Faculty of Technology, University of Colombo

Intensive Course – Basic Science Courses - Year 2020

Date and Time Allocated	Course Content & Instructors' Name			
	Mathematics	**Physics**	**Chemistry**	**Biology**
18th May - 2 h	**Quadratics** *(Mr. Chanaka Galpaya)*	**Measurement & Mechanics** *(Ms. Ganga Ruwandi)*	**Fundamentals of Chemistry** *(Dr. S.M. Young, Ms. Nilushi Perera)*	**The Evolutionary History of Biological Diversity** *(Dr. Aruna Kumara Udawasala)*

	• Solution of Quadratic Equations
	• Method of completing the square
	• Nature of roots of Quadratic Equations
		Measurement:
		• Fundamental/Base Quantities and Their Units
		• Supplementary Quantities and Their Units
		• Derived Quantities and Their Units
		• Dimensional Analysis
		• Uses of Dimensional Analysis
		• Converting Units
		• Prefixes for SI Units
		
		Motion along a straight line (one dimension):
		• Position & Displacement
		• Average Velocity & Average Speed
		• Acceleration
		• Straight Line Motion
		• Free Fall Acceleration
		• Graphs of Motion
		
		Vectors:
		• Co-ordinate Systems
		• Scalar and Vector Quantities
		• Resolving a Vector
		
		Motion in two dimensions:
		• Projectile Motion
		
		Force & Motion:
		• Newton's Laws
		
		Work, Power, & Energy:
		• Work
		• Power
		• Energy
		  ○ Kinetic Energy
		  ○ Potential Energy
		  ○ Conservation of Energy
			Atomic and Molecular Perspective, Elements, compounds and mixtures. Bonding, The Atomic Theory, The Structure of the Atom, Atomic Number and Mass Number, Isotopes, Radioactive elements, Molecules and Ions	What is biology? Characteristics of life Organization of life
				
				Organizing and arranging living organisms into a classification system Kingdom, Phylum, Class, Order, Family, Genus, Species

19th May - 2 h			**Inorganic Chemistry** *(Dr. S.M. Young, Ms. Nilushi Perera)* Introduce the periodic table and its properties Ionization energies and its principles	Classification of life -The 5 Kingdom Classification System l. Kingdom Monera Bacteria, Blue-green algae 2. Kingdom Protista Algae, Protozoa 3. Kingdom Fungi Slime molds, True fungi 4.Kingdom Plantae (Metapbyta) 5.Kingdom Animalia (Metazoa)
20th May - 2 h	**Trigonometry** *(Mr. Suresh Nonis)* • State the relationship between radian and degree • Solves problems involving arc length and area of a circular sector • Define trigonometric ratios using the Cartesian coordinate system		**Organic Chemistry** *(Dr. Kosala Sirisena, Ms. Punya Lakmini)* Introduction to Organic Chemistry, Hydrocarbons and other organic compounds (containing N, P, S, O)	**Cell and Cell Biology** *(Dr. Priyanga Kariyawasam)* • What is cell biology? • What is a cell? • Cell theory • Prokaryotic and eukaryotic cells • Animal and plant cell • Cell structure • Cellular organelles • Function

