Course timetable and reading materials for PHYS2041/PHYS7141, Semester 2, 2020

Week 1		
Wed	5 Aug	Lecture 1: Three failures of classical physics and Quantum Physics in a nutshell. [PHYS1002 textbook, Knight's "Physics for Scientists and Engineers", Chapters 37 and 38, especially Ch. 38]
Wed	5 Aug	L2: The wave function. The (time-dependent) Schrödinger equation. [Griffiths, Ch. 1.1 - 1.3]
Thu	6 Aug	Tutorial 1

Week 2		
Tue	11 Aug	11:59pm Assignment 1 due
Wed	12 Aug	L3: Normalisation. Expectation values. [Griffiths, Ch. 1.1 - 1.5]
Wed	12 Aug	L4: Measurement. Momentum. The Heisenberg uncertainty principle. [Griffiths, Ch. 1.5-1.6]
Thu	13 Aug	Tutorial 2

Week 3		
Tue	18 Aug	11:59pm Assignment 2 due
Wed	19 Aug	L5: Time-dependent Schrödinger equation (again): worked examples and some physical implications. [Griffiths, Ch. 1]
Wed	19 Aug	L6: Time-independent Schrödinger equation. Stationary states. [Griffiths, Ch. 2.1]
Thu	20 Aug	Tutorial 3

Week 4		
Tue	25 Aug	11:59pm Assignment 3 due
Wed	26 Aug	L7: Particle in an infinite square well. Part I: Energy Eigenfunctions and Eigenvalues. [Griffiths, Ch. 2.2]
Wed	26 Aug	L8: Particle in an infinite square well. Part II: Orthogonality, Completeness and Superpositions. [Griffiths, Ch. 2.2]
Thu	27 Aug	Tutorial 4

Week 5		
Tue	1 Sep	11:59pm Assignment 4 due
Wed	2 Sep	L9: The Harmonic Oscillator. Part I: General features and the analytic method. [Griffiths, Ch. 2.3 and Section 2.3.2, in particular]
Wed	2 Sep	L10: The Harmonic Oscillator. Part II: The algebraic method of ladder operators. [Griffiths, Ch. 2.3.1]
Thu	3 Sep	Tutorial 5

Week 6		
Tue	8 Sep	11:59pm Assignment 5 due
Wed	9 Sep	L11: The free particle. Fourier transforms. [Griffiths, Ch. 2.4]
Wed	9 Sep	L12: The Dirac delta-function. The delta-function potential. [Griffiths, Ch. 2.5]
Thu	10 Sep	Tutorial 6

Week 7		
Tue	15 Sep	11:59pm Assignment 6 due
Wed	16 Sep	L13: The finite square well. [Griffiths, Ch. 2.6]
Wed	16 Sep	L14: Formalism: Hilbert Space. Matrix Mechanics. Dirac Notation. [Griffiths, Ch. 3.1, 3.6]
Thu	17 Sep	Tutorial 7

Week 8		
Tue	22 Sep	11:59pm Assignment 7 due
Wed	23 Sep	L15: Hermitian Operators. Observables. Eigenfunctions of Hermitian Operators. [Griffiths, Ch. 3.2, 3.3]
Wed	23 Sep	L16: Generalised Statistical Interpretation. Heisenberg Uncertainty. Heisenberg Equation. [Griffiths, Ch. 3.4, 3.5]
Thu	24 Sep	Tutorial 8
MID-SEMESTER BREAK		
Week 9		
Tue	6 Oct	11:59pm Assignment 8 due
Wed	7 Oct	L17: Quantum Mechanics in 3D. Motion in a spherically symmetric potential. [Griffiths, Ch. 4.1]
Wed	7 Oct	L18: The hydrogen atom. [Griffiths, Ch. 4.2]
Thu	8 Oct	Tutorial 9
Week 10		
Tue	13 Oct	11:59pm Assignment 9 due
Wed	14 Oct	L19: Orbital angular momentum: General. [Griffiths, Ch. 4.3]
Wed	14 Oct	L20: Orbital angular momentum: Ket notation and the algebraic method of ladder operators. [Griffiths, Ch. 4.3]
Thu	15 Oct	Tutorial 10
Week 11		
Tue	20 Oct	11:59pm Assignment 10 due
Wed	21 Oct	L21: Spin (the intrinsic angular momentum). [Griffiths, Ch. 4.4]
Wed	21 Oct	L22: Spin ½. Pauli spin matrices. General spin state in different bases. [Griffiths, Ch. 4.4]
Thu	22 Oct	Tutorial 11
Week 12		
Tue	27 Oct	11:59pm Assignment 11 due
Wed	28 Oct	L23: Two-particle systems. Identical Particles. Bosons and Fermions. Addition of two spins. [Griffiths, Ch. 5.1 and 4.4.3]
Wed	28 Oct	L24: Addition of two spins. Spin singlet and triplet states. Atoms and the periodic table. Electronic configurations and spectral terms. [Griffith, Ch. 5.2]
Thu	29 Oct	Tutorial 12
Fri	30 Oct	11:59pm Assignment 12 due