Applied Mathematics

Course Code	ADU5300				
Level	05				
Course Title	Linear Programming				
Credit value	03				
Core/Optional	Optional				
Prerequisites	**Pass in G.C.E. Advanced Level Combined Mathematics/ Higher Mathematics or Equivalent**				
Hourly breakdown	**Theory**		**Practical hours**	**Independent Learning**	**Assessments**	**Total hrs**
	Sessionsx2 =25x2= 50hrs	DS hrs=4x3 =12 hrs	-	▪ Sessions x3=25x3 75hrs ▪ Online /Audio-visual materials and other learning resources 11 hrs	▪ Continuous Assessments (CA) -2hrs	150hrs
Course Aim/s.	1. State the basic concepts of linear programming 2. Apply various linear programming techniques to real world problems and to follow advanced linear programming, non-linear programming and operations research courses.					
PLOs addressed by course	**PLO1: Knowledge:** Explain the fundamental, principles and broader knowledge pertaining to the chosen science disciplines offered for the degree. **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. **PLO5: Creativity and Problem Solving:** Identify and analyze problems using quantitative and/or qualitative approaches using scientific methodology to provide valid conclusions.					
Course Learning Outcomes (CLO)	At the completion of this course student will be able to CLO1: State the basic concepts of linear programming (PLO 1,3) CLO2: Learn applications in linear programming(PLO 1,3,5) CLO3: Formulate linear programming models for various situations (PLO 1,3,5). CLO4: Apply algorithms to solve linear programming models and interpret the solutions (PLO 1,3,5). CLO5: Interpret the obtained optimal solution to the model (PLO 1,3,5).					
Content (Main topics, sub topics)	Introduction to Optimization Theory, Introduction to Linear Programming, Mathematical Formulation of the Linear Programming Problem, Convex Sets, Convex Functions, Graphical Method of Solving Linear Programming Problems, Sensitivity Analysis using Graphical Method, Simplex Algorithm, Big -M Method, Two-Phase Simplex Method, Revised Simplex Method, Linear Programming Problems with Unrestricted Variables, Degeneracy and Cycling, Concept in Duality, Fundamental Properties of Duality, Dual Simplex Algorithm, Introduction to Transportation Problem, The Transportation Algorithm with North-West Corner Rule, Minimum Cost Method, Vogel's Approximation Method (VAM), Degeneracy in Transportation Problem, Unbalanced Transportation Problem, Maximization Case in Transportation Problem, Assignment Problem					
Teaching Learning methods (TL)	Self-Learning/Independent learning of Self-study ▪ Instructional Material (IL) ▪ Online Activities (OL) ▪ Reference Work (RF) Compulsory contact sessions ▪ Assessments (AS) and Feedback – Structured Essay (SEQ); Essay Questions (ES) Non-compulsory contact sessions ▪ 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:	• Bronson, R. (1997) *Schaum's Outline of Theory and Problems of Operations Research* : McGraw Hill Professional • Hira, D.S, Gupta, P.K. (1995). *Introduction to Operations Research :* S. Chand					