



UNIVERSITY
of
TECHNOLOGY,
MAURITIUS

**School of Innovative Technologies and Engineering
and
School of Health Sciences**

Certificate in Science and Technology

PROGRAMME DOCUMENT

VERSION V1.0

CST 1.0

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University of Technology, Mauritius

La Tour Koenig, Pointe aux Sables 11134, Mauritius

Tel: (230) 207 5250 Fax: (230) 234 1747 Email: site@umail.utm.ac.mu

website: www.utm.ac.mu

CERTIFICATE IN SCIENCE AND TECHNOLOGY

B. PROGRAMME INFORMATION

This programme is a one-year university level certificate is designed for school leavers who need entrance or additional credits for entry into specific degrees offered at the University. This certificate will also appeal to those who wish to further extend their knowledge and technical skills while at the same time experience university life.

The unit related to Information Technology will provide students with a broad understanding of computer applications and associated hardware. Students will also learn about simple computer programming in the popular VB.NET. This course will also draw upon the fundamentals of various science disciplines such as biology, chemistry, physics, mathematics and electronics to familiarize students with the University's electronic and science laboratory facilities.

B. PROGRAMME AIMS

The Certificate in Science and Technology (CST) aims to provide students a foundation upon which they can build a successful career. Students will be given the opportunity to study specific subjects at foundation level, develop technical and soft skillsets and gain hands-on practical experience that will assist them to embark on an undergraduate degree in areas related to science or computer information technology.

Undergraduate Programme Enrolment Prospects

Upon successful completion of this course, students will be presented with the opportunity to enroll in an undergraduate degree offered at the University such as, but not limited to: BSc (Hons) Software Engineering, BSc (Hons) Computer Science with Network Security, BSc (Hons) Mathematics, BSc (Hons) Environmental and Public Health amongst others.

C. PROGRAMME OBJECTIVES

After successful completion of the Certificate programme, the students will have

- gained access to the first level of a university degree programme
- improved their reading, writing, listening and speaking skills in English Language
- achieved the knowledge and understanding of mathematical, scientific and engineering principles
- achieved the understanding of different mathematical and statistical tools
- developed the ability to improve their presentation skills
- the ability to create and develop a computer application using the latest technology
- achieved theoretical and practical knowledge in chemistry, biology and physics which will be supported by practical components.

PART I REGULATIONS

D. GENERAL ENTRY REQUIREMENTS

As per UTM'S Admission Regulations, and 'Admission to Certificate and Diploma'.

E. PROGRAMME ENTRY REQUIREMENTS

None

F. PROGRAMME MODE AND DURATION

Full Time: Minimum 1 year (2 semesters) and Maximum 3 years (6 semesters)

Part Time: Minimum 1½ years (3 semesters) and Maximum 3½ years (7 semesters)

G. TEACHING AND LEARNING STRATEGIES

- Lectures, Tutorials and Practical
- Class Tests and Assignments
- Laboratory Sessions
- Structured Discussions & Self Development Study
- Case Study Materials & Scenarios

H. STUDENT SUPPORT AND GUIDANCE

Each cohort of the programme is allocated a Programme coordinator who acts as a liaison between the students and school management and provides support for academic management of the programme.

I. ATTENDANCE REQUIREMENTS

As per UTM's Regulations and Policy.

J. CREDIT SYSTEM

1 Credit = 15 hours of Lecture (L)

1 Credit = 30 hours of Practical (P)/Tutorials (T)/Self Development (SD) activities

Total Credit = 34

K. STUDENT PROGRESS AND ASSESSMENT

The programme is delivered through lectures and seminars, and practical sessions in Chemistry, Biology and Information Technology. Self-study or self-development is also important and will include reading, designing and preparing presentations, academic tutoring and writing reports.

The credit structure is defined as follows:

1. Three-credit modules consist of 45 contact hours and 15 additional hours of self-development activities
2. Four-credit modules consist of 60 contact hours and 30 additional hours of self-development activities
3. One six-credit yearly module consists of 45 contact hours and 15 additional hours of self-development activities per semester
4. One eight-credit yearly module consists of 60 contact hours and 30 additional hours of self-development activities per semester.

For the award of the Certificate, all modules must be passed overall with passes in the examinations, coursework and other forms of assessment. Each module carries 100 marks and unless otherwise specified will be assessed as follows:

1. Written and/or practical examination, and continuous assessment carrying up to 50% of total marks
2. The yearly module "Computer Applications" will be assessed by 100% coursework. The coursework must consist of at least one class test and two assignments
3. The continuous assessment for the yearly module "Physics" will carry a weightage of 50%. The coursework must consist of at least one class test and one assignment
4. The continuous assessment for all four-credit modules will carry a weightage varying between 40% and 50%. The coursework must consist of at least one class test and one assignment
5. The continuous assessment for all three-credit modules will carry a weightage of 30%. The coursework must consist of at least one class test and one assignment.

