



University of
Salford
MANCHESTER

BSc Physics

First Year (Level 4) Induction Session

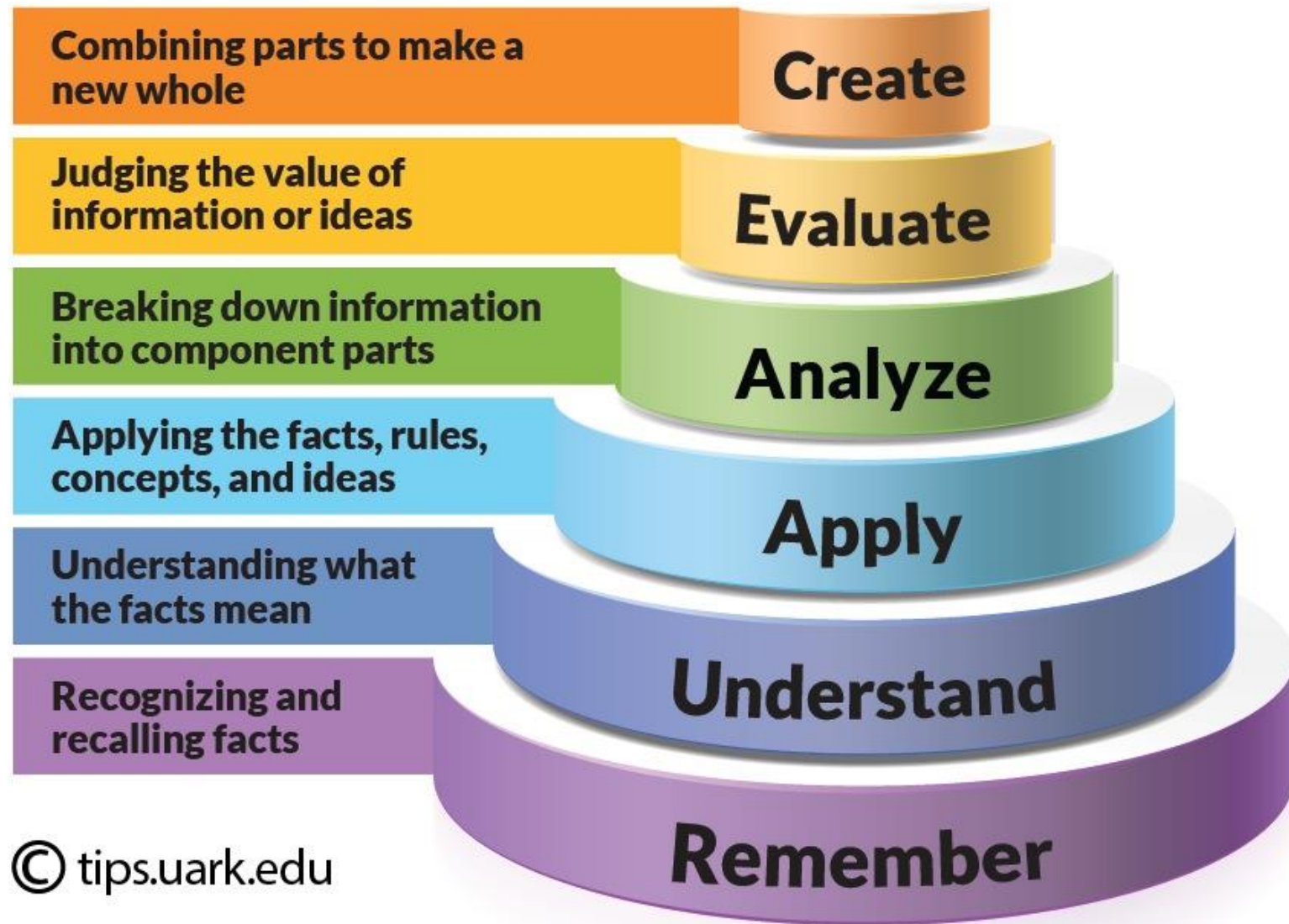
Dr Dan Bull

What is the purpose of the physics degree?

