BSc (Hons) Physics with Electronics - SCE 341 (Under Review)

1. Objectives

One of the most important concepts in physics is that, behind the apparent complexity of the world around us, nature has an underlying simplicity and unity which can be expressed in terms of all-embracing fundamental principles and laws. As well as being concerned with such fundamental questions, physics is a widely applicable subject and forms the basis of much modern and, more importantly, future technologies. Moreover the distinction between certain traditional branches of other disciplines and physics is rapidly fading out, resulting in an increasing number of employment opportunities in technical areas requiring expertise at the interface of physics and these disciplines.

The BSc (Hons) Physics with Electronics Programme has been developed to provide students simultaneously with a solid theoretical grounding in physics and competency in the technological area of Electronics Engineering. This is achieved by combining modules from BSc(Hons) Physics offered by the Faculty of Science with modules offered by the Faculty of Engineering (BEng (Hons) Electrical and Electronic Engineering/BEng (Hons) Electronic and Communication Engineering). The Programme structure puts a heavy emphasis on the acquisition of practical skills and offers a wide range of choice of subject areas.

Depending on their specific interests and aptitudes, our graduates may opt for traditional careers like teaching or for jobs in technical areas of research and development in industry, laboratories and universities. The Programme also offers adequate background for _pecialization through further studies/research at postgraduate level both locally and overseas.

2. General Entry Requirements

As per General Entry Requirements for admission to the University for undergraduate degrees.

3. Programme Requirements

Passes at GCE 'A' Level in Mathematics and Physics.

4. Programme Duration

	Normal	**Maximum**
Degree:	6 Semesters (i.e. 3 years)	10 Semesters (i.e. 5 years)

5. Credits per Semester

Minimum 9, Maximum 24 (including retake modules) subject to Regulation 4.

6. Minimum Credits Required for Award of Undergraduate Degree: 104

Breakdown as follows:

	Credits from			
	Core Taught Modules	**Project**	**Electives[a]**	**GEMs[b]**

Degree	73.5	10	Minimum 11.5	9

[a] A minimum of 8.5 credits to be obtained from the programme plan including at least 3 credits from an elective module with an ELEC code. CSE 1010e(1) is a compulsory elective

[b] GEMs are to be taken within Years 1 & 2, and must include SCI 1010(1).

7. Assessment

Each module will be assessed over 100 marks (i.e. expressed as %) with details as follows (unless otherwise specified):

Assessment of a module will be based on a written examination (of 2 to 3-hour duration, as specified) carrying 100 marks and/or on continuous assessment done during the semester carrying also 100 marks.

The continuous assessment will count for 10-30% of the overall percentage mark for the module, except for a programme where the structure makes for other specific provision(s).

Continuous assessment may be based on laboratory work, and/or assignments and should include at least 1 class test.
A minimum of at least 30% should be attained in each of continuous assessment and written examination, with an overall total of 40% for a candidate to pass a module.

Physics Lab I, II, III and SCI 1010(1) will carry 100 marks each and will be assessed solely by continuous assessment.

Modules (if any) to be assessed jointly will be indicated to the students prior to their delivery.

Projects will carry 10 credits.

8. List of Modules

A. PHYSICS WITH ELECTRONICS CORE MODULES (73.5 + 10 credits)

Code	Module Name	Hrs/Wk L+P	Credits
PHYS 1111(1)	Mechanics I	3+0	3
PHYS 1121(1)	Waves & Optics	3+0	3
PHYS 1131(1)	Thermal Physics	3+0	3
PHYS 1141(1)	Physics Lab I	0+3	1.5
PHYS 1151(1)	Mathematical Techniques for Physicists I	3+0	3
ELEC 1101(1)	Electrical Engineering	3+1	3.5
PHYS 1211(1)	Quantum Physics	3+0	3
PHYS 1221(1)	Electromagnetism I	3+0	3
PHYS 1231(1)	Physics of Matter	3+0	3