21st May - 2 h	• Derives values of basic trigonometric functions at commonly used angles • States the sign of basic trigonometric function of θ in each quadrant • States Sine rule and Cosine rule • Obtains Pythagorean Identities and Solves problems involving Pythagorean Identities • Solves trigonometric problems using sum formulae and difference formulae • Solves trigonometric problems using product- sum and sum-product formulae • Solves trigonometric problems using double angles, triple angles and half angles formulae		**Organic Chemistry** *(Dr. Kosala Sirisena, Ms. Punya Lakmini)* Chemical Boding in Organic Compounds, Open Chains and Cyclic Compounds, Functional groups: hydroxyl, methyl, carbonyl, carboxyl, amino, phosphate, and sulfhydryl, Introduction to Biochemistry: Carbohydrates, Proteins, Lipids, Nucleic Acids	
22nd May - 2 h **25th May - 2 h**	**Differentiation** *(Mr. Chanaka Galpaya)* • Intuitive idea of a limit • Theorems on limits • The derivative • The derivative of x^n • Theorems on differentiation	**Introduction to Electricity & Magnetism** *(Ms. Irann Chamika)* • Electrostatic force • Electric field • Electric flux • Introduction to Gauss law • Electric potential • Capacitance • Current • Circuits • Magnetic field • Force on a moving charge in a magnetic field • Motion of a charged particle in a magnetic field • Force on current carrying wire in a magnetic field • Torque on a current loop in a magnetic field	**Analytical Chemistry** *(Dr. Poorna Piyathilake, Ms. Manasee Weerarathunga)* Basic Calculations Used in Analytical Chemistry Units of Measurements Used in Chemistry, International System of Units (SI System), Derived units and their prefixes, Mass vs. Weight, The mole Concept, Concentrations of Solutions, Different Measures of Concentration Basic Calculations Used in Analytical Chemistry Density and Specific Gravity of Solutions, Solution Preparation, Dilution of Stock Solutions, Serial Dilution Molecular Formulae, Empirical Formulae, Chemical Stoichiometry, Stoichiometric Calculations	**The Chemistry of Life** *(Dr. Kanchana Abeysekera)* What are macromolecules? Composition, structure and the function • Carbohydrates • Protein • Lipids • Nucleic acid

Date	Integration	Electronics	Physical Chemistry	Cell Cycle and Cellular Metabolism
26th May - 2 h			**Physical Chemistry** *(Dr. Chamini Hemachandara, Ms. Thilini Dikella)*	**Cell Cycle and Cellular Metabolism** *(Dr. Jayani Wewalwela)*
			Behavior of substances which exist in the gaseous phase, Gas laws: Ideal gas and ideal gas equation, Boyle law, Charles law, Avogadro law, Combined gas law Molar volume	- Cell cycle and cell division - Photosynthesis - Cellular respiration - Transpiration
27th May - 2 h	**Integration** *(Mr. Suresh Nonis)*	**Electronics** *(Mr. Viduravi Dassanayake)*	**Physical Chemistry** *(Dr. Chamini Hemachandara, Ms. Thilini Dikella)*	
28th May - 2 h **29th May - 2 h**	- Simple introduction about the integration - Deduces indefinite integral using anti-derivatives - Integrates rational functions using appropriate methods. $\frac{f'(x)}{f(x)}$; where f ′(x) is the derivative of f (x) with respect to x - Uses the method of substitution for integration	Analog Electronics: - Diodes, rectifier circuits, special diode types - Bipolar transistors, transistor characteristics - Introduction to feedback amplifiers, inverting, and non-inverting amplifiers Digital Electronics: - Basic logic gates, introduction to logic families - Designing of combinational logic circuits - Minimization of logic expressions using algebraic method	Introduction to kinetics and reactions, Rate of a reaction, Factors affecting the rate of a reaction, Rate Laws and reaction orders, Half-life of a reaction, Introduction to Thermodynamics	

Department of Information and Communication Technology
Faculty of Technology, University of Colombo

Intensive Course - ICT - Year 2020

Date and Time Allocated	Course Content & Lecture's Name
	Information and Communication Technology
18th May - 2 h	**Introduction to Computer** *(Dr. Rohan Samarasinghe)*
	Fundamentals of a computer system - Evolution of the computer systems - Classification of the computers - Parts of the computer systems Hardware of the computers - Input and output devices - Processors and its different types - Memory and its usage (RAM and ROM) - How to evaluate the performance of the computers Software of the computers - What is system software? Explain the different types of operating systems - What is application software and explain different type of application software - Explain the utility programs and its usages - Explain how to customize the operating system settings - Different services provided by the operating system Introduction of the Computer Networks - Use of the computer Network - Different between internet and the Internet - What is Internet protocol and IP address - Explain the World Wide Web (www) - What is Unified Resources Locator (URL) - The connection between IP address and URL ICT in Different Sectors - Government - Education - Business - Transport - Banking and share market - Entertainment - Social security.
19th May - 2 h	**Online Learning : A Guide For Students** *(Mr. Navod Thilakarathne)*
	- Usage of LMS and its features - Understand how online learning works - How effectively study online
20th May - 2 h	**Internet and Online Communication for Academic Activities** *(Ms. N T Weerawarna)*