➤ TO LEARN PHYSICS

➤ TO LEARN TO **BECOME A PHYSICIST**

Bloom's Taxonomy of Learning



Mechanics, Relativity and
Quantum Physics

Electricity, Magnetism and Light

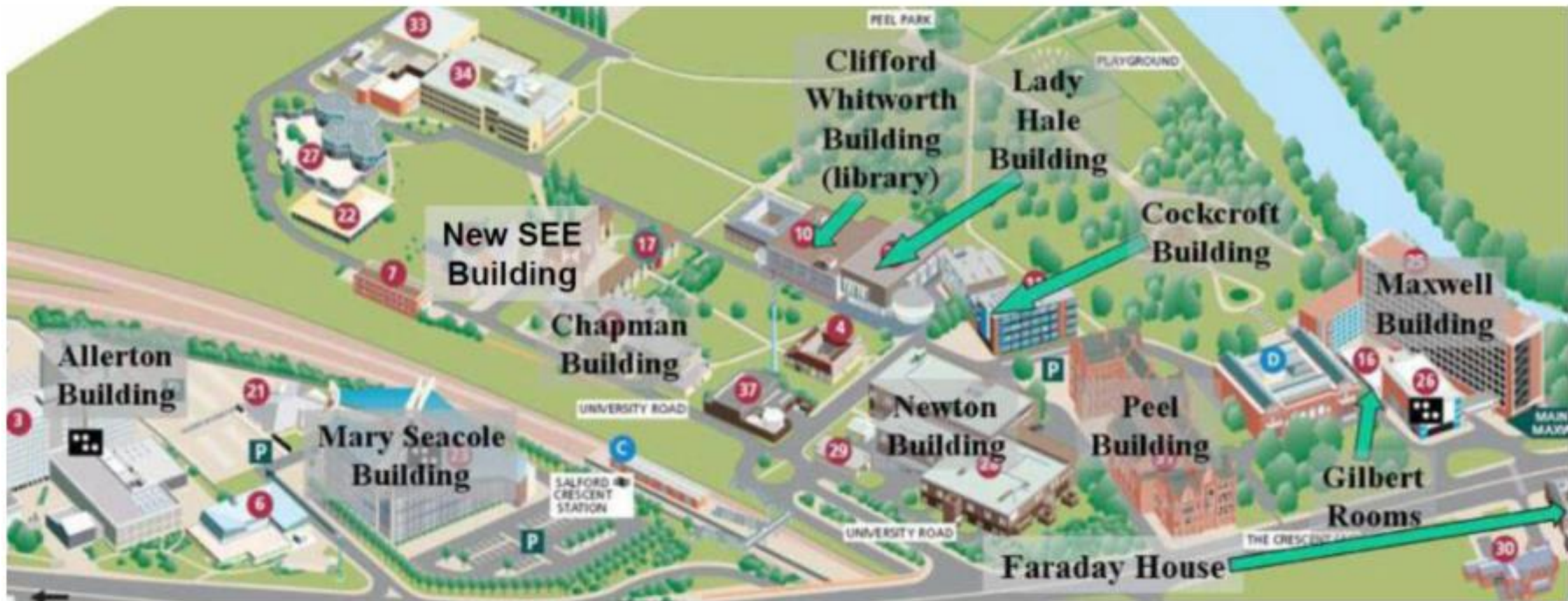
Modelling of Physical Systems

Physics Laboratory 1

Mathematics

Physics in Context

	9	10	11	12	13	14	15	16	17
Mon	Modelling of Physical Systems SEE Building: SB2.19				Physics in Context SEE Build. SB2.12	Electricity, Magnetism and Light SEE Building SB2.01			
Tue						Mathematics TUTORIAL ONLINE DELIVERY			
Wed									
Thu	Physics Laboratory SEE Building SB3.07				Physics in Context SEE Building SB3.01				
Fri		Mathematics Maxwell M412b			Mechanics, Relativity and Quantum Physics SEE Building SB2.03-04				