PHYS 1241(1)	Physics Lab II	0+3	1.5
PHYS 1251(1)	Mathematical Techniques for Physicists II	3+0	3
PHYCO 1011(1)	Numerical and Scientific Computing I	2+2	3
ELEC 1202(1)	Electronics I	3+1	3.5
PHYS 2111(3)	Optics	3+0	3
PHYS 2121(3)	Mechanics II	3+0	3
PHYS 2131(3)	Electromagnetism II	3+0	3
PHYS 2141(3)	Physics Lab III	0+3	1.5
PHYS 2151(3)	Maths for Physicists I	3+0	3
ELEC 2105(3)	Electronics II	3+2	4
PHYS 2211(3)	Quantum Mechanics	3+0	3
PHYS 2221(5)	Statistical Physics	3+0	3
PHYS 2251(3)	Maths for Physicists II	3+0	3
ELEC 2213(3)	Electronics III	3+2	4
PHYS 3000(5)	Project	-	10
PHYS 3111(5)	Nuclear & Elementary Particle Physics I	3+0	3
PHYS 3211(5)	Physics Problem Paper	3+0	3

B. PHYSICS WITH ELECTRONICS ELECTIVES (Not all modules may be on offer)

PHYS 2161(3)	Atmospheric Physics	3+0	3
PHYS 2181(3)	Computational Physics	3+0	3
ELEC 2104(3)	Microprocessors I	3+1	3.5
PHYS 2261(3)	Introduction to Classical Mechanics	3+0	3
PHYS 2281(3)	Renewable Energy Resources	3+0	3
ELEC 2212(3)	Communications I	3+1	3.5
PHYS 3121(5)	Atomic and Molecular Physics	3+0	3
PHYS 3041(5)	Electromagnetic Theory	3+0	3
PHYS 3051(5)	Solid State Physics	3+0	3
PHYCO 3011(5)	Signal & Image Processing	2+2	3
ELEC 3114(5)	Microprocessors II	3+2	4
ELEC 4128(5)	Microwave Engineering	3+0	3
PHYS 3061(5)	Medical Physics	3+0	3
PHYS 3071(5)	Nuclear and Elementary Particle Physics II	3+0	3
PHYS 3081(5)	Quantum Electronics	3+0	3
ELEC 2211(3)	Control Systems I	3+0	3

C. GENERAL EDUCATION MODULE

SCI 1010(1)	Computing Envir & Tools for Scientific Reporting	2+2	3

D. OTHER ELECTIVES

CSE 1010e(1)	Introduction to Information Technology	O.E.	3

and approved modules offered by the Physics department and by other units/departments.

9. Programme Plan - BSc (Hons) Physics with Electronics

YEAR 1

Semester 1

Code	Module Name	Hrs/Wk L+P	Credits
CORE			
PHYS 1111(1)	Mechanics I	3+0	3
PHYS 1121(1)	Waves & Optics	3+0	3
PHYS 1131(1)	Thermal Physics	3+0	3
PHYS 1141(1)	Physics Lab I	0+3	1.5
PHYS 1151(1)	Math. Tech. for Physicists I	3+0	3
ELEC 1101(1)	Electrical Engineering	3+1	3.5
COMPULSORY ELECTIVE			
CSE 1010e(1)	Introduction to IT	O.E.	3
ELECTIVES			
At least one GEM from selection by department			

Semester 2

Code	Module Name	Hrs/Wk L+P	Credits
CORE			
PHYS 1211(1)	Quantum Physics	3+0	3
PHYS 1221(1)	Electromagnetism I	3+0	3
PHYS 1231(1)	Physics of Matter	3+0	3
PHYS 1241(1)	Physics Lab II	0+3	1.5
PHYS 1251(1)	Math. Tech. for Physicists II	3+0	3
PHYCO 1011(1)	Numer & Scientific Comp I	2+2	3
ELEC 1202(1)	Electronics I	3+1	3.5
GEM			
SCI 1010(1)	Computing Environments & Tools for Scientific Reporting	2+2	3

The non-credit module ELEC 1200 (vacation training) is normally planned at the end of semester 2.

YEAR 2

Semester 1

Code	Module Name	Hrs/Wk L+P	Credits
CORE			
PHYS 2111(3)	Optics	3+0	3
PHYS 2121(3)	Mechanics II	3+0	3
PHYS 2131(3)	Electromagnetism II	3+0	3
PHYS 2141(3)	Physics Lab III	0+3	1.5
PHYS 2151(3)	Maths for Physicists I	3+0	3
ELEC 2105(3)	Electronics II	3+2	4
ELECTIVES			
PHYS 2161(3)	Atmospheric Physics	3+0	3
PHYS 2181(3)	Computational Physics	3+0	3
ELEC 2104(3)	Microprocessors I	3+1	3.5
One GEM may be chosen from selection by department			

