CURRICULUM FRAMEWORK

TECHNOLOGY EDUCATION
FOR
GRADES 10-11 (TE)
AT
SECONDARY SCHOOL LEVEL

October 2023

Mauritius Institute of Education
under the aegis of
Ministry of Education, Tertiary Education, Science and Technology

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TECHNOLOGY EDUCATION FOR GRADES 10-11 (TE) AT SECONDARY SCHOOL LEVEL

Director, MIE: Dr Hemant Bessoondyal
Project Coordinator: Dr Navin Hurreeram
Assistant Project Coordinator: Dr Shakeel Atchia

Core Writing Team:
Dr Navin Hurreeram (Lead)
Dr Shakeel Atchia (Lead)
Dr Rajendra Korlapu-Bungaree
Dr Roodradeo Beefun

Contributors, MIE:
Dr Aruna Ankiah-Gangadeen
Ms Aartee Jodheea
Mrs Ashwina Engutsamy-Borthosow
Mr B. Dhuneshswaraj Narayen
Mrs Bibi Swalehah Beebeejaun-Roojee
Ms Joann Permall
Dr Khemanand Moheeput
Mr Kaviraj Goodoory
Mr Kaviraj Sharma Peedoly
Dr Khemduth Singh Angateeah
Mrs Majhegy Murden-Louise
Mrs Malini Callimootoo-Jeewon
Mrs Mridula Beeharry
Mrs Poonam Hemraj
Mr Ravindra Ramsamy
Mr Shailendra Ramsaha
Mr Sheik Mohammad Ismut Belath
Dr Sooryadev Purdasseea
Dr Vandana Tulsidas Veeraragoo
Mr Vickren Narrainsawmy
Dr Vishnee Bissonauth
Dr Wesley Marie

Contributors, other institutions:
Mauritius Examinations Syndicate
Polytechnics Mauritius Ltd
University of Mauritius
Mauritius Qualifications Authority

Consultancy:
British Council
Professor Bonita Watt, University of Alberta

Graphic Design:
Mr Kunal Sumbhoo
mie graphic section

REPUBLIC OF MAURITIUS

Ministry of Education, Tertiary Education, Science and Technology

Foreword

One of the unalterable facts about education is that every era conditions the type that best fits its context. Context itself is critical in education because it provides meaning to everything we learn. It makes for an education that is tailored to the specific needs of the time period and the society in which it operates. This makes of education a dynamic rather than a static concept, one that is flexible enough to adapt to ever-pressing changes over time.

Our educational reform agenda, steadfast in its promise, has been instrumental in shaping a national education system that is not only quality-driven but also responsive to the dynamic needs of our society and our learners. In fact, the accelerated evolution in our socio-economic landscape underscores the urgency to increase the relevance and effectiveness of education.

It is thus crucial, in the post -nine year-basic- education phase, to offer our students multiple educational pathways, enabling them to keep their learning options open and ensuring their sustained engagement in a dynamic learning environment.

The introduction of Technology Education, commencing in January 2024, initially, ten secondary schools, marks a significant milestone in our journey. This initiative reflects our dedication to aligning our educational framework with the evolving learning preferences, styles, and needs of the Mauritian youth, while simultaneously equipping them with skills and knowledge that are highly valued both locally and internationally.

As we all know by now, Technology Education, will lead to a National School Certificate awarded by the University of Mauritius and pitched at level 3 on the National Qualifications Framework. The Technology Education pathway will co-exist with the traditional pathways leading to SC Cambridge Examinations but offer an alternative to these.

I am therefore pleased to present this new Curriculum Framework that will guide the teaching and learning of Technology Education in our schools at grades 10 and 11 and support the development of the knowledge, skills, and competencies that our students need to succeed in the 21st century.

Seamlessly aligned with globally recognised educational goals and targets, this Framework demonstrates our ability to develop and implement a curriculum that is home grown, yet informed and supported by international expertise.

This curriculum of high standard, innovatively hands-on and competency-based, is a blueprint for the future, a future where every Mauritian learner is empowered, inspired, and prepared to contribute positively to the socio-economic development of our nation.

Hon. Mrs. Leela Devi DOOKUN LUCHOOMUN, GCSK, FRSB
Vice Prime Minister
Minister of Education, Tertiary Education, Science & Technology

Mauritius Institute of Education

Foreword

Technology now permeates the world of today, and future citizens require the necessary knowledge, skills, and dispositions to be able to integrate in such a world. The world in which our future citizens will be living will require revisiting our understanding of employment, with a workforce that is adaptable and innovative. It is becoming increasingly apparent that there cannot be a one-box-fits-all solution when it comes to Education, and it is imperative that our education system adapts to prepare learners for the challenges and opportunities of this dynamic era.

With this vision in mind, we are pleased to present the 'Technology Education for Grades 10-11 (TE)' Curriculum Framework, which has been designed to empower learners with the knowledge, skills, and mindset necessary to thrive in a world where technological advancements are reshaping industries, economies, and societies. It is a curriculum that promotes the acquisition of technical knowledge and skills while fostering a spirit of curiosity, critical thinking, and creativity, where students learn to adapt and innovate to meet the complexities of the digital age with integrity and learn to contribute meaningfully to the world they live in.

Through the palette of subjects and clusters offered, this curriculum seeks to address the diverse needs, interest, and aspirations of individual learners and prepare them for further studies or an eventual entry into the workplace. It encourages learners to explore the connections between technology and other fields of study, promoting a well-rounded understanding of the broader implications of their chosen career path. This curriculum document thus represents a commitment to equipping our learners with the tools they need to shape the future.

The development of this curriculum has been a collaborative effort, involving educators, industry experts, policymakers, and the broader community. Their insights, expertise, and passion have enriched the framework, ensuring its relevance and effectiveness.

I wish to thank all those who have been involved in the production of this document and place on record my deep appreciation for the work accomplished.

Dr. Hemant BESSOONDYAL
Director
Mauritius Institute of Education

Mauritius Institute of Education

Foreword

In a world of technological advancements and dynamic shifts in the global economic landscape, it is imperative that the Mauritian education system evolves to equip students with competencies needed in the world of work.

The 'Grade 10/11 Technology Education (TE) programme', which embodies a visionary approach to education, is aligned to the contemporary demands of our society. The programme marks a significant milestone in our collaborative commitment to prepare students to face current and future challenges, especially the challenges of the modern professional landscape. It aims to broaden students' access to a diverse array of disciplines and to nurture the necessary human capital capable of leading and thriving in established as well as emerging economic sectors.

This Curriculum Framework (CF) articulates the educational philosophy underpinning the TE programme. The CF provides the necessary frame that guides curriculum development, mobilisation of resources, pedagogical practices, and assessment methodologies, that are underpinned by the competency-based approach. This approach ensures that the teaching and learning process is dynamic, inclusive, meaningful, and reflective of real-world demands. Through this curriculum, a rich tapestry of competencies will be cultivated to transform students into creative and innovative problem solvers, critical thinkers, effective communicators, and leaders in their respective disciplines.

We acknowledge the significant contribution of all collaborators involved in the development of this CF. As we embark on this educational journey, let this curriculum framework, which provides the roadmap to competency development, stand as a testament to our commitment to nurturing a generation of learners who are not only academically adept but also socially conscious, technologically skilled, and poised to shape the future.

Dr. Navin HURREERAM (Coordinator) and
Dr. Shakeel ATCHIA (Assistant coordinator)
Mauritius Institute of Education

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1.0 Preamble

This document articulates the policy and philosophy for a Technology Education (TE) curriculum for Grades 10-11 in view of widening access to a larger variety of courses at this level of study. By the same means, this curriculum will serve the needs of the Republic by developing its human capital to lead and operate existing and emerging economic sectors. This document thus sets the expectations for the Technology Education courses for Grades 10-11.

