ATOMIC, MOLECULAR AND QUANTUM INFORMATION SCIENCE

3-1-0

Detailed syllabus and Lecture-wise Break-up

Sr.	Topic	Hours
1.	3-j, 6-j, 9-j symbols, their properties and relations among them; Euler angles, spherical harmonics and rotational harmonics.	4
2.	Group theory, irreducible representation, point groups, symmetry adapted wave function or generalized harmonics.	6
3.	Density operator and its properties; Hilbert space and spherical tensor operators; spin 1/2 and two level systems; EPR paradox, Bell's theorem	4
4.	Entanglement, its criteria and measures; Quantum gates	4
5.	Application of entanglement: quantum cryptography	4
6.	quantum teleportation, dense coding; Nocloning theorem	4
7.	Quantum Information Theory; Quantum computation. Grover's algorithms	4
8.	Quantum Algorithms and Computation: Quantum no-cloning; The Deutsch-Jozsa algorithm	4
9.	Quantum simulations; Quantum logic gates and circuits; Universal Quantum gates	4
10.	Quantum Fourier Transform; Phase Estimation; Shor's algorithm; Physical Realization of Quantum Computers using atoms and molecules	4
11.	Tutorials	14
Total		56