Semester 2

Code	Module Name	Hrs/Wk L+P	Credits
CORE			
PHYS 2211(3)	Quantum Mechanics	3+0	3
PHYS 2221(5)	Statistical Physics	3+0	3
PHYS 2251(3)	Maths for Physicists II	3+0	3
ELEC 2213(3)	Electronics III	3+2	4
ELECTIVES			
PHYS 2261(3)	Intro to Classical Mechanics	3+0	3
PHYS 2281(3)	Renewable Energy Resources	3+0	3
ELEC 2212(3)	Communications I	3+1	3.5
One GEM may be chosen from selection by department			

and/or PHYS or PHYCO modules or modules to be chosen from any other units/department

YEAR 3

Semester 1

Code	Module Name	Hrs/Wk L+P	Credits
CORE			
PHYS 3000(5)	Project	-	-
PHYS 3111(5)	Nucl & Elem Particle Physics I	3+0	3
ELECTIVES			
PHYS 3121(5)	Atomic and Molecular Physics	3+0	3
PHYS 3041(5)	Electromagnetic Theory	3+0	3
PHYS 3051(5)	Solid State Physics	3+0	3
PHYCO 3011(5)	Signal and Image Processing	2+2	3
ELEC 3114(5)	Microprocessors II	3+2	4
ELEC 4128(5)	Microwave Engineering	3+0	3

Semester 2

Code	Module Name	Hrs/Wk L+P	Credits
CORE			
PHYS 3000(5)	Project	-	10
PHYS 3211(5)	Physics Problem Paper	3+0	3
ELECTIVES			
PHYS 3061(5)	Medical Physics	3+0	3
PHYS 3071(5)	Nucl & Elem Particle Physics II	3+0	3
PHYS 3081(5)	Quantum Electronics	3+0	3
ELEC 2211(3)	Control Systems I	3+0	3

and/or PHYS or PHYCO modules or modules to be chosen from any other units/departments.

NOTE:
(i) Not all electives may be on offer.
(ii) ELEC 1101(1) and ELEC 1202(1) are serviced by the Faculty of Engineering.

10. Outline Syllabus

This outline syllabus is not prescriptive and is intended to serve as a guide only.

Note: Pre-requisite (PR); Pre-requirement (PQ); Minimum requirement (MR).

CSE 1010e(1) - INTRODUCTION TO INFORMATION TECHNOLOGY
IT and Computers; Stepping in the Computer; Input and Output Devices; Secondary Storage; Programming; Systems Software; Applications Software; Systems Development; Computer Networks; The Internet Computer Security; Software Utilities; Issues and Trends in IT.

ELEC 1101(1) - ELECTRICAL ENGINEERING (L/P - 3.5)
DC and AC single phase electric circuits. Magnetic Circuits. 3-phase Systems.

ELEC 1202(1) - ELECTRONICS 1 (L/P - 3.5)
PN Junction, Diode circuits, and Simple Transistor Circuits. Operational Amplifier. Combinational Logic. Flip Flops.

ELEC 2104(3) - MICROPROCESSORS 1 (L/P - 3.5)
Microprocessors, Internal Architecture, Instructions and Timing. Programming and Interfacing Devices.

ELEC 2105(3) - ELECTRONICS 2 (L/P - 4) (PQ: ELEC 1202(1))
Low Frequency Amplifier Circuits. H-Parameters, Hybrid-pi Model. Power Amplifiers Oscillators, Feedback. Differential Amplifier.

ELEC 2211(3) - CONTROL SYSTEMS 1 (L - 3)
Modelling of Single Input Single Output Systems. Time and Frequency Domain Analysis. Stability.

ELEC 2212(3) - COMMUNICATIONS I (L/P - 3.5)
Amplitude and angle modulation, Noise in amplitude and angle modulation, Introduction to digital modulation techniques.

ELEC 2213(3) - ELECTRONICS III (L/P - 4) (PQ: ELEC 1202(1))
I.C. Logic Families. Digital System Components; ADC, DAC. Sequential Logic Design. Finite State Machines.

ELEC 3114(5) - MICROPROCESSORS II (L/P - 4) (PQ: ELEC 2104(3))
Different Modes of Parallel and Serial Data Transfer. Peripheral Chips and Programming. Transducers and Interfacing. Data Acquisition.