The expected goals to be achieved at the end of Grade 11 schooling are formulated to direct the outcomes of curriculum development and teaching. The document also comprises the rationale of this programme of study, the pedagogical principles to be adopted, assessment principles and tools to be considered along with the infrastructural, material and human resources to be deployed. As this programme of study relates to life beyond school premises and experiences, the role of stakeholders and community partners as important resources for schools and students are highlighted as well.

2.0 Context: current schooling system and provision for Grades 10-11

The targets of the current education system in Mauritius, namely the 'Nine Year Continuous Basic Education' (NYCBE), are in line with international and regional goals and initiatives, such as the World Declaration on Education for All (Jomtien, 1990; Dakar, 2000), the Salamanca Statement and Framework for Action on Special Needs Education (Salamanca, 1994), the Convention on the Rights of Persons with Disabilities (UN, 2007), Reaching Out All (ROA) initiatives, and the Sustainable Development Goals (SDGs), particularly the SDG4, which ensures inclusive and equitable quality education and promote lifelong learning opportunities for all.

The main objectives of the NYCBE are to (i) promote the holistic and integral development of learners, (ii) provide learning opportunities to all students for high levels of achievement commensurate with their abilities and strengths, (iii) inculcate in learners a set of values and sense of moral responsibility, and belonging to the country, (iv) equip all students with knowledge, foundational skills and attitudes for future learning, (v) achieve a smooth transition to and completion of secondary education, and (vi) give greater recognition to Technical and Vocational Education and Training (TVET) in building human capital for transforming the economy into one which is knowledge-based and skills-driven. The National Curriculum Framework (NCF) for NYCBE (2015), NCF for Primary Education Grade 1-6 (2015) and the NCF for lower secondary education Grade 7-9 (2016), were designed and developed to guide the implementation of the NYCBE reform targeting the transformation of these objectives into action.

The current education structure, as depicted in Figure 1, consists of four cycles, namely:

(i) the early childhood development and education which lasts for two years targeting students of three to four years old, (ii) the nine years of basic continuous education for students aged five to fourteen, (iii) the post Basic Education (Upper Secondary) for fourteen to eighteen years old students and (iv) the postsecondary and Higher education (above 18 years).

The nine years education is divided into six years of primary schooling that ends with the 'Primary School Achievement Certificate' (PSAC) assessment and three or four (extended stream) additional years at lower secondary ending with the 'National Certificate of Examination' (NCE) which serves as a selection and promotion exercise. Beyond the compulsory nine years of basic schooling, students currently have the choice to pursue the general academic pathway to complete the Cambridge 'O' and 'A' levels certificates or to follow vocational programme in specialised Vocational Schools.

However, it should be noted that though the current NYCBE reform provides the necessary structure for a child to move from one educational level to another as illustrated in Figure 1, the progression of students beyond grade 9, which marks the end of the nine years of continuous basic education, remains too academic. Despite the option to move into vocational education, most Mauritian students who have successfully completed the NCE opt for the Cambridge O-Level certificate, which represents mainly an academic pathway loaded with mainly theoretical content knowledge. It is in this line that the 'Technology Education for Secondary Schools (Grades 10-11)' (TE) is being conceptualised as an alternative pathway beyond Grade 9, as shown in Figure 1. The aim of TE is to provide students with an education which is largely competency and skills-driven to prepare students for the industry and develops the necessary competencies needed by citizens to meet current and future technology-based challenges.

PATHWAYS TO HIGHER EDUCATION & EMPLOYABILITY

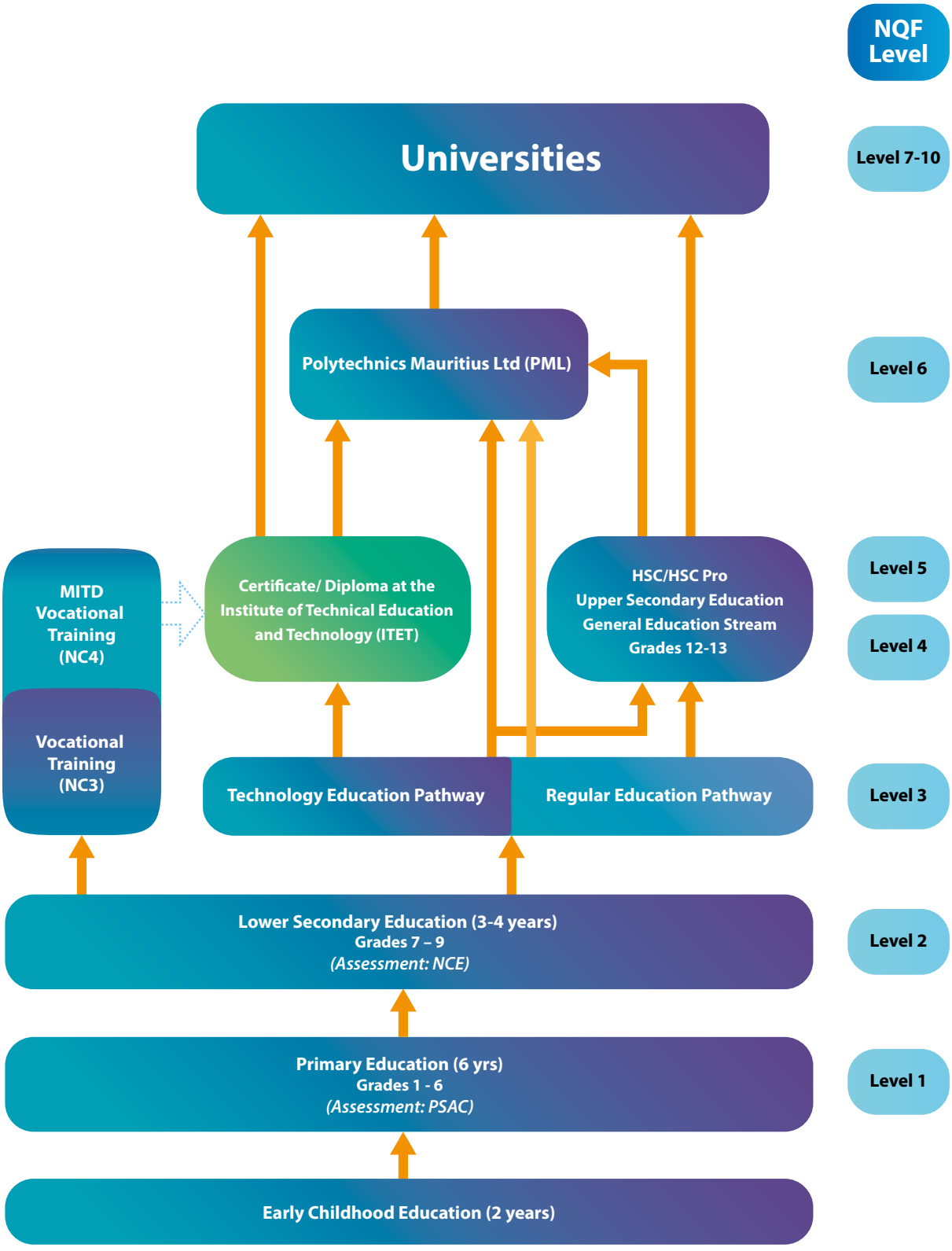


Figure 1: Educational pathway

3.0 Background and philosophy of Technology Education

Education systems around the world are being reimagined, modernised, contextualised, and restructured to acknowledge and advance international, regional, and national goals which focus on the needs of the population, wider access to education, provision of quality education for all, equitable development, poverty reduction, economic prosperity, and social justice. The Mauritian education system is therefore expected to review its current structure to ensure that these goals are met, and that the future workforce has the necessary know-how, skills, attitudes, and values needed to legitimately position the country at the competing edge with other countries.