GRADING

Grade	Marks x(%)
A	$x \geq 70$
B	$60 \leq x < 70$
C	$50 \leq x < 60$
D	$40 \leq x < 50$
F	$x < 40$
A - D	Pass
F	Fail

L. EVALUATION OF PERFORMANCE

The % mark at Level 1 contributes a 100% weighting towards the certificate Level 1 classification.

M. AWARD CLASSIFICATION

Overall weighted mark y (%)	Classification
$y \geq 70$	Distinction
$40 \leq y < 70$	Pass
$y < 40$	No Award

N. PROGRAMME ORGANISATION AND MANAGEMENT

Programme Design Committee: Mr Hansraj Seegobin (SITE), Dr. Vinaye Armoogum (SITE), Dr N. Jaypaul (SHS), Dr Yirajen Vuddamalay (SHS), Dr Meera Jhoti Somanah-Bhugowandeen (SHS), Dr Sameer Sunhaloo (SITE), Mr J. Narsoo (SITE) and Mr Dudley Tse (SITE)

Programme Director: Mr Hansraj Seegobin

Contact Details : Tel: 207-5250 Fax: 234-1767

Email: hseegobin@umail.utm.ac.mu

PART II

O. PROGRAMME STRUCTURE (Full-Time)

CERTIFICATE IN SCIENCE AND TECHNOLOGY

YEAR 1 (Level 1 – 34 Credits)							
Semester 1				Semester 2			
Code	Modules	Hrs/Wk L T/P/SD	Credits	Code	Modules	Hrs/Wk L T/P/SD	Credits
CST1101	Mathematics with Statistics I	2 + 2	3	CST1106	Mathematics with Statistics II	2 + 2	3
CST1102	Proficiency in English Language	2 + 2	3	CST1107	Soft skills Essentials	2 + 2	3
CST1103	Physics (Yearly module)	2 + 2	-	CST1103	Physics (Yearly module)	2 + 2	6*
CST1104	Fundamentals in Chemistry	2 + 4	4	CST1108	Fundamentals in Biology	2 + 4	4
CST1105	Computer applications (Yearly module)	2 + 4	-	CST1105	Computer applications (Yearly module)	2 + 4	8*

* Credits are earned at the end of Semester 2.

P. PROGRAMME STRUCTURE (Part-Time)

CERTIFICATE IN SCIENCE AND TECHNOLOGY

YEAR 1 (Level 1)							
Semester 1				Semester 2			
Code	Modules	Hrs/Wk L T/P/SD	Credits	Code	Modules	Hrs/Wk L T/P/SD	Credits
CST1101	Mathematics with Statistics I	2 + 2	3	CST1106	Mathematics with Statistics II	2 + 2	3
CST1102	Proficiency in English Language	2 + 2	3	CST1107	Soft skills Essentials	2 + 2	3
CST1105	Computer applications (Yearly module)	2 + 4	-	CST1105	Computer applications (Yearly module)	2 + 4	8*
CST1104	Fundamentals in Chemistry	2 + 4	4	CST1103	Physics (Yearly module)	2 + 2	-

YEAR 2 (Level 1)							
Semester 3							
Code	Modules	Hrs/Wk L T/P/SD	Credits				
CST1103	Physics (Yearly module)	2 + 2	6*				
CST1108	Fundamentals in Biology	2 + 4	4				
End of Level 1 →							

* Credits are earned at the end of Semester 2 and Semester 3.

Q. MODULE OUTLINE

CST1101: MATHEMATICS WITH STATISTICS I (2+1+1) - SEMESTER MODULE

Quadratics: completing the square, discriminant, solving equations and inequalities; Indices and Surds; Set: set language & notation and Venn diagrams; Functions: domain, range, one-to-one function and inverse & composite functions; Coordinate Geometry: length, mid-point & gradient of a line segment and parallel & perpendicular lines; Polynomials: remainder & factor theorems and solving polynomials of degree not exceeding four; Circular Measure: radians & degrees, length of arc and area of sector; Trigonometry: trigonometric & inverse trigonometric functions, trigonometric identities and double-angle formulae; Exponential and Logarithmic functions; Series: binomial expansion, arithmetic & geometric series and sum to infinity; Differentiation: gradient of a curve, derivatives of polynomials, exponential, logarithmic, trigonometric & inverse trigonometric functions, product & quotient rules, tangents & normals, increasing & decreasing functions, rates of change and locate & classify stationary points. Permutations and Combinations: solving simple arrangement and selection problems; Probability: evaluate probabilities, exclusive & independent events, conditional probabilities and tree diagram.