ELEC 4128(5) - MICROWAVE ENGINEERING (L - 3) (PR: PHYS 1221(1))
Microwave Waveguides. Microwave Components. Design of Microwave links. Application of Microwaves

PHYCO 1011(1) - NUMERICAL & SCIENTIFIC COMPUTING I (PR: A-LEVEL PHYSICS & MATHS)
Introduction to C/Fortran programming. Interpolation. Numerical integration and differentiation. Applications to physical systems.

PHYCO 3011(5) - SIGNAL AND IMAGE PROCESSING (PQ: PHYS 2251(3))
Continuous and discrete signals. Noise. Signal-to-noise ratio. Effects of sampling (Nyquist theorem). Digitisation of analogue signals. Correlation and convolution. Spectral analysis. Imaging. Deconvolution techniques. Image enhancement.

PHYS 1111(1) - MECHANICS I (PR: A-LEVEL PHYSICS & MATHS)
Vectors, Statics, Frames of reference, Kinematics, Dynamics & Forces, Newton's laws of motion, Momentum, Newton's law of gravitation, Oscillatory motion, Resonance, Conservation laws.

PHYS 1121(1) - WAVES AND OPTICS (PR: A-LEVEL PHYSICS & MATHS)
Vibrations, Wave equation, Sound waves, Interference and diffraction phenomena, Elements of geometrical optics.

PHYS 1131(1) - THERMAL PHYSICS (PR: A-LEVEL PHYSICS & MATHS)
State variables, equilibrium states, PVT surface temperature, Zeroth law of thermodynamics, Thermometers, temperature scales. Thermal expansion, thermal conductivity in solids, Specific heat, phase changes. Laws of thermodynamics. Entropy and the second law. Heat engines and reversible processes. Kinetic theory of gases. Specific heats of gases, Law of equipartition of energy, atomicity. Adiabatic processes, speed of sound in gases. Free energies and Maxwell's relations. Black-body radiation.

PHYS 1141(1) - PHYSICS LAB I (PR: A-LEVEL PHYSICS)
Lectures on measurement systems and methods, characteristics and uses of instruments, data analysis and presentation, report writing.
Practical training sessions covering heat, optics, sound, electricity, mechanics and properties of matter.

PHYS 1151(1) - MATHEMATICAL TECHNIQUES FOR PHYSICISTS I (PR: A-LEVEL MATHS)
Vector algebra: vector addition, scalar and vector products, triple products. Vector equation: differentiation and integration of vectors. Polar coordinates. Introduction to complex numbers. Calculus of several variables: partial derivatives, scalar and vector fields. Coordinate systems: cylindrical, spherical. Vector Analysis: gradient, divergence and curl. Line and multiple integrals. Green's theorem in the plane, Divergence theorem and Stokes' theorem. Ordinary differential equations: methods of solution for first order and second order differential equations.

PHYS 1211(1) - QUANTUM PHYSICS (PR: A-LEVEL PHYSICS & MATHS)
Some problems of classical physics: black body radiation, photoelectric effect and stability of atoms. Energy quantisation. Particle nature of radiation. Compton effect. Rutherford model of the atom. Bohr model of the hydrogen atom. Wave-particle dualism. The Uncertainty Principle. An introduction to wave mechanics.

PHYS 1221(1) - ELECTROMAGNETISM I (PR: A-LEVEL PHYSICS & MATHS, PQ: PHYS 1151(1))
Electrostatics: Coulomb's Law and the electric field; Electric flux and Gauss's Law. Electric potential, and the relationship between field and potential. Capacitors and electrical energy storage. Calculations of the electric field, electric potential and capacitance in simple cases.
Magnetostatics: Magnetic fields and forces generated by a conductor; Biot-Savart and Ampere's Laws and applications to calculation of magnetic fields; Forces between currents, torque on a current loop. The magnetic dipole, torque and P.E in a magnetic field.
Time varying fields: Magnetic Induction, Faraday's Law and Lenz's Law; generators and alternators. Inductance and energy storage in inductors. Self and mutual inductance.

PHYS 1231(1) - PHYSICS OF MATTER (PR: A-LEVEL PHYSICS & MATHS)
States of matter, Interatomic and intermolecular forces, X-ray diffraction and the crystal lattice, Cohesive & Elastic properties, Thermal motion & Boltzmann principle, Thermal properties of crystalline solids and gases, Transport properties. Dielectrics. Magnetism in

matter - magnetisation and susceptibility. Atomic magnetic moments. Diamagnetic, paramagnetic, ferromagnetic and antiferromagnetic materials.