Today, the Mauritian education system is expected to prepare students for Industry 4.0, which foregrounds the view that productivity gains and innovation cannot be achieved based on entry-level work. Skills and competencies are the new currency for success, development, and economic growth. It is therefore crucial to recentre Mauritian educational goals to provide the necessary ecosystem to professionalise the current vocational education and to develop a contextualised technical education. Pitched at NQF level 3, these educational goals align themselves to the academic CIE School certificates, while providing a skills-based technical orientation. This philosophy determines the development of 'Technology Education for Secondary Schools' (TE) as an alternative pathway for students having completed their National Certificate in Education (NCE), which marks the end of the nine years of continuous basic education.

TE is based on a curriculum that adopts activity-based, and project-driven approaches that engage students in problem solving as they develop knowledge, skills, values, attitudes, and experiences in the core, as well as the technological subject areas of their choice, provided as clusters. The TE pathway is aligned to the holistic approach and orientation of the current educational reform, and to the 2030 agenda for Sustainable Development Goals, which target a substantial increase in the number of youth and adults who have relevant technical and vocational skills, for employment, decent jobs, and entrepreneurship. The Curriculum Framework (CF) for TE supports high-quality learning while giving individual students the opportunity to choose programs that suit their skills and interests. Based on the problem-solving approach, the CF provides a broad range of learning options outside traditional classroom instruction to enable students to better customize their high school education, improve their prospects for success in school and in life, and meet current and future challenges. It focuses on the transformation of all learners into responsible citizens; effective communicators; critical, creative, and innovative thinkers; well-balanced individuals; autonomous life-long learners; effective collaborators; and, above all, problem solvers.

In today's conjuncture where the power, reach, and rapid evolution of technology have permeated every sphere of our life, TE will enable students to become technologically literate – that is, able to understand, safely work with, and benefit from a range of technologies. Students will acquire the technological and transferable skills and knowledge that will allow them to participate fully in a competitive global economy and to become responsible citizens in an environmentally vulnerable world. The TE curriculum is also underpinned by the interdisciplinary concepts of Science, Technology, Engineering, Arts, and Mathematics (STEAM) education which promotes the integration of learning across subject disciplines. For example, when students are engaged in problem-solving activities or designing a product, they explore the social or human need that the product addresses, the scientific principles involved, the mathematical dimensions, the technological implications, and the aesthetic qualities.

4.0 Goals of Technology Education for Grades 10-11

The overarching goal of the Technology Education curriculum is to empower students with the necessary knowledge, skills, and dispositions to enhance their ability to achieve success at this level while preparing them to engage in the world of work and/or post Grade 11 secondary education or technical training.

The goals of the Technology Education curriculum are to enable students to:

- develop an understanding of the fundamental concepts of technology;
- develop communication and mathematical skills to confidently operate in technology-oriented education and workplace environments;
- apply creative, innovative, and logical approaches to address challenges in various technology areas;
- realise their full potential and achieve excellence in technology areas of particular interest, which are aligned with their learning traits and preferences;
- foster personal values and work ethics to become responsible members and lifelong learners of technology-based studies and work environments;
- develop critical thinking skills and flexible approaches required to solve problems and conduct research to adapt to technological changes and innovation in education, technical training and future careers;
- become conversant with potential post Grade 11 education, technical training, and employment opportunities;
- develop skills-based knowledge in planning entrepreneurial initiatives in technology-based areas;
- collaborate with community and peers to develop an appreciation of interpersonal skills in current and future workplaces.

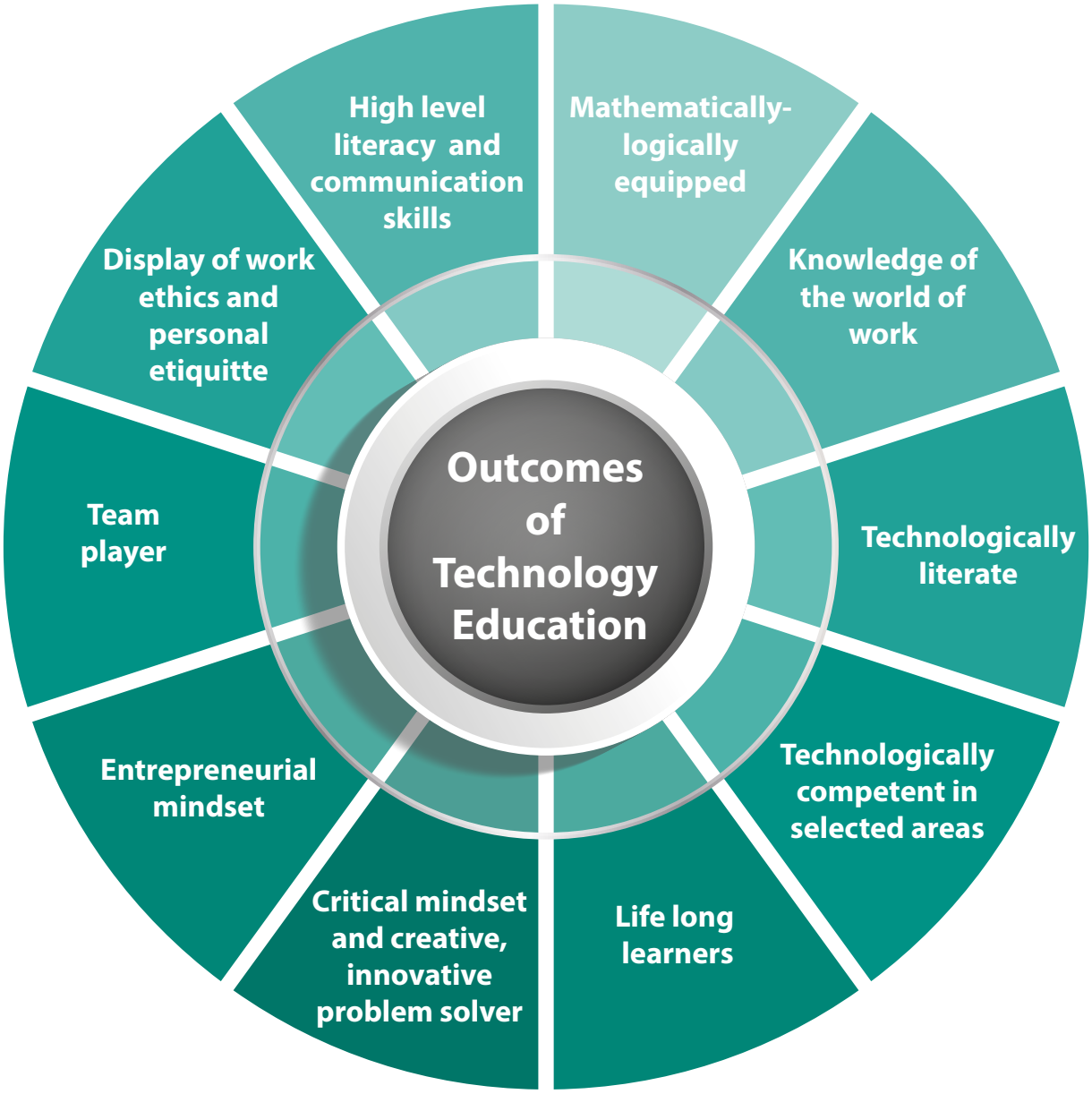


Figure 2: Outcomes of TE

5.0 The programme structure of Technology Education at Grades 10-11

To achieve the overarching goals of Technology Education, a selection of subjects and specialised technological disciplines have been made. Figure 3 illustrates the structure of TE at Grades 10-11.

The programme of study consists of core and non-core subjects. The core subjects are examinable contributing to the award of the Technology Education Certification at Grade 11 level. The non-core subjects will be assessed at school level (School-based assessment) on an achievement rating and does not contribute to the award of the Technology Education Certification at Grade 11 level. The non-core subjects are Physical Education, Life Skills, and Values.

