PROPOPSAL TO PGPEC FOR INTRODUCING A NEW PG ELECTIVE SUBJECT '**ROBUST CONTROL'**

Course Content	Lecture Hour
Overview and Preliminaries: Overview on Robust control, Basics from Matrix Algebra, Norms of signals and systems (L_2, H_2, L_\infinity, H_\infinity)	3
Convex Optimization: Convexity, Convex sets, Affine function, Linear matrix inequality (LMI), Projection lemma, S-procedure, Semi-definite programming, Feasibility problem, Minimization problem, Generalized eigenvalue problem, Programming in MATLAB.	3
System properties and stability: Well-posedness, Causality, Passivity, Bounded-realness, Positive-realness, Internal stability, Bounded-Input-Bounded-Output stability, Finite-gain stability.	3
Robust performance and Linear Fractional Transformation: Robust performance and limitations due to physical constraints, Linear Fractional Transformation (LFT), Uncertainties, Riccati equation and inequality.	4
Useful Lemmas and Theorems in Robust Control: KYP Lemma, Bounded-real lemma, Positive-real lemma, Small-gain theorem, Passivity theorem.	3
H-infinity controller synthesis: Generalized H-infinity controller synthesis problem, Controller design via LMI approach.	4
H-infinity Loopshaping Design: Four-block problem, Loopshaping concept, Weight selection, Controller synthesis via LMI.	4
Mu Analysis and Synthesis: Robust stability and performance problems, Structured singular value, D-scaling problem, D-K Iteration.	3
Gap metric, IQC, Robust adaptive control, Iterative identification and robust controller redesign technique.	4
Conclusions and Feedback	1