PHYS 1241(1) - PHYSICS LAB II (PR: PHYS 1141(1))
Sessions will consist of a variety of experiments closely related to year 1 core Physics modules.

PHYS 1251(1) - MATHEMATICAL TECHNIQUES FOR PHYSICISTS II (PQ: PHYS 1151(1))
Further differential equations. Further complex numbers. Hyperbolic functions. Limits. Curve sketching. Infinite series: comparison test and ratio test for non-negative series. Introduction to Fourier Series.
Matrix Algebra: Matrices, determinants, inverses; solutions of linear systems of equations. Eigenvalues and eigenvectors.

PHYS 2111(3) - OPTICS (PQ: PHYS 1121(1))
Mathematics of Wave motion. Maxwell's equations (an introduction). Electromagnetic waves. Wave superposition. Interference. Diffraction. Polarisation. Further geometrical optics.

PHYS 2121(3) - MECHANICS II (PQ: PHYS 1111(1) & PHYS 1251(1))
Angular momentum. An introduction to rigid body mechanics. Inertial and non-inertial frames of reference. Introduction to relativistic mechanics.

PHYS 2131(3) - ELECTROMAGNETISM II (PQ: PHYS 1221(1))
Review of the basic laws of electromagnetism. Polarisation in dielectrics, permittivity and dielectric susceptibility. Magnetism in matter: Magnetisation, magnetic susceptibility and permeability. Ampere's law and the displacement current. Maxwell's equations. The EM wave equation in lossless or lossy media: Plane waves, effects of boundaries. Energy and momentum of electromagnetic waves - the Poynting theorem. Waveguides.

PHYS 2141(3) - PHYSICS LAB III (PR: PHYS 1141(1))
Sessions will consist of a variety of experiments closely related to year 1 / year 2 Physics modules. Students will be exposed to the use of computers for experiments.

PHYS 2151(3) - MATHS FOR PHYSICISTS I (PQ: PHYS 1251(1))
Theory of linear vector spaces, linear operators, Fourier series, Some equations of mathematical physics, Series solution and some special functions. Applications.

PHYS 2161(3) - ATMOSPHERIC PHYSICS (PQ: PHYS 1111(1) & PHYS 1251(1))
Physical properties and evolution of planetary atmospheres. Radiative transfers and energy balance. Atmospheric motion-trade winds, cyclones, turbulence, etc. and accompanying transport phenomena. Relationship between velocity and pressure gradients. Physics of water and ice clouds, distribution of condensation and freezing nuclei clouds droplets and ice crystals. Rain and snow formation. Earth's electric field, charge generation lightning. Remote sensing of atmospheric properties. Radar and sonar detection. Satellite observations.

PHYS 2181(3) - COMPUTATIONAL PHYSICS (PQ: PHYS 1251 (1) & PHYCO 1011 (1))
Phase space, computational aspects of phase space diagrams, spectral methods of analysis, Optimisation procedures, simulation methods, Applications to physical systems.

PHYS 2211(3) - QUANTUM MECHANICS (PQ: PHYS 1251(1) & PHYS 2151(3))
Development of the Schrödinger wave equation (SWE), Wavefunctions, Eigenfunctions and eigenvalues, 1-D potentials, Angular momentum, 3-D SWE, Operator methods in quantum mechanics, General structure of wave mechanics.

PHYS 2221(5) - STATISTICAL PHYSICS (PQ: PHYS 1131(1) & PHYS 1251(1))

Review of basic concepts & Laws of Thermodynamics. Entropy and its relation to microscopic properties of a system. Basic methods of Statistical Mechanics - concept of Statistical ensembles. Microcanonical and canonical ensembles and their applications for discrete systems. Classical sytems: the Equipartition theorem, Ideal Classical gas. Introduction to Quantum Statistical Mechanics.

PHYS 2251(3) - MATHS FOR PHYSICISTS II (PQ: PHYS 2151(3))

Complex variable theory, Calculus of residues. Dirac delta function, Fourier and LaplaceTransforms, Parseval's Theorem, Convolution Theorem, applications.

PHYS 2261(3) - INTRODUCTION TO CLASSICAL MECHANICS (PQ: PHYS 2121(3))

Lagrangian formulation, Applications to physical examples, Hamiltonian formulation, Variational principles, Phase space, Poisson Brackets, Transition to quantum mechanics, Introduction to Hamilton-Jacobi equations.