The Core Areas of Study comprise:

1) Common areas of study (compulsory for all students)

   The common areas of study are:

   i. English

   ii. French

   iii. Applied Mathematics

   iv. Applied Life Sciences or Applied Physical Sciences

   v. Essential Skills (ICT, Arts, and Entrepreneurship).

2) Elective specialised Technological clusters with students having to select one cluster.

   The Elective Specialised Technological clusters are:

   i. Engineering Technology

   ii. Health and Hospitality

   iii. Computer Technology and Innovation

Each cluster is composed of three subjects as outlined in Table 1

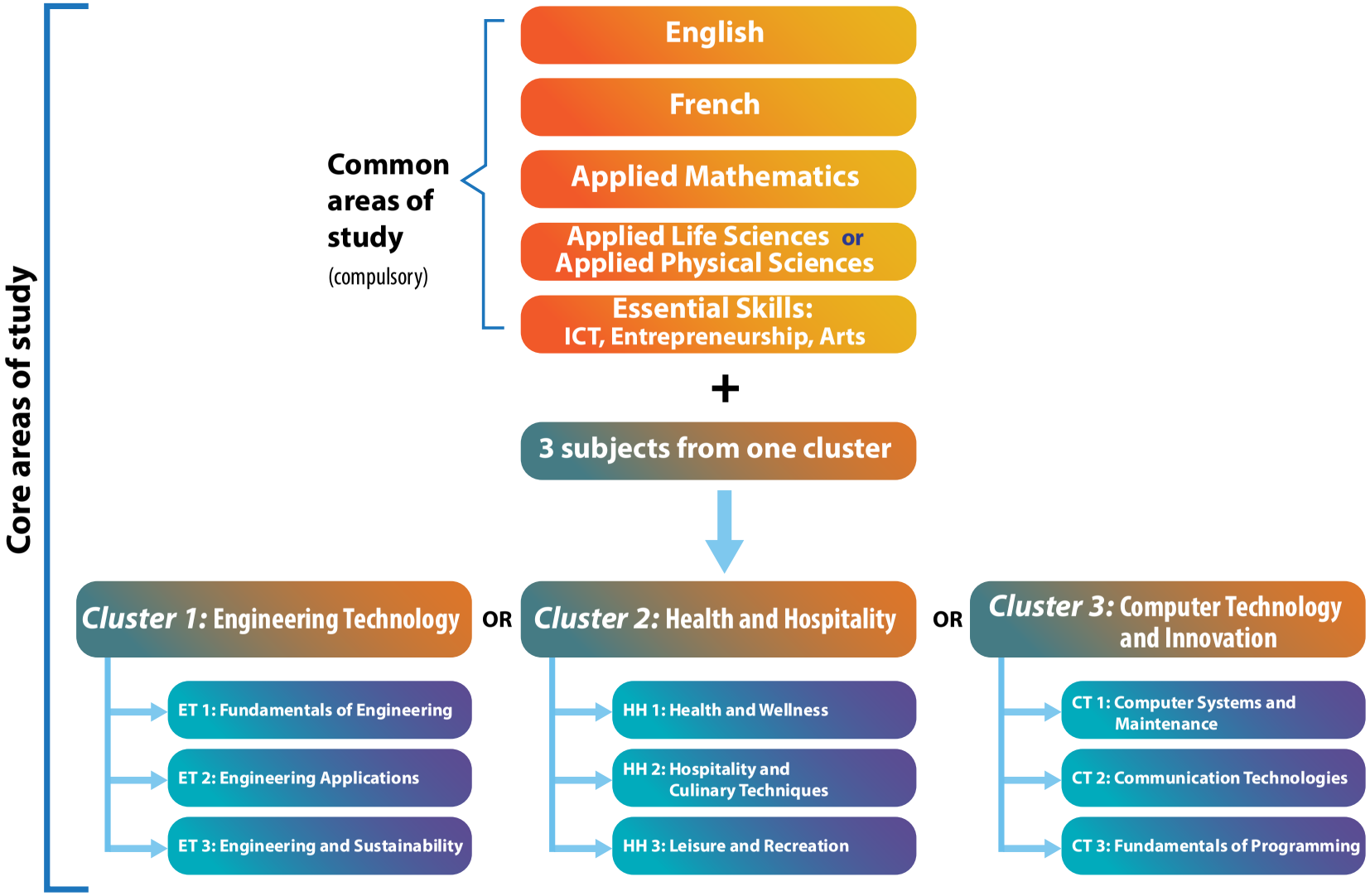
Table 1: Subjects of the Specialised Clusters

Cluster	Subjects
A. Engineering Technology	1. Fundamentals of Engineering
	2. Engineering applications
	3. Engineering and Sustainability
B. Health and Hospitality	1. Health and Wellness
	2. Hospitality and Culinary Techniques
	3. Leisure and Recreation
C. Computer Technology and Innovation	1. Computer Systems and Maintenance
	2. Communication Technologies
	3. Fundamentals of Programming

Learners select one cluster for specialization and complete the three subjects under the same.

In future, new clusters will be added to the curriculum structure to respond to emerging needs of the economy and society.

SUBJECTS AND CLUSTERS FOR TECHNOLOGY EDUCATION



Non-core areas of study: *Physical Education, Life Skills and Values will also be part of the programme of study and assessed at school level (School-based assessment)*

Figure 3: Programme Structure

6.0 Generic Competencies

The structure has been devised in line with the goals of Technology Education at Grades 10-11. The goals of TE and the structure allows the delineation of a set of generic competencies for learners to acquire as outlined in Table 2.

Table 2: Generic Competencies

Learners of the Technology Education Stream should be able to:		
1	Technological Knowledge and Understanding	Demonstrate understanding of a repertoire of fundamental concepts and skills-based knowledge. This includes knowledge of the principles, theories, terminologies, and conventions related to the generic and specialised fields of study.
2	Technological Skills and Practice	Deploy a range of technological skills and exercise dexterity in undertaking project-based activities. This includes manipulating and maintaining tools and equipment with confidence and safely in realising project-based artefacts.
3	Soft Skills	Exhibit a set of personal attributes, social skills, and abilities to interact effectively with others in various professional and personal situations. Soft skills encompass traits such as teamwork, adaptability, and emotional intelligence.
4	Communication Literacy	Effectively and proficiently convey and interpret information through various forms of communication to engage in meaningful and impactful interactions and to adapt communication styles to different contexts and audiences.
5	Digital Literacy	Use digital tools and technologies to search, access, manage, evaluate, create, and communicate information. It includes the ability to share digital content, maintain digital security and engage with social media, AI and other online communities in a safe and responsible manner.
6	Creative Problem-Solving Skills	Break down a problem to understand it, ideate and evaluate possible creative ideas to find the most effective solution. This involves critical thinking, decision-making, creativity, and effectively using a variety of problem-solving/analytical approaches to engage in creative tasks.
7	Career and Workplace Knowledge	Demonstrate knowledge related to work practices, policies, procedures, resources, laws, customer service, technical information and the relationship of work to the organization's mission as well as to explore career opportunities and develop a career-orientated focus.

7.0 Importance of career and workplace knowledge in Technology Education

Technology Education aims to provide students with fundamental career and workplace knowledge, which will help them develop a clear understanding of various possible career pathways in the field of technology. Through the different clusters, students are exposed to different industries which will help them make informed decisions about their future careers. The different subjects on offer will equip students with up-to-date knowledge about and exposure to emerging technologies and trends. They will acquire practical skills as well as soft skills relevant to the workplace and which are highly valued by employers in the technology industry. The world of work requires that future employees possess theoretical knowledge and practical skills and that they are prepared for the rapidly changing economy. Students following TE are able to see real-world application of the knowledge and skills acquired, which will help them to effectively navigate the professional world. The students will therefore be equipped with the required skills, awareness of industry trends and employability attributes to thrive in the technology sector.

