes occurring during food spoilage; browning, staling and rancidity. Food additives including legislation and standards; preservatives, antioxidants, food colors, flavors, emulsifiers and stabilizers, Toxins of plant and animal foods; endogenous toxins, mycotoxins and bacterial toxins.			
Food Technology (15 h)			
Biochemical and chemical changes involved in processing of dairy foods, non-alcoholic beverages (tea and coffee), fish and meat products, fruits and vegetables, bakery products including cereals, confectionary including chocolates, vegetable oils. Effects of nutritional quality on food during processing. Principles and practices of food packaging.			
Nutritional Biochemistry (15 h)			
Quality assessment of foods based on nutritional factors, role of dietary supplements and functional foods, energy balance and weight management nutritional requirements in childhood, adolescence, adult and aging, consequences of unbalanced diet, modifications of the diet to overcome metabolic disorders,			

relationship between nutrition, physiology and biochemistry for health and fitness.

Teaching/ Learning Methods: A combination of lectures, tutorial discussions (supporting materials will be provided via CAL)

Assessment Strategy:

Continuous assessment and end of semester examination.

Continuous Assessment 20%	Final Assessment 80%		
Details: -	Theory	Practical	Other
Quizzes/ assignments 20	80	-	-

Recommended Reading:

1. Potter, N. N., and Hotchkiss, J. H., (1999), *Food Science*, Aspen.
2. Belitz, H. D., and Grosch, W., (1998), *Food Chemistry*, Springer.
3. Gunn, D. L., and Stevens, J. G. R., (1979), *Pesticides and Human Warfare*, Oxford.
4. Wong, D. W. S., (1996), *Mechanism and Theory in Food Chemistry*, Chapman & Hall.
5. Haug, G., and Hoffmann, H., (1985), *Chemistry of Plant Protection*, Springer.

Semester	2		
Course Code	BIOC 32661		
Course Name	Food and Nutritional Biochemistry Laboratory		
Credit Value	1		
Compulsory/ Optional	Optional		
Pre-requisites	BIOC 12612		
Co-requisites	BIOC 32653		
Hourly Breakdown	Theory	Practical	Independent Learning
	-	45	05
Course Aim/ Intended Learning Outcomes:			
Upon successful completion of this course unit, the student should be able to, • apply AOAC methods in food analysis • demonstrate skills on detecting nutritional quality of food • apply the knowledge of the biochemical changes that occur during the food processing			
Course Content:			
AOAC methods in food analysis, detection of nutritional quality of raw food and processed food, detection of phenolic, organic acids, antioxidants in food, phytates and oxalates in leafy vegetables, estimation of carotenoids, dietary fiber in food, browning reactions and lipid peroxidation in food,			
Teaching/ Learning Methods: A 3 h laboratory class per week (15 weeks). Pre-lab quizzes and assignments. Group projects			
Assessment Strategy:			
Continuous assessment and end of semester examination.			
Continuous Assessment 30%		Final Assessment 70%	
Details: -		Theory	Practical
Quizzes/ assignments/ lab reports 30		-	70
			Other
			-
Recommended Reading:			

1. Miller, D. D., (1998), *Food Chemistry Laboratory Manual*, John Willey and Sons.
2. Connie, W., (1996), *The Food Chemistry Laboratory Science*, CRC press.
3. Nielsen, S. S., (1998), *Food Analysis*, Aspen.