	Fall 2017	***MBT 220, Shastry, ISB214***		***Chapter in Books***
	Notation of Second quantization	Many body Wave functions vs Fock space representation	Canonical (anti) commutation relations	Coleman Ch 4
		Cooper pair molecule as example	Free Bosons, Phonons, Fermions, Majorana	
		Spins versus bosons Holstein Primakoff, Dyson Maleev	Finite Temperature; Grand canonical ensemble, thermal averages	Mattis ”Magnetism”,
		Turning on interactions, electron-phonon model, electron electron model.	Hubbard model, Heisenberg model, electron gas model	
	Basic ideas of Density functional theory	Kohn Sham equations	Graphene band structure	TBD
	Simple minded MFT for interacting models	Interactions factorized, Ferromagnetic Hubbard model, BCS reduced Hamiltonian,		Tinkham Superconductivity
	Solution by canonical transformations	Interacting Bose gas,	BCS superconductor	Bogoliubov, Fetter-Walecka
		Solution of Transverse field Ising model	Jordan Wigner transform, Ising model in transverse field	Lieb Mattis, Katsura papers
	Greens functions and information contained therein	Spectral representation, spectral functions, finite T versus T=0	Structure function and neutron scattering, STM, ARPES,..	Coleman Ch 10, AGD,
	Perturbation theory Feynman diagrams, Schwinger methodology	Low orders expansion in the interaction, Fermi liquid theory basics, Luttinger-Ward theorem, Fermi surface theorem	Kubo formulas and resistivity	Coleman Ch 6, AGD,
		Ideas of Gutzwiller projection and failure of perturbation theory in Mott Insulators, t-J model physics	DMFT and introduction to Extremely Correlated Fermi Liquids	TBD, Various publications
	Path integrals at finite T	Simple ideas re path integral formulation		TBD, Various publications
	Gorkov Nambu Superconductor	Matrix anomalous Greens functions		Nambu Gorkov papers