Sl.NO	Module Name	Plan Type	Plan OR Topic
1	Deterministic optimization	Lecture	Newton-Raphson
2	Deterministic optimization	Lecture	conjugate gradients
3	Deterministic optimization	Lecture	preconditioning, quasi-Newton methods,
4	Deterministic optimization	Lecture	Fisher scoring, EM and its various derivatives
5	Deterministic optimization	Lecture	Numerical recipes for linear algebra: matrix inverse, LU,
6	Deterministic optimization	Lecture	Cholesky decompositions,
7	Deterministic optimization	Lecture	low-rank updates,
8	Deterministic optimization	Lecture	SVD,
9	Deterministic optimization	Lecture	banded matrices, Toeplitz matrices and the FFT,
10	Deterministic optimization	Lecture	Kronecker products (separable matrices), sparse matrix solvers
11	Convex Analysis	Lecture	Convex analysis: convex functions
12	Convex Analysis	Lecture	duality, KKT conditions,
13	Convex Analysis	Lecture	interior point methods,
14	Convex Analysis	Lecture	projected gradients, augmented Lagrangian methods,
15	Convex Analysis	Lecture	convex relaxations Applications: support vector machines, splines,
16	Convex Analysis	Lecture	kriging, isotonic regression,
17	Convex Analysis	Lecture	LASSO and LARS regression
18	Convex Analysis	Lecture	LASSO and LARS regression
19	Markov Models	Lecture	Hidden Markov models,
20	Markov Models	Lecture	Hidden Markov models,
21	Markov Models	Lecture	forward-backward algorithm,

22	Markov Models	Lecture	Kalman filter,
23	Markov Models	Lecture	Markov random fields
24	Markov Models	Guest Lecture (Subject Expert)	Markov random fields
25	Deterministic integration:	Lecture	Gaussian quadrature,
26	Deterministic integration:	Lecture	Gaussian quadrature,
27	Deterministic integration:	Lecture	quasi-Monte Carlo.
28	Deterministic integration:	Lecture	quasi-Monte Carlo.
29	Deterministic integration:	Lecture	Application: expectation propagation
30	Deterministic integration:	Assessment/Evaluation	Application: expectation propagation
31	Monte Carlo methods	Lecture	Rejection sampling
32	Monte Carlo methods	Lecture	importance sampling
33	Monte Carlo methods	Lecture	variance reduction methods (Rao-Blackwellization, stratified sampling)
34	Monte Carlo methods	Lecture	MCMC methods: Gibbs sampling,
35	Monte Carlo methods	Lecture	MCMC methods: Gibbs sampling,
36	Monte Carlo methods	Lecture	Metropolis-Hastings, Langevin methods,
37	Monte Carlo methods	Lecture	Hamiltonian Monte Carlo,
38	Monte Carlo methods	Lecture	slice sampling.
39	Monte Carlo methods	Lecture	Implementation issues: burnin, monitoring convergence Sequential Monte Carlo (particle filtering)
40	Monte Carlo methods	Assessment/Evaluation	Implementation issues: burnin, monitoring convergence Sequential Monte Carlo (particle filtering)