8.0 Importance of soft skills in Technology Education

Beyond academic skills, Technology Education aims at preparing students for the world of work, which has increasingly relies on interpersonal relations. Soft skills are those skills pertaining to someone's personality and behaviour which involve the ability to critically think and solve problems, creativity, emotional intelligence, adaptability, time management, and interpersonal skills, among others. Soft skills are fundamental to be able to work in a healthy work environment and effectively collaborate with others in society. These skills may be developed and enhanced over time and can be a crucial asset in someone's career and in developing professional relationships.

9.0 Curriculum outline

The outline of the curriculum is presented below through the subject outline and the core subject competencies of each subject which have been developed to remain consistent with the generic competencies of TE.

9.1 English

Subject outline:

In an increasingly globalised world, characterised by the prominence of English, the ability to communicate effectively in this language is crucial for academic progression, and for a successful transition into the world of work. This subject aims at developing academic and applied English language skills to complement the study of selected technical subjects and prepare students to communicate in academic and professional contexts. Through authentic and integrated task-based approaches, students develop their ability to understand and respond appropriately

and confidently to a range of language learning experiences and communicative situations. As students engage with various modes of English communication, they become better equipped to succeed personally, socially, and professionally.

Core subject competencies:

1.0 Develop listening and speaking skills relevant to audience, purpose, and form.

2.0 Read to understand and engage with facts, opinions, and ideas.

3.0 Write to express facts, opinions, and ideas, relevant to audience, purpose, and form, with fluency and accuracy.

9.2 French

Présentation:

Dans le village global qu'est le monde, la maîtrise et l'utilisation des langues majoritaires sont un avantage capital. A Maurice, le français se positionne comme une des langues les plus utilisées, et sa maîtrise est un gage de succès, tant académique, professionnel que personnel et la capacité de communiquer dans cette langue est, à cet égard, un atout considérable dans le monde du travail et à l'école. Ce syllabus vise à développer les compétences linguistiques et communicatives chez nos apprenants en les outillant à comprendre, agir et réagir convenablement en français dans des situations qui les engagent dans un contexte linguistique et communicatif. Nos apprenants seront appelés à développer les quatre grandes compétences essentielles à leurs besoins et à les réinvestir en les appliquant dans leur contexte académique et professionnel.

Compétences principales du sujet:

1.0 Décoder et comprendre un discours (oral et écrit) en français.

2.0 Démontrer la capacité de prendre la parole dans des contextes professionnels et académiques.

3.0 S'exprimer à l'écrit avec correction et clarté de façon formelle et informelle dans des situations professionnelles et académiques.

4.0 émontrer la capacité d'effectuer des recherches et s'en approprier le contenu pour leurs besoins académiques et professionnels.

9.3 Applied Mathematics

Subject outline:

Mathematics is the study of numbers, space, measures, patterns, and relationships which enables individuals to analyse information and make informed decisions. A strong mathematical background is needed to model and solve real life problems, related to numbers, geometry, measurement, algebra, and probability and statistics. This course provides students with the foundational mathematical competencies needed in the world of work.

Core subject competencies:

1.0 Use numerical concepts in real life.
2.0 Use algebra to formulate and solve problems.
3.0 Draw and interpret linear and quadratic graphs in practical situations.
4.0 Use concepts of measurements in problem solving.
5.0 Use geometric concepts in real life context.
6.0 Use probability and statistical concepts to solve problems in context

9.4 Applied Sciences

9.4.1: Applied Life Sciences

Subject outline:

Applied Life Sciences aims at developing in learners the essential scientific proficiencies needed to produce a scientific citizenry, support the growing economy, and face complex, local and global challenges such as climate change, energy crisis, food security, water crisis, and emergence of new epidemics. The subject adopts a competency, skill-based, problem-solving approach, where scientific concepts, processes and principles are applied to solve authentic real-life problems. Applied Life Sciences also prepares learners to pursue studies at higher academic levels and familiarise them to the world of work.

Core subject competencies:

1.0 Apply the scientific method in the study of cell dynamics.

2.0 Apply the scientific method in the study of matter and its interactions.

3.0 Investigate the world of work focussing on sustainable agricultural practices.

4.0 Investigate the world of work focussing on blue economy.

5.0 Explore the use of biotechnology.

6.0 Identify and address environmental issues within their own contexts.

7.0 Recognise health-related issues and apply appropriate contextualised solutions.

9.4.2: Applied Physical Sciences

Subject outline:

Applied Physical Sciences explores the intricacies of physical and chemical phenomena within non-living systems. This inquiry-driven subject is designed to equip students with fundamental competencies centered on five core themes: measurement, systems and models, energy, diversity, and interactions. Beyond theoretical knowledge, Applied Physical Sciences actively promotes the practical application of these central themes across various industries, fostering higher-order thinking and reasoning.

Core subject competencies:

1.0 Perform accurate measurements as an integral part of scientific inquiry.

2.0 Use models and systems to unpack the relationships between structures and behaviour of non-living systems.

3.0 Examine the characteristics and functions of energy within non-living systems.

4.0 Explore the diversity of non-living systems, considering their unique attributes and properties.

5.0 Analyse the interactions occurring within physical and chemical systems.

9.5 Entrepreneurship

Subject outline:

A comprehensive understanding of entrepreneurship equips students with a range of key transferable soft skills relevant to the world of work. This subject will allow students to apply those skills in meaningful contexts across their cluster areas. They will benefit from inputs from guest speakers who are successful entrepreneurs and from research into chosen enterprises. They will understand the importance of entrepreneurs for economic development and growth. By identifying entrepreneurial opportunities within their own environment, they will apply their knowledge and skills to a relevant entrepreneurial project ideally linked to their cluster.

Core subject competencies:

1.0 Explain the concept of entrepreneur, list entrepreneurial attributes and ethical principles.

2.0 Develop a simple business plan.

3.0 Apply key marketing principles.

4.0 Perform basic accounting and comprehend basic business finance practices.

9.6 Arts

Subject outline:

The Arts provide a unique way for students to explore, experiment, and express their creativity and imagination. In this practice-based subject, the competencies will be developed around one main project allowing them to acquire discipline-based competencies as well as soft skills. Students will be actively engaged in artmaking which will be enhanced through the use of technological tools; lectures by guest speakers; site visits and virtual tours to galleries and museums and interactive visits to artists' and designers' studios. These engagements foster professional and personal values and work ethics preparing flexible, creative, and innovative individuals for their potential engagement in creative industries.

Core subject competencies:

1.0 Carry out in-depth research on a specific theme from an artistic perspective.

2.0 Use research to generate innovative ideas to create original compositions.

3.0 Experiment with a range of media, techniques and processes including technological tools and performing arts.

4.0 Produce an artwork based on informed artistic choices and decisions.

5.0 Employ effective communication for artwork presentations.

9.7 Information and Communication Technologies (ICT)

Subject outline:

Technological advancements, particularly digital technologies, are opening new opportunities in various fields. Digital literacy, therefore, is gaining importance as a fundamental skill. The aim of this subject, Information and Computer Technologies (ICT), is to provide students with fundamental ICT competencies for the knowledge society. The competencies gained will be applicable in various domains of Technology Education.

Core subject competencies:

1.0 Create and manage documents in the various fields of study.

2.0 Report production and data analysis using a spreadsheet.

3.0 Develop essential presentation and multimedia skills.

4.0 Data integration from multiple sources to produce content for the various fields of study.

9.8 Engineering Technology

This specialisation cluster comprises three subjects namely:

1) Fundamentals of Engineering
2) Engineering Applications
3) Engineering and Sustainability

9.8.1: Fundamentals of engineering

Subject outline:

Engineering is a subject which is in essence practical. In this subject, students develop knowledge and skills through engagement with industry to learn about the many different types of engineering and their impact on our everyday lives. Students are equipped with key knowledge and skills to design products that are useful in solving real-life problems. They develop the competencies to create various technical drawings and models to explore solutions. They also examine the use of engineering materials and structures in the development of engineering solutions.