Mechanics, Relativity and
Quantum Physics

Electricity, Magnetism and Light

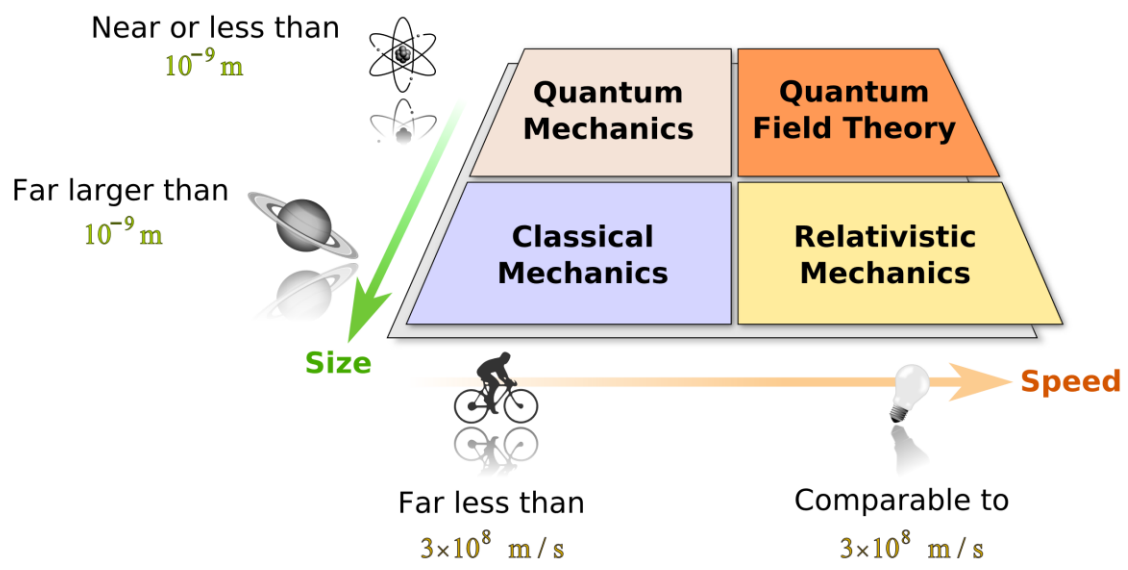
Modelling of Physical Systems

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Physics in Context

Mechanics, Relativity and Quantum Physics
Electricity, Magnetism and Light
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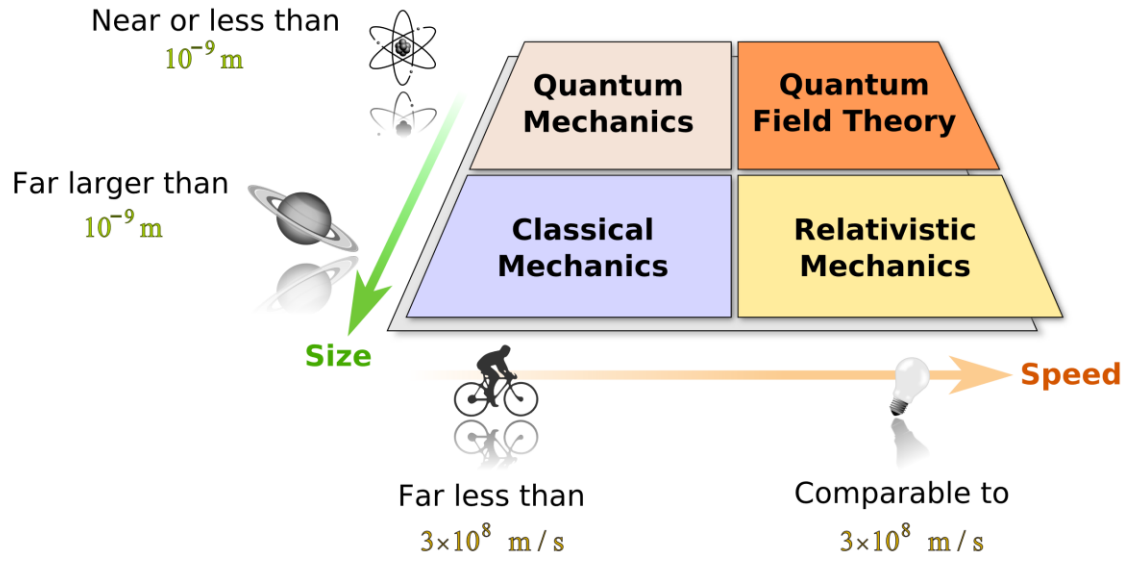


TRIMESTER 1: CLASSICAL MECHANICS

Prof Ian Morrison

- Dynamics in 1D, 2D and 3D
- Newton's Laws of Motion
- Work and Energy
- Momentum and Collisions
- Rotational Motion
- Angular Momentum

Mechanics, Relativity and Quantum Physics
Electricity, Magnetism and Light
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TRIMESTER 2: RELATIVITY AND QUANTUM PHYSICS

Dr Marina Leontiadou

- The Postulates of Special Relativity
- Lorentz Transformation
- Relativistic Momentum and Energy
- The Origins of Quantum Physics
- Photons and Matter Waves
- Electrons in Confinement: Quantisation of Energy

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TRIMESTER 1: ELECTRONICS AND ELECTRICITY

