University of Engineering and Technology Lahore

Section Course Outline Report

Department: Electrical Engineering **Printed Date:** December 31, 2018

Section Course Detail	
Semester	Spring 2019
Department	Electrical Engineering
Section	A
Subject Title	EE-599D: Meta-heuristic optimization algorithms in power systems
Subject Domain	Engineering
Subject Knowledge	Engineering Foundation
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Measurable Student Learning Outcomes

CLOs	Description	PLOs	Domain	Domain Level
CLO1	Explain the concept of engineering optimization and its mathematical foundation	PLO1	Cognitive	2. Understand
CLO2	Explain Classic and Meta – heuristic optimization methods	PLO1	Cognitive	2. Understand
CLO3	Apply Meta – heuristic optimization methods on benchmark test Problems	PLO2	Cognitive	3. Apply
CLO4	Apply meta – heuristic optimization methods on power systems' problems and perform statistical analysis	PLO2	Cognitive	3. Apply

Class Timings
MON - 9, - EE 120B WED - 9, - EE 120B

Grading Policy
Quiz1: 5.0
Quiz2:5.0
Quiz3: 5.0
Quiz4: 5.0
Assignments/Class Participation: 10.0
Mid Term: 30.0

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Grading Policy
Final Term: 40.0

Section Content		
Week (Lec)	**Topics**	**CLO's**
week1	**Introduction to engineering optimization** (types of optimization, optimization algorithms, order notation and algorithm complexity)	CLO1
week2	**Mathematical foundation** (Upper and lower bounds, optimality, continuity and smoothness, stationary points, etc.)	CLO1
week3	**Random numbers generators** (linear congruential algorithm, uniform distribution, other distributions)	CLO1
week4	**Classic optimization methods** (Newton method, Gradient search method)	CLO2
week5 – week 6	**Meta – heurisitic optimization methods** (Particle swarm optimization and variants, Firefly algorithm and variants)	CLO2
week7 – week 8	**Implementation of meta-heuristic algorithms on benchmark test problems** (Michaelwicz function, Rosen brock's function etc.)	CLO3
week9	**Economic dispatch problem** (using meta-heuristic algorithms)	CLO4
week10	**Environmental economic dispatch problem** (using meta-heuristic algorithms)	CLO4
week 11	**Short term hydrothermal scheduling problem** (using meta-heuristic algorithms)	CLO4
week 12	**Maximum power point tracking problem** (using meta-heuristic algorithms)	CLO4
week 13	**Optimal location and sizing of FACTs devices** (using meta-heuristic algorithms)	CLO4
week 14	**Types of statistical analysis on optimization problems** (T - tests)	CLO4
week 15	**Types of statistical analysis on optimization problems** (ANNOVA)	CLO4
week 16	**Introduction to statistical tool** (SPSS), **for analysis**	CLO4

Recommended books	**Author**
Engineering optimization an introduction with meta-heuristic applications (2010 John Wiley and Sons)	Xin She Yang
Research papers on required application	On research paper