Core subject competencies:

1.0 Recognise engineering as a field of professional practice.

2.0 Produce accurate technical drawings using conventions in engineering graphics.

3.0 Examine the use of different engineering materials.

4.0 Examine the use of structures in engineering.

5.0 Use the design process as a structured thinking process to solve problems.

6.0 Use modelling as a tool to explore develop design solutions.

9.8.2: Engineering applications

Subject outline:

Engineering Applications has a practical focus, where tudents will be engaged in the design and manufacture of objects. They will make use of simulations and virtual reality to enhance their knowledge of engineering applications in the real world. This subject provides students with ample opportunities for hands-on activities to develop technical competencies in engineering applications using various materials, tools, equipment, processing techniques, and manufacturing technologies. Students devise solutions to problems through the exploration and use of mechanisms, electricity, electronics, and hydraulic and pneumatic systems. Health and safety are core considerations in this subject.

Core subject competencies:

1.0 Demonstrate skills in manufacturing practices.

2.0 Examine engineering applications of common mechanical components.

3.0 Discover the use of electricity and electronics systems in engineering applications.

4.0 Explain the functions of pneumatic and hydraulic systems in engineering.

9.8.3: Engineering and sustainability

Subject outline:

In this subject, students learn about the impact of engineering on the main pillars of sustainability: environment, society and economy. Sustainability practices aim to reduce the depletion of natural resources. The long-term intention is to minimise the effects of engineering, construction, and manufacturing industries on the environment for the future generations. This subject offers students opportunities to gain insights into eco-friendly practices, materials, and their different applications. Students are equipped to develop real life solutions to problems related to society and the protection of the environment. They develop their knowledge and skills in real world contexts, engaging in industrial visits, and benefiting from inputs from guest speakers with relevant experience.

Core subject competencies:

1.0 Examine how engineering, manufacturing and construction industries affect the environment and society.

2.0 Demonstrate knowledge of eco-friendly production processes in manufacturing simple sustainable products and systems.

3.0 Apply innovative sustainability processes to minimise harmful effects in industrial and domestic activities.

9.9 Health and Hospitality

This specialisation cluster comprises three subjects namely:

1) Health and Wellness
2) Hospitality and Culinary Techniques
3) Leisure and Recreation

9.9.1 Health and Wellness

Subject outline:

Health and Wellness emphasises three dimensions of health namely, mental, physical, and social and how these are interconnected for the individual's wellbeing and balanced life. Students will engage in activities such as mindfulness practices, self-care, and stress management techniques to promote well-being in all aspects. It will also enable students to learn about reproductive health. Moreover, students will gain knowledge into the benefits of physical activity, balanced diet, other lifestyle health factors (e.g., avoiding smoking and excessive alcohol consumption) and traditional medicine that significantly reduce the risk of developing diseases. Students will also be exposed to the diversity of careers in health and wellness services. .

Core subject competencies:

1.0 Describe the basic concepts of health and wellness to better understand adolescents' mental, physical, social and reproductive health.

2.0 Design recipes, prepare and cook healthy meals in relation to health and wellness.

3.0 Plan and execute activities promoting a healthy lifestyle.

4.0 Demonstrate basic health care skills.

5.0 Explore the scope and diversity of careers in health and wellness services.

9.9.2 Hospitality and Culinary Techniques

Subject outline:

Hospitality and Culinary Techniques offers a comprehensive introduction to the exciting world of the hospitality industry. Students will gain a deep understanding of the principles and practices involved in the four main functional areas of hospitality namely: Housekeeping, Front Office, Food and Beverage Service and the Kitchen. Students will gain practical skills and knowledge in culinary techniques involved in the preparation of nutritious and appealing dishes. The subject prepares students for potential careers or further studies in Hospitality, Travel and Tourism and Food Studies sectors Additionally, the course fosters creativity, teamwork, and a passion for excellence, setting the stage for lifelong learning and professional growth.

Core subject competencies:

1.0 Explain the key components of the hospitality industry and identify associated career opportunities.

2.0 Acquire skills and techniques in respective functionals department in Hospitality (Housekeeping, Front Office and Food and Beverage Service).

3.0 Manipulate the appropriate kitchen tools and equipment in the preparation of dishes.

4.0 Use appropriate cooking methods and culinary techniques to prepare, cook and serve nutritious and appealing dishes.

9.9.3 Leisure and Recreation

Subject outline:

Leisure and recreation play a central role in communities and contribute to the well-being of individuals. This subject will take students on a fascinating journey through the diverse characteristics and realms of leisure and recreational operations. Students will develop fundamental knowledge and skills for planning and conducting successful leisure and recreational activities in their local communities. As students immerse themselves in real-world scenarios, they will be aware of the competencies required to embrace a career within this exciting industry. This subject will prepare students for a journey that fosters professional growth and unlocks promising opportunities in the world of leisure and recreation.

Core subject competencies:

1.0 Examine the relationship among tourism, leisure, and recreation.

2.0 Develop an understanding of the operation of the leisure and recreation industry.

3.0 Organise a leisure and recreation activity.

4.0 Outline the career opportunities and competencies required in the leisure and recreation industry.

9.10 Computer Technology and Innovation

This specialisation cluster comprises three subjects namely:

1) Computer systems and maintenance
2) Communication Technologies
3) Fundamentals of programming

9.10.1 Computer Systems and Maintenance

Subject Outline:

Computer systems are used in a wide range of applications, including business operations, scientific research, entertainment and communications. They have revolutionized many aspects of society, enabling increased efficiency, automation and access to information. Maintenance activities and procedures ensure the smooth operation and reliability of computer systems. These activities encompass hardware and software components and involve preventive measures as well as troubleshooting and repairs. Studying computer systems and maintenance provides numerous benefits, such as expanded career opportunities in the world of work and empowerment in the face of technology challenges.

Core subject competencies

1.0 Build a computer system based on a specification.

2.0 Explain the different types of software.

3.0 Describe the functions of the components in a Central Processing Unit (CPU).

4.0 Perform maintenance and troubleshooting tasks.

5.0 Use cloud storage to store and retrieve data.

6.0 Create artefacts using 3D printers.

7.0 Build IoT and automated systems.

9.10.2 Communication Technologies

Subject outline:

Communication technologies are the tools and systems that enable people to exchange information across different locations. They are constantly evolving and improving, offering new features and capabilities that promote communication, collaboration and learning. This subject focuses on developing knowledge and skills in relation to computer networks, data transmission, the internet and emerging technologies, and cybersecurity.

Core subject competencies:

1.0 Explain the fundamentals of the internet and emerging technologies.

2.0 Apply main concepts and principles of data transmission and methods of error detection.

3.0 Design a basic computer network.

4.0 Explore the fundamentals of cybersecurity.

5.0 Apply strategies to manage digital footprints and protect online information.

9.10.3 Fundamentals of Programming

Subject outline:

Computational thinking, algorithms, problem-solving and software development are key pillars of computer programming. This subject enables students to develop a systematic and logical approach to problem-solving and to foster critical thinking skills. Algorithms and problem-solving techniques provide students with the ability to break down complex problems and develop solutions. The subject covers software development and introduces students to programming languages and web development to design, build and deploy software applications.

Core subject competencies:

1.0 Use computational thinking skills to develop solutions to problems.

2.0 Explore the main principles of problem-solving using computer systems.

3.0 Write and amend algorithms for solving problems.

4.0 Explain the Program Development Life Cycle (PDLC).

5.0 Design and develop software applications using programming languages and tools.

6.0 Design and develop a visually appealing website.

10.0 Pedagogy

The overarching goal of the Technology Education curriculum for Grades 10-11 is to empower students with the necessary knowledge, skills, and dispositions to engage in the world of work and/or post Grade 11 secondary education or technical training. To achieve this goal, a pedagogy that offers an engaging, challenging, and collaborative learning environment is desired. This requires a shift from rote learning and teacher-directed learning to a more learner-centred, student-driven environment encompassing both deductive and inductive learning approaches that foster teamwork and collaborative learning, innovation, and creativity in solving technological issues.