Dr Mark Hughes

- Electric current, voltage and resistance
- Electrical circuits and circuit networks
- Semiconductors
- Semiconductor Devices
- Electric Fields
- Capacitors and dielectrics

TRIMESTER 2: ELECTRIC AND MAGNETIC FIELDS

Dr Tiehan Shen

- Magnetic fields
- Electromagnetic Induction
- Inductors
- Alternating current
- Electromagnetic waves
- Ray optics

Mechanics, Relativity and
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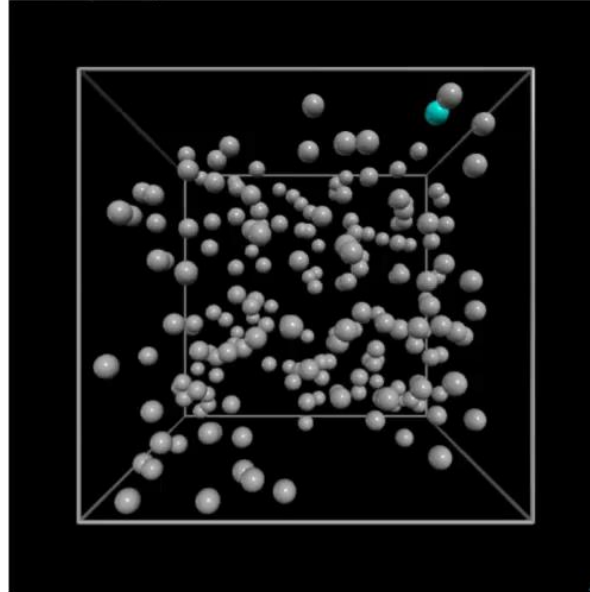
Modelling of Physical Systems

Physics Laboratory 1

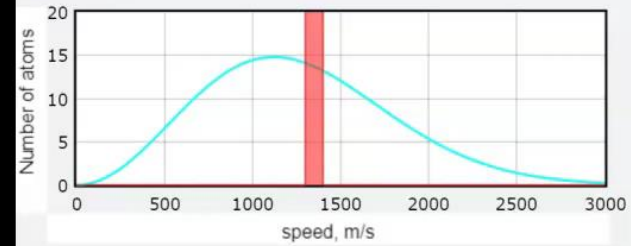
Mathematics

Physics in Context

A "hard-sphere" gas



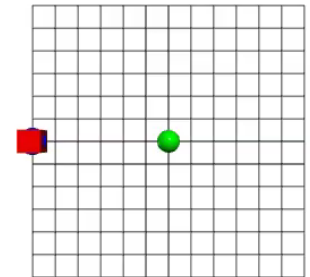
Theoretical and averaged speed distributions (meters/sec). Initially all atoms have the same speed, but collisions change the speeds of the colliding atoms. One of the atoms is marked and leaves a trail so you can follow its path.



TRIMESTER 1: THERMAL PHYSICS AND WAVES

Dr Dan Bull

- Kinetic theory in gases: The origin of pressure; the Maxwell speed distribution
- Temperature and thermal transport
- The zeroth, first and second law of thermodynamics
- Basic statistical mechanics
- Transverse and longitudinal travelling waves
- Superposition of waves and standing waves
- Sound waves and the doppler effect



Mechanics, Relativity and
Quantum Physics

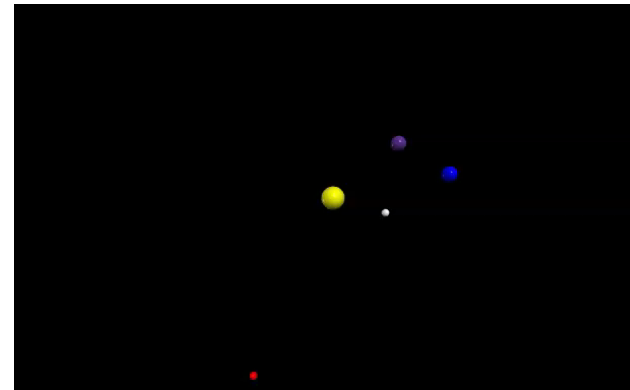
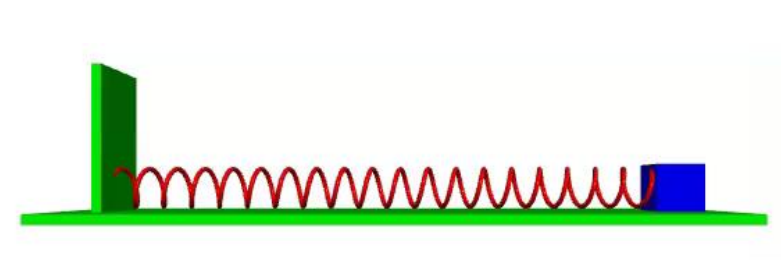
Electricity, Magnetism and Light

