

RAJASTHAN TECHNICAL UNIVERSITY
M.Tech. (Digital Communication)
Teaching & Examination Scheme (Full Time) w.e.f. 2020-21

Semester I

SN	Course Type	Course code	Course Name	Teaching Scheme			Marks			Credit
				L	T	P	I	E	T	
1.	PCC	1MDC1-01	Digital Communication system	3	0	0	30	70	100	3
2.	PCC	1MDC1-02	Advanced Digital Signal Processing	3	0	0	30	70	100	3
3.	PEC-1	1MDC2-11	High Frequency Electronics	3	0	0	30	70	100	3
		1MDC2-12	Optimization Techniques							
		1MDC2-13	Detection & Estimation Theory							
4.	PEC-2	1MDC2-14	Advanced Computer Networks	3	0	0	30	70	100	3
		1MDC2-15	Statistical signal processing							
		1MDC2-16	Satellite Communication							
5.	MCC	1MCC3-21	Research Methodology and IPR	2	0	0	30	70	100	2
6.	PCC	1MDC1-06	Digital Communication System Lab	0	0	4	60	40	100	2
7.	PCC	1MDC1-07	Modelling & Simulation Lab	0	0	4	60	40	100	2
8.	SODECA	1MDC5-00	Social Outreach Discipline & Extra Curriculum Activities				50		50	1
			Total						750	19

1MDC2-12: OPTIMIZATION TECHNIQUES

Course Objective:

- This course introduces the principal algorithms for linear, network, discrete, nonlinear, dynamic optimization and optimal control.
- Emphasis is on methodology and the underlying mathematical structures.
- Modeling of the real-world problem and simulate it.

Topics	Hours
Introduction: Historical development, application to engineering problems, statement of optimization, classification of optimization, examples of optimization problems.	5
Linear Programming: Graphical method, simplex method, revised simplex method, Big-M method, 2- phase method, alternate optimal solutions, unbounded LPs, degeneracy and convergence, duality in linear programming, sensitivity analysis, dual simplex method, Transportation, assignment and other applications.	10
Non-Linear Programming: Unconstrained optimization techniques, direct search methods (Fibonacci method, golden section, quadrature and cubic interpolation) descent methods, constrained optimization, direct and indirect methods, optimization with calculus, kuhn-tucker conditions.	10
Dynamic Programming: Multistage decision process, principles of optimality, computational procedures in dynamic programming.	5
PID parameters optimization by using these techniques: Particle Swarm Optimization (PSO), Bacteria Foraging Algorithm (BFA), Genetic Algorithm (GA), and Ant colony optimization (ACO), Swarm Optimization Method (SMO), Artificial bee colony (ABC), grey wolf optimization (GWO), whale optimization algorithm (WOA), Sine Cosine algorithm (SCA)	10
Total	40

Course Outcomes:

- Understand importance of optimization
- Apply basic concepts of mathematics to formulate an optimization problem
- Analyze and appreciate variety of performance measures for various optimization problems

Reference books:

1. Hiller and Lieberman, "Introduction to Operation Research" 7th Edition, Tata McGrawHill, 2000.
2. Ravindran Philips and Solberg, "Operation Research Principles and Practice" 2nd Edition, Wiley India, 2007.
3. Research Papers in PID Parameter Optimization.