The main attraction of the Technology Education curriculum is the adoption of a pedagogy that allows students to acquire experiences oriented towards real-life and real-work situations. Learners acquire knowledge more effectively when putting theory into practice. So, a project-based pedagogy, which consists of offering opportunities for in-context learning, experiential learning, application of theory and reflection, is privileged. It is a learner-centred method which engages students in addressing scenarios in real-world situations and by the same means develops 21st-century skills like critical thinking and creativity as it provides opportunities to construct knowledge through asking questions, designing and conducting investigations, gathering, analysing, and interpreting information and data, and drawing conclusions. Another interesting feature of project-based learning is that it is cooperative, allowing interaction with peers and developing collaborative, planning, and communication abilities when sharing their understanding and knowledge to resolve difficult situations. Project-based learning can be used in a variety of school settings and with students of diverse abilities.

The aim of using a project-driven pedagogy is also to provide holistic learning situations to develop understanding and a broad range of competencies across the Technology Education curricula, thereby breaking the subject barriers and promoting interdisciplinary learning across compulsory areas of learning and elective clusters.

The following indicative methods have considerable significance in implementing a project-based pedagogy:

- Learning by practising and doing
- Real-world problem solving
- Learning through inquiry
- Simulation and role play
- Gamification

- Working in groups
- Reflection on learning experiences
- Peer and educator feedback
- Activity-based learning
- Reverse engineering

Knowledge of the world of work is one major expected outcome of the Technology Education for Grades 10-11. Therefore, real–work encounters as a teaching and learning approach are a principal condition to achieve such a situated learning goal. The following strategies are proposed to bridge the gap between theoretical knowledge and practical applications (theory in action):

- Regular educational visits (full-day on-the-job observation)
- Talks and seminars by targeted professionals
- Learning through virtual environments
- Virtual field trips and tools
- Video conferencing with intervention of professionals (national and international) from the world of work in technology applications
- Real world simulations

11.0 Assessment Framework for the Technology Education Curriculum

The Assessment Framework for the TE Curriculum will ensure students can demonstrate competency in the core competencies across all subjects. The assessment process will be underpinned by the following criteria:

- validity – tasks will provide an accurate measure of students' achievements;
- transparency – students will be clear about the aims, objectives, and assessment criteria relating to assessment tasks;
- reliability – assessment criteria based on the core competencies in each TLS will ensure consistency in grading across the range of schools delivering the TE curriculum; and
- relevance – tasks students complete will be purposeful and related to real world contexts.

11.1 Summative Assessment

Summative assessment will involve portfolio building and an end of programme examination in core and cluster subjects. Essential skills will include only portfolio.

Portfolios will be built throughout the duration of the programme in these subjects. This will allow the students to apply their knowledge and skills to real-world tasks when they have mastered the various competencies. On completion of the programme, each of these subjects will also be assessed through a final examination. The assessment requirements are summarised as follows:

<table>
<tr><th>Subjects</th><th>Assessment Method</th><th>Percentage Weighting</th></tr>
<tr><td rowspan="3">English
French
Applied Mathematics
Applied Life Sciences
Applied Physical Sciences
All subjects of the specialisation of clusters</td><td>1 x portfolio continuously built and assessed throughout the programme, focusing on application of knowledge and skills in real-world contexts.</td><td>50%</td></tr>
<tr><td colspan="2">plus</td></tr>
<tr><td>1 x written examination at the end of program</td><td>50%</td></tr>
<tr><td colspan="2">Total Percentage</td><td>100%</td></tr>
<tr><td>Essential Skills</td><td>1 portfolio for each essential skill.</td><td></td></tr>
</table>

The portfolio tasks for the subjects will be externally set and will be issued at regular intervals throughout the programme.

Essential Skills

Students will compile a portfolio for each essential skill. A proficiency level will be awarded by educators on completion of each portfolio for the essential skills (grading at 11.5 applies).

Portfolio Tasks

The portfolio tasks will be scenario-based and will allow the students to apply their knowledge in real world contexts. They may be in a variety of formats, including:

- case studies
- assignments
- records of observation
- photographs / videos
- podcasts
- blogs and vlogs
- online noticeboards
- presentations, posters, infographics
- webinars
- professional discussions
- projects
- quizzes
- role-plays
- design briefs
- production of artefacts
- technical reports
- online tests
- etc.

Using a wide variety of task formats will allow students to demonstrate more fully their learning in a technology rich environment.

Portfolios can either be stored digitally or paper based. Students will be encouraged to take responsibility for the management and safe keeping of their portfolio work. They will be required to reflect on their achievements and strive for continuous improvement.

Examinations

Examinations will occur towards the end of the two-year programme. Questions will be mostly scenario based and will confirm the students' knowledge and understanding across the subject competencies.

11.2 Assessment Objectives

Assessment activities will be based on the following assessment objectives, relevant to all subjects.

Assessment Objectives	
AO1	Learners demonstrate knowledge and understanding of subject-specific content acquired and the comprehension of its meaning and significance.
AO2	Learners apply their knowledge, understanding and skills to scenarios drawn from real-life contexts. This may include demonstration of problem-solving, critical and creative thinking, communication, planning , designing, and manufacturing skills.
AO3	Learners reflect on their own performance and identify areas for improvement.

Designing assessment tasks around these objectives will promote consistency of approach across all subjects.

11.3 Assessment Criteria

Each portfolio task will be based on relevant assessment criteria. The tasks will be designed to provide an integrated approach to assessment. Students will be encouraged to take a holistic view of their subjects, integrating knowledge and skills from English and French, for example, with the subject knowledge from their chosen cluster. The essential skills of information and communications technology (ICT) and entrepreneurship may also be assessed through the cluster and core portfolio tasks where appropriate. The good use of ICT will, for example, enhance the quality of the portfolio work across all subjects. Integration in this way will avoid duplication and reduce the assessment burden on the students.

Where specific requirements must be met in each essential skill, separate tasks will have to be completed for that purpose.

Details of the assessment criteria being assessed across the various subjects will be provided on an assessment planning sheet accompanying individual tasks.

The successful implementation of the assessment arrangements will require effective collaboration between educators involved in the various subjects making up the TE curriculum.

11.4 Setting and Assessing Tasks

The portfolio tasks will be externally set and internally assessed by the educators. An assessment rubric outlining the different levels of achievement (performance descriptors) against the assessment criteria will be provided to aid the assessment process and to promote standardisation across educators and schools.

The portfolios will be subject to external validation to ensure standardisation and rigour.

All examinations will be externally set and externally assessed

11.5 Grading

The portfolios and examinations will be graded as follows:

Distinction*

Distinction

Merit

Pass

Fail.

The assessment rubrics underpinning each task will indicate the standard of performance at each grade as follows:

TE Grade Awarded	Performance Statement
Distinction*	Demonstrates Excellence
Distinction	Highly Proficient
Merit	Proficient
Pass	Basic Proficiency
Fail	Requires Further Development

To indicate comparability with the Cambridge 'O' Levels, the grades will be mapped onto a similar grading scheme as follows:

Cambridge O'Level Grade	TE Grade	Performance Statement
A*	Distinction*	Demonstrates Excellence
A	Distinction	Highly Proficient
B – C	Merit	Proficient
D – E	Pass	Basic Proficiency
Ungraded	Fail	Requires Further Development

11.6 Standardisation

Standardisation meetings will be planned to ensure educators have an opportunity to compare their work, their assessment judgements and to identify good practice. This will ensure consistency across subjects delivered in different schools and strengthen educators' confidence. Initially, standardisation meetings will be face to face but as educators become more experienced, they may be conducted online.

External validation of educators' assessment judgements will ensure the TE curriculum is assessed to a high standard, promoting rigour across the qualification.