CST1102: PROFICIENCY IN ENGLISH LANGUAGE (2+1+1) - SEMESTER MODULE

Reading skills: reading and comprehending contemporary articles, reports and publications; Interpreting writer's viewpoint, Identifying genre, tone and attitude in written text, finding evidence to support written arguments, techniques to increase reading rate; Writing skills: grammar rules, vocabulary: synonyms, antonyms, dictionary use, prefixes, basic punctuation, composing paragraphs for essays, summary or reports using researched evidence, different forms of written communication, techniques for note-making; Listening skills: active and passive listening, Identifying main ideas and details, Interpreting tone and attitude, techniques for note-taking; Speaking skills: pronunciation, expressing emotion through voice control: tone, rate, clarity, volume, pause, presentation skills, defending opinions, interviewing, role-play

CST1103: PHYSICS (2+1+1) - YEARLY MODULE

Kinematics, Newton's Law of Motion, Motion and Forces in two dimension, Momentum, Work Energy Power, Circular Motion, Static Electricity. Wave Motion, Sound Waves, Stationary Waves, Doppler Effect, The wave nature of light, Diffraction of Light Waves, Polarization of Light, Lenses, Current of Electricity, The Wheatstone Bridge and Potentiometer, Capacitors, Alternating Current, Charge in Electric and Magnetic Fields, Magnetic Effect of a current. Analogue and Digital electronics fundamentals, electronic components, resistors, diodes, amplifiers, Numbers and Character Systems, Combinational Logic basics, Binary Logic, Logic functions fundamentals (AND, OR, NOT gates), Truth table, Boolean algebra.

CST1104: FUNDAMENTALS IN CHEMISTRY (2+2+2) - SEMESTER MODULE

Atoms, molecules and sub-atomic particles, stoichiometry in physical chemistry, introduction to electrochemistry, reaction kinetics, chemical bonds, The periodic table and its major groups, basic concepts in organic chemistry, major organic compounds, synthesis of organic compounds, polymers, analytical techniques in chemistry, Practical will include: basic laboratory skills, preparing chemical solutions and compounds, titration, rate of reaction measurements analysis of inorganic and organic compounds, chromatography, distillation, filtration, purification.

CST1105: COMPUTER APPLICATIONS (2+2+2) - YEARLY MODULE

Overview of Visual Studio Integrated Environment, working with Toolbox Controls (Menus, Toolbars and Dialog Boxes), Data Types, Variables and Constants, Operators, Using Decision Structures, Loops and Timers, Working with Arrays and Collections, Exception Handling, Creating Modules and Sub Procedures, Creating Function and Procedures, Managing Windows Forms and Controls, Working with Graphics and Animation Effects, Database Connectivity to develop Desktop or Web Application.

CST1106: MATHEMATICS WITH STATISTICS II (2+1+1) - SEMESTER MODULE

Vectors: algebraic manipulation, unit vectors, magnitude of a vector, dot product and angle between two vectors; Matrices: algebraic manipulation, zero & identity matrices, determinant and inverse of matrices of order two; Algebra: the modulus function and partial fractions; Integration: evaluation of simple integrals, use integration by parts to evaluate integrals involving trigonometric, exponential & logarithmic functions, area under curve, volume of revolution and trapezium rule; Complex numbers: algebraic manipulations, Argand diagram, polar form, square roots of complex numbers and loci; Differential equations: method of separation of variables for solving linear first order differential equations and particular solution; Representation of data: raw data representation, stem-and-leaf diagrams, box-and-whisker diagram, histograms and cumulative frequency curves; Discrete Random Variables: probability distribution, binomial distribution and expectation & variance; Continuous random variables: normal distribution and approximating binomial distribution using normal distribution.

CST1107: SOFT SKILLS ESSENTIALS (2+1+1) - SEMESTER MODULE

Definition and importance of soft skills and professionalism, Emotional intelligence, Learned vs. inborn traits, Verbal and non-verbal communication skills: presentation skills, active listening, body language, Team-building, Leadership management and mentoring, Professional attitudes and work ethics, Time management: multi-tasking, planning, prioritizing jobs, Problem-solving and conflict resolution, Stress management, Business etiquette: business writing skills, phone and email etiquette, use of social media, interviewing skills

CST1108: FUNDAMENTALS IN BIOLOGY (2+2+2) - SEMESTER MODULE

Cell structures and their functions, proteins, carbohydrates and lipids, cell division, DNA replication, protein synthesis, immunology and infectious diseases, evolution, cellular respiration, the circulatory system, gas exchange in mammals, components of environmental management, introduction to environmental and public health, introduction to marine sciences, Practical will include: basic laboratory skills, use of light microscope, photomicrographs, observable features of cells, measuring protein concentration, ethanol emulsion test, non-reducing sugar test, investigating the energy content of food, blood smear examination, DNA extraction, building a respirometer.

***** END OF PROGRAMME DOCUMENT *****