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TRIMESTER 2: MOTION OF PHYSICAL SYSTEMS

Dr Dan Bull

- Projectile motion under the effects of both gravity and air resistance
- Oscillatory motion: Linear simple harmonic motion and beyond
- Gravitation including planetary and satellite motion
- The motion of charged particles in electric fields

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Physics in Context

TRIMESTERS 1&2

Dr Mark Hughes, Dr Heather Yates, Dr John Proctor

- Measurement Skills, including quantifying precision
- Propagation of Errors
- Data Manipulation in a Spreadsheet
- Plotting of Data
- Curve Fitting
- Electronics
- Keeping an Effective Experimental Logbook
- A series of experiments across a range of areas in physics
- Reporting of Experiments in Physics

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TRIMESTERS 1&2

Dr Graham McDonald

- Algebra and Functions
- Differentiation and Integration
- Geometry: Co-ordinate systems
- Vectors
- Complex Numbers
- Ordinary Differential Equations: First Order Equations; Second Order Equations, Applications to Simple Physical Systems
- Series: Notions of Convergence; Taylor and Maclaurin Series Expansions; Power Series; Fourier Series

TRIMESTERS 1&2

Prof Ian Morrison

- ❑ A series of short thematic keynote lecture courses including seminars by external speakers demonstrating the role of the physicist in the workplace and the role of physics in addressing real world problems
- ❑ Skills Elements: Problem solving; team building; research skills; presentation skills; report writing and graphical presentation skills:
 - ❑ Learning how to present to different audiences
 - ❑ The development of free scientific thinking, to be able to look at problems and issues from different viewpoints and to formulate and present ideas;
 - ❑ The use of Fusion360 CAD/CAM software;
 - ❑ Producing an effective LinkedIn profile;
 - ❑ Scientific report writing and the research of relevant data, including the importance of accurate referencing

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Physics in Context

12 September 2022	<i>Welcome/Induction</i>		0	
19 September 2022	Trimester 1	1	1	✓
26 September 2022	Trimester 1	2	2	✓
3 October 2022	Trimester 1	3	3	✓
10 October 2022	Trimester 1	4	4	✓
17 October 2022	Trimester 1	5	5	✓
24 October 2022	Trimester 1	6	6	✓
31 October 2022	Trimester 1	7	7	✓
7 November 2022	Trimester 1	8	8	✓
14 November 2022	Trimester 1	9	9	✓
21 November 2022	Trimester 1	10	10	✓
28 November 2022	Trimester 1	11	11	✓
5 December 2022	Trimester 1	12	12	✓
12 December 2022	Trimester 1	13	13	✓
19 December 2022	<i>Christmas Vacation</i>		14	
26 December 2022	<i>Christmas Vacation</i>		15	
2 January 2023	<i>Christmas Vacation</i>		16	
9 January 2023	<i>Welcome/Induction</i>		17	
16 January 2023	Trimester 2	1	18	✓
23 January 2023	Trimester 2	2	19	✓
30 January 2023	Trimester 2	3	20	✓
6 February 2023	Trimester 2	4	21	✓
13 February 2023	Trimester 2	5	22	✓
20 February 2023	Trimester 2	6	23	✓
27 February 2023	Trimester 2	7	24	✓
6 March 2023	Trimester 2	8	25	✓
13 March 2023	Trimester 2	9	26	✓
20 March 2023	Trimester 2	10	27	✓
27 March 2023	<i>Easter Vacation</i>		28	
3 April 2023	<i>Easter Vacation</i>		29	(Bank Holiday Friday)
10 April 2023	<i>Easter Vacation</i>		30	(Bank Holiday Monday)
17 April 2023	Trimester 2	11	31	✓
24 April 2023	Trimester 2	12	32	✓
1 May 2023	Trimester 2	13	33	✓ (Bank Holiday Monday)

ASSESSMENTS

Modelling of Physical Systems

Maths + MechRelQuantPhys + ElectMagLight

Laboratory (Experimental Journal)

Physics in Context (Problem Solving)

Lab (Electronics) + Physics in Context (Energy)

Modelling of Physical Systems + Maths

MechRelQuantPhys + ElectMagLight