11.7 Formative Assessment

Formative assessment activities will be a key focus of the TE curriculum. They will identify progress the students are making and inform the educators on areas needing further development. Formative assessment will ensure students can build the skills and confidence required to complete portfolio tasks successfully.

11.8 Conduct of Summative Assessment

Summative examinations will be conducted under the aegis of the 'National Examinations Board'. The board will:

1) set portfolio tasks yearly
2) put in place an external moderation mechanism for portfolio tasks
3) issue specimen papers
4) prepare examinations papers
5) set up correction panels for examinations scripts

11.9 Award of certificate

Upon successful completion of the TE as per award rules, students will be awarded a 'National School Certificate'.

The awarding body will be the 'University of Mauritius'.

12.0 Human resource deployment

Educators are centrally responsible for the operationalisation of the intended curriculum. The alignment between curriculum standards and instruction is a necessary condition to make valid inferences about what students know.

The Technology Education curriculum for Grades 10-11 requires a different approach to teaching because its pedagogy is designed around active and project-based learning. Additionally, the programme of study, in particular the specialization routes, comprises new and integrated areas that are derived from subject specificities. Therefore, the implementation of the Technology Education curriculum for Grades 10-11 demands the input of trained teaching personnel to make sure that equivalence in the prescribed curriculum in terms of outcomes is achieved.

Educators should primarily master the content materials of their specific learning areas and be equipped to implement the curriculum in an integrated way. The adoption of a project-based strategy requires a pronounced shift from a didactic mode to a facilitator mode. Though learners need to show autonomy of learning, educators have to support and guide students towards the objectives of projects, with feedback remaining a principal consideration at each stage of the process. Educators also need to indulge in proper planning and prepare the adequate resources to facilitate the implementation of projects.

Health and safety are given paramount importance in the implementation of the Technology Education curriculum. Educators not only have to educate learners on adopting safe work practices, but also should model such dispositions and practices for students to adhere to during lab work and visits to industries and other workplace settings.

Therefore, an educator of Technology Education needs to be trained in a holistic way, cutting across subject matter expertise, project planning, monitoring and motivational techniques and health and safety amongst others.

The successful implementation of Technology Education for Grades 10-11 requires support from personnel skilled in the diverse trades and fields of engineering within the curriculum. Technicians need to comprehensively support educators and students in relation to the following:

- Maintaining and operating equipment in a laboratory and workshop;
- Assisting educators and students in practical work and visits to workplaces;
- Assisting educators in the design and preparation of equipment and materials;
- Carrying out inventory of tools, equipment and materials after classes;
- Ensuring that all health and safety protocols are respected.

13.0 Material and infrastructural resources

Technology Education will be run in secondary schools and implementing its curriculum will necessitate particular material and infrastructural resources. To that effect, secondary schools will have their infrastructure modernised to offer appropriate and specialised set-ups to offer quality Technology Education. As health and safety plays an important role in Technology Education, all specialist rooms (i.e., workshops and labs) need to be designed or upgraded as per norms to maintain a high level of security to learners, educators and other users. Moreover, provision has to be made for resources and systems within the specialist rooms to facilitate an IT-mediated learning environment with the intent that e-pedagogies will increasingly be enablers for the implementation of the Technology Education curriculum. Bearing in mind that the Technology Education curriculum comprises areas relating to new and in some instances complex technologies, equipping the specialist rooms with specialised equipment is fundamental to achieving the learning outcomes, particularly the competency-based ones, related to the specialist clusters.

Currently, most secondary schools have existing infrastructures like Design and Technology labs, Home Economics labs, Computer labs, and Science labs which can be used to implement the Technology Education curriculum, but will need to be upgraded.

The setting up of centralized labs in parts of the island can also be considered where high-end technological equipment having considerable costs can be made available to schools for demonstration and practice by educators and learners.

14.0 Roles and responsibilities in the implementation of the Technology Education curriculum

Students

Students opting for the TE will have to shoulder their responsibilities to complete the given activities and tasks in an organised way. Students who are committed to the programme and take full responsibility of their studies will achieve the objectives set in Technology Education. For students with learning difficulties or who find it more difficult to take responsibility for their own learning, a support system will be developed to reinforce their progression within the programme. However, taking responsibility for one's own progress and learning is an important part of the education of all students, regardless of their circumstances.

Mastering the concepts related to technology education and developing the necessary competencies and skills requires hard work, study, and collaboration. In addition, students are expected to actively seek opportunities and extracurricular activities outside the classroom to broaden and enrich their understanding of the subjects offered.

Parents or Guardians

Parents play an important role in supporting student learning. Research shows that students perform better in school when their parents are involved in their education. By familiarising themselves with the curriculum, parents will be able to guide their children in their studies, better discuss their children's work with them and their teachers, and monitor the progress of their children in the programme.

Effective ways for parents to support their children's learning include attending parent-teacher meetings, parent seminars, and school-based activities.

Educators

This new orientation will require educators to recalibrate their pedagogy to gain expertise in using problem-based, inquisitive, project-based and inquiry approaches to learning and teaching. The educators will have the responsibility to guide and facilitate all students in (i) the development of know-how, skills, attitudes, and values related to the world of work, (ii) the development of competencies in applying knowledge and understanding in problem solving, (iii) the planning, designing, implementation, and communication of their problem-based project, and (iv) preparing students for the written summative examination.

Educators will help students to develop the literacy, reasoning, problem-solving, oral communication, and numeracy skills necessary to succeed in the curriculum. Using approaches to teaching and assessment that respond to the diverse needs of students, educators will ensure that every student has solid and meaningful learning opportunities. Drawing on a variety of teaching and assessment strategies, educators will provide students with numerous practical opportunities to develop and refine their problem-solving, critical and creative thinking, and communication skills, while discovering fundamental concepts through activities, projects, and research. The activities provided should enable students to relate and apply these concepts to the social, environmental, and economic conditions and concerns of the world in which they live. Educators will be required to identify appropriate visits to be effected in the selected industries to gain knowledge of the owrld of work.

Educators will be responsible for ensuring the safety of students during classroom activities and for encouraging and motivating students to assume responsibility for their own safety and the safety of others. They must also ensure that students acquire the knowledge and skills needed for safe participation in all technological activities.

To shoulder their responsibilities, newly recruited or in-service educators will have to undergo training focussing on the development of competencies, skills, and attitudes related to the use of a problem-based pedagogy. They will develop appropriate instructional strategies to help students achieve curriculum expectations, as well as appropriate methods for assessing and evaluating student learning.

Rectors/ School administrators

The Rectors and/or school administrators will work in close collaboration with educators and parents to ensure that each student has access to the best possible educational experiences. To support student learning, they will ensure the curriculum is properly implemented at classroom level, using a variety of teaching methods and strategies with a focus on problem solving. They will also ensure that appropriate resources are available for educators and students.

To enhance teaching and learning in all subjects, Rectors and/or school administrators will promote learning teams and professional learning development for educators. They will also provide all administrative support in organising visits and developing links with industries and the community.

Community Partnerships or Industry

Community partners, mainly experts from Industry, will play an important role in the implementation of the Technology Education in secondary schools. They will serve as role models for how the knowledge and skills gained through the course of study relate to life outside of school. They may also be involved as moderators of students' coursework. As role models, they can enrich the educational experience of students, as well as the life of the community.

For example, schools may make arrangements with industries or other groups in the community to provide the input and services of specialists in different fields and technologies, such as in engineering, manufacturing, health, hospitality, ICT, and green industries. In addition to participating in face- to-face workshops with students to discuss topics, concepts and skills in the course, these industries or groups may be interested in working with schools to create opportunities for co- operative education and apprenticeships.

Schools can play an important role by coordinating efforts with community partners. They can involve colleges, universities, trade unions or professional organizations, local businesses, and community volunteers in supporting instruction and in promoting a focus on technological education in and outside the school.

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