

Pure Mathematics

Course Code	PEU3300					
Level	03					
Course Title	Mathematical Logic and Mathematical Proofs					
Credit value	3					
Core/Optional	Core					
Prerequisites	Pass in Combined Mathematics/Higher Mathematics/Mathematics in GCE A/L or equivalent					
Hourly breakdown	Theory		Practical hours	Independent Learning	Assessments	Total hrs
	25 X 2 = 50 hrs	DS hrs = 4*3=12hrs		<ul style="list-style-type: none"> ▪ (25 x 3)=75 hrs ▪ Online /Audio-visual materials and other learning resources(11hrs) 	<ul style="list-style-type: none"> ▪ Continuous Assessments (CA)(2 hrs) 	
Course Aim/s.	Use the logical meanings of the logical connectives with their properties in order to read and comprehend mathematical proofs as well as to write mathematical proofs with valid statements using logically correct arguments.					
POs addressed by course	<p>PLO1: Knowledge: Explain the fundamental, principles and broader knowledge pertaining to the chosen science disciplines offered for the degree.</p> <p>PLO3: Communication: Demonstrate the competency in communicating efficiently and effectively to present information, ideas and concepts to the scientific community as well as to the wider society.</p> <p>PLO5: Creativity and Problem Solving: Identify and analyze problems using quantitative and/or qualitative approaches using scientific methodology to provide valid conclusions.</p> <p>PLO9: Lifelong Learning: Develop the capacity to foresee new trends and their impacts and continuously update knowledge and develop skills willingly to meet those future challenges.</p>					
Course Learning Outcomes (CLO)	<p>At the completion of this course student will be able to</p> <p>CLO1: Use the meanings of the logical connectives “not”, “and”, “or”, “implies” and “if and only if” to read and write compound statements that are considered in mathematics (PLO 1,3,5, 9)</p> <p>CLO2: Use the meanings of both universal and existential quantifiers in reading and writing meaningful statements in mathematics (PLO 1,3,5, 9)</p> <p>CLO3: To write simple proofs of mathematically correct statements using words and statements those are meaningful in mathematics with valid arguments. (PLO 1, 3,5, 9)</p>					
Content (Main topics, sub topics)	<p>Mathematical logics: Meaningful Statements, Logical Connectives, Simpler Statements and Compound Statements, Logical Connective “not”, Logical Connective “and”, Logical Connective “or”, Logical Connective “implies”, Logical Connective “if and only if”, Relations among Logical Connectives – Distributive Laws, Relations among Logical Connectives – De Morgan's Laws, Conditional Statements and Biconditional Statements, Conditional Proof and the Definition of \Rightarrow, Tautologies, Contradictions and Proof by Contradiction, Quantifiers, Statements with more than one Quantifier, The Generalized Laws, Ordinary Language, Logic and Daily Life.</p> <p>Mathematical proofs: Proof of a Disjunctive Statement, Proof of a Conjunctive Statement, Proof of a Conditional Statement, Proof of a Biconditional Statement, Proof of an Existential Statement, Proof of a Universal Statement, Proof of a Statement with More than One Quantifier, Proof of a Negation of a Statement and Proof by Contradiction, Proof of a General Statement.</p>					
Teaching Learning methods (TL)	<p>Self-Learning/Independent learning of Self-study</p> <ul style="list-style-type: none"> ▪ Instructional Material (IL) ▪ Online Activities (OL) ▪ Reference Work (RF) <p>Compulsory contact sessions</p> <ul style="list-style-type: none"> ▪ Assessments (AS) and Feedback – MCQs (MCQ); Structured Essay (SEQ); Essay Questions (ES); <p>Non-compulsory contact sessions</p> <ul style="list-style-type: none"> ▪ Day Schools (DS) 					
Assessment strategy	Overall Continuous Assessment Mark (OCAM): 40%			Final Assessment (FA): 60%		
	Details: Continuous Assessment1 (CAT1):- 1hr Continuous Assessment2 (CAT2):- 1hr OCAM=60%Maximum(CAT1, CAT2)+ 40% Minimum(CAT1, CAT2)			Final Evaluation-Theory: 100 %-2hrs:		
Recommended Readings:	<ul style="list-style-type: none"> • Rosen, K.H. (2012). <i>Discrete Mathematics and its Applications (7th Edition)</i>. Mc Grow-Hill Companies. • SundStrom, T. (2014). <i>Mathematical Reasoning: Version 2.1 (Open Textbook Edition)</i>. Grand valley State University. • Ramasinghe, W. (2008). <i>Ananthaya Samagha Hora Dekak</i>. Bon & Bickey Publications (written in Sinhala). • Ramasinghe, W. (2006). <i>Bindhuwe Sita Ananthaya Dakwa Bidhak (2nd Edition)</i>. Bon & Bickey Publications (written in Sinhala). • Ramasinghe, W. (2009). <i>Usas Pela Ganitha Abyuhanaya</i>. Bon & Bickey Publications (written in Sinhala). 					