PHYS 2281(3) - RENEWABLE ENERGY RESOURCES (PQ: PHYS 1111(1), PHYS 1121(1) & PHYS 1131(1))

Principles of renewable energy. Solar radiation; Solar water heating and other uses; Photovoltaic generation.

Hydropower. Power from the wind. Biofuels. Wave energy. Tidal power. Ocean thermal energy conversion. Geothermal energy.

PHYS 3000(5) - PROJECT (MR: 39 CREDITS IN YEAR 1 AND 2 CORE MODULES COMBINED)

Project work on a topic approved by the Department.

PHYS 3041(5) - ELECTROMAGNETIC THEORY (PR: PHYS 2251(3); PQ: PHYS 1221(1) & PHYS 2121(3))

Special relativity; Lorentz transformation; Lorentz scalars, vectors and tensors. Maxwell equations recast in relativistically covariant form; transformation laws for the electric and magnetic fields; invariants. Lorentz force; motion of a charged particle in an electromagnetic field.

PHYS 3051(5) - SOLID STATE PHYSICS (PQ: PHYS 2211(3))

Crystal diffraction and the reciprocal lattice, Lattice vibrations, Thermal properties, Free electron Fermi gas, Band theory, Semi-conductors, Fermi surfaces.

PHYS 3061(5) - MEDICAL PHYSICS (PR: A-LEVEL PHYSICS)

Aspects of dosimetry, nuclear medicine, radiotherapy, medical instrumentation, ultrasound, magnetic resonance imaging and radiology.

PHYS 3071(5) - NUCLEAR & ELEMENTARY PARTICLE PHYSICS II (PQ: PHYS 3111(5))

Theories of alpha, beta & gamma decay. Nuclear reactions. Fission and fusion reactors. Controlled fusion. Fusion processes inside stars. Feynman diagrams. Conservation laws. Klein-Gordon & Dirac equations. Parity violation. CPT invariances. Group theory: U(1), SU(2) and SU(3) symmetries.

Gauge theories. Quantum Electrodynamics (QED), Electroweak model. Introduction to Quantum Chromodynamics (QCD) Introduction to Grand Unified Theories (GUTs).

PHYS 3081(5) - QUANTUM ELECTRONICS (PQ: PHYS 2111(3) & PHYS 2211(3))

Interaction of radiation and atomic systems, Laser-Physics, Non-linear optics, Parametric oscillation, Electro-modulation, Interaction of light with sound, Phase conjugation, Two-laser applications.

PHYS 3111(5) - NUCLEAR & ELEMENTARY PARTICLE PHYSICS I (PQ: PHYS 2211(3))

Nuclear structure and size. Binding energy and semi-empirical mass formulae. Nuclear forces and nuclear models. Radioactivity (natural and artificial). Fission and fusion.

The Standard Model. Leptons, quarks, hadrons and gauge bosons. Strong, Electromagnetic and Weak interactions and transmission. Particle properties and quantum numbers. Conservation laws in particle physics. Introduction to Feynman diagrams.

PHYS 3121(5) - ATOMIC & MOLECULAR PHYSICS (PQ: PHYS 1211(1) & PHYS 2211(3))
Review of Bohr's theory - observations in support of the theory, its limitations. QM approach for spinless one-electron atoms. The Stern Gerlach expt - Space quantisation and the electron spin. Spin effects in one electron atoms. Many electron atoms. The periodic table. The Zeeman Effect. Molecular Spectra.

PHYS 3211(5) - PHYSICS PROBLEM PAPER (PQ: YEAR I AND YEAR II CORE MODULES)
This paper will consist of problems on material drawn from the core modules normally covered in the first two years of the course. The comprehensive nature of the paper will aim at assessing the general understanding of physical principles and their applications.

SCI 1010(1) - COMPUTING ENVIRONMENTS & TOOLS FOR SCIENTIFIC REPORTING
Introduction to Windows, Linux and Internet. Word processing: Document Layout – Outlining, Templates, Wizards, and Add-Ins. Streamlining Formatting with Styles, Automating Processes, Master Documents - Control and Share Large Documents. Spreadsheets: Creating a spreadsheet. Importing data into a spreadsheet, Sorting and Linking data in a spreadsheet. Formatting. Use of Excel Macros, reference and mathematical functions, statistical and database functions. Customising charts. Sharing and protecting spreadsheets. Technical Writing and Presentations.