CONTENTS

Resource list

KEY: *N = Notes, B = Book, V = Video, PS = Research Papers & Scholarly Articles, Q = Quantum, QME = Q. Masters Equation, QIS = Q. Information Sciences, OQS = Open Q. Systems, QM = Q. Mechanics*

Numbering is just for general structure, some topics may be added/removed.

SESSION # 01

2. Review of QM and Density matrix formalism **(N1 B4 B5 B6)**
    1. Chapters 1 and 2 from **(B5)** - (for self study will only discuss if needed)
    2. First 17 pages **(N1)**
    3. Chapters 2-5 **(B4)**

SESSION # 02

3. Quantum Information - 1.6 **(B6)** Intro from QIS perspective **(N3)**
    1. Density matrix formalism **(N1 B4 B5 B6)** **~ carried forward from S1**
    2. Quantum Information - 1.6 **(B6)**
    3. Intro to oqs from QIS perspective **(N3)**

SESSION # 03

4. Classical Probability Theory **(B1 N5)**
    1. Classical Probability Theory 1.1 - 1.3 **(B1)**
    2. What is quantum **(N5)**

SESSION # 04

5. Distinguishability and information **(B1 B7 B6)**
    1. Classical Probability Theory 1.2 - 1.3 **(B1)** **~ carried forward from S3**
    2. Distinguishability - 4.1, 4.2 **(B7)** 2.2.4 **(B6)**
    3. Uncertainty - 4.5 **(B7)**
    4. Distance measures for q.information - 9.1 - 9.2.3 **(B6)**

SESSION # 05

6. Distinguishability and information **(B7 RS3 RS4)**
    1. Q.Stat Mech - 1, 2.1 - 2.2.2 **(B2)**
7. Quantum Probability - 2.1 **(B1)**
8. Composite Systems - 2.2 **(B1)** 6 **(B7)** IV **(N1)**

SESSION # 06

9. Theory of Measurement - 6 **(B4)** 2.4 **(B1)** 2.2.3 **(B6)** 5 **(N4)**
10. Quantum Entropy - 2.3 **(B1)** 19 **(B7)** 11 **(B6)**

SESSION # 07

11. Open Quantum Systems, Noise, POVM & Kraus Representation
    1. Theory of Measurement - 2.4 **(B1)** **~ carried forward from S6**
    2. Quantum Entropy - 19 **(B7)** **~ carried forward from S6**
    3. POVM - 2.2.5, 2.2.6 **(B6)**
    4. Quantum Noise and Error Correction - 12 *p251 - p259* **(B4)**
    5. Quantum noise and quantum operations - 8.1 **(B6)**
    6. Open System Dynamics - V **(N1)**

SESSION # 08

11. Open Quantum Systems, Noise, POVM & Kraus Representation ***~ continued***
    1. Quantum noise and quantum operations - 8.2 **(B6)**
    2. OQS and QIP Interface - 8.1 - *p176* **(B2)**
    3. Quantum Dynamics - 5 **(B7)**
    4. Open Systems - 9.1, 9.2, 9.5, 9.6 **(B7)**

SESSION # 09

12. Super Operators, Dynamical Maps, Q. Maps, Q. Channels, Positivity, Banach Space, Linear Operators, Groups and Semigroups
    1. Banach Space, Linear Operators, Groups and Semigroups - 1 **(B3)**
    2. Super Operators, Q. Maps, Q. Channels, Positivity - VI *B - G* **(N1)** 2.2, 2.3 **(N3)**
    3. Dynamical Maps - 3.1 - 3.4 **(B3)**

SESSION # 10

13. Markovianity and Piecewise Deterministic Processes - 1.4 - 1.5 **(B1)** 4 **(B3)**
    1. Markovianity - 1.4 **(B1)**
    2. Piecewise Deterministic Processes - 1.5 **(B1)**
    3. Quantum Markov Process: Mathematical Structure - 4 **(B3)**

SESSION # 11

14. QME: Microscopic derivations and Models - 3.1 - 3.3 **(B1)** 3 **(N3)**
    1. Microscopic derivations - 3.1 - 3.3 **(B1)**
    2. Microscopic derivation of the master equation - 3 **(N3)**

SESSION # 12

15. Non-Markovianity, 6 **(B3)** 8.1 - 8.2 **(N3)**
    1. Microscopic Description: Non-Markovian Case, 6 **(B3)**
    2. Non-Markovian quantum dynamics, 8.1 - 8.2 **(N3)**

SESSION # 13

16. Markovian and Non-Markovian Models - 8.2 - 8.4 **(N3)**