	Internet and online communication for academic activities • Guidelines for secure usage of internet • Usage of email communication • Usage of advance search features for academic activities • Organizing and managing data • Online resources for academic works • Tools and technologies for effective academic works
26ᵗʰ May - 2 h	**Introduction to Word Processing** *(Dr. Rohan Samarasinghe)*
	Introduction to word Processing • Basic introduction • Different software types for word processing Explore the Office 365 • Introduction to Office 365 • Explain the features • Working with the User Interface • Explain the one drive and how to use it • Getting help with office 365. Creating a new Word document • Opening, Saving, Printing and Closing documents • Starting with the new blank document • Working on page setup • Writing on a document • Modify the appearance of text • Simple formatting • Create a table of content • Insert the different number types for different pages. Working on Pictures and Graphics • How to insert a picture • Doing adjustment for a picture • Cross reference to characters and pictures • How to insert a clip art, smart art, Excel chart • Apply image captions Working on tables • How to insert a table • Adding, deleting a column and row • Apply table caption Proofreading • How to apply spell and grammar checking • How to review the document and insert a comment on the document Insert the citation and Reference to the research document • Download the Mendeley to your computer and install it. • Use of Mendeley and create the folders and copy the reference documents to that folder • How to insert citations to the research document and insert to the Bibliography List.
27ᵗʰ May - 2 h	**Introduction to Spreadsheet (Microsoft Excel)** *(Mr. Navod Thilakarathne)*
	Introduction to Electronic Spreadsheet • Basic introduction about the spreadsheets and its menus • Row, column, cell and address of the cell • Working with user interface • Getting help from office 365 Working with worksheet and workbook • Opening, saving and renaming worksheet

- Cell reference and formatting the cell or worksheet
- Entering the data to the cell and editing the data
- Insert row, column to the worksheet

Formula Creation and math function
- Explain how to use inbuilt functions
- Simple calculations using values and mathematical operators
- Formulas with cell addresses and operators
- Use of functions to do calculations

Cell for different requirement
- Working with formatting tools Ribbon
- Use of dialog boxes to format values
- Adjusting row height/column width
- Formatting a range of cells
- Locking Cells and Hiding Formulas

Relative and absolute cell references
- Use of fill handle for copying formula
- Understand the Difference Between Relative and Absolute References
- Relative cell reference
- Row absolute cell references
- Column absolute cell references
- Row and column absolute cell references

Visualize the data
- Explain different types of graphs and charts in excel
- Using the dataset create charts and graphs
- Format the charts and graphs

Setting up pages
- How to import the charts and graphs to word document or PowerPoint slide
- Adding title rows/columns and headers/footers
- Freeze Panes
- Page Breaks & Page Setup
- Print Preview
- Workbook Protection.

28th May - 2 h	**Introduction to Electronic Presentation**
	(Ms. Sherina Sally)

Introduction to electronic presentation
- What is meant by presentation?
- Benefits of electronic presentation

Electronic presentation Software
- Common features of electronic presentation software
- Popular presentation software

Create electronic presentation
- Create a new presentation, insert a title slide and new slides
- Different layouts and themes
- Save your presentation
- Create a bullet list and number list
- Animate the contents of the slides
- Create charts and add shapes in your presentation
- Add SmartArt and import images to the slide
- Insert video clips
- Different views in a presentation
- Print the hand-outs from the presentation

Features of a good presentation
- Guidelines on creating an effective presentation