ENSURING THE
EXPERTISE TO GROW
SOUTH AFRICA

RESEARCH REPORT ON COMPUTER ENGINEERING

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ECSA

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1. INTRODUCTION

The Research, Policy and Standards (RPS) Business Unit is tasked with conducting preliminary research for the introduction of new disciplines on bi-annual basis and has included this target in the Annual Performance Plan (APP). In line with this mandate and the APP target, RPS has identified Computer Engineering as one possible new discipline to conduct such research on within 2019/20 financial year.

Computer and electronic engineers make the world a more efficient place by connecting humans and the world we live in, to the digital world of computer systems and the internet. They do this by using electronics, embedded computers and the skill of programming to control mechatronic systems and to build the internet. Computer and electronic engineering is the number one scarce skill in South Africa.

Computer engineering is a branch of engineering that integrates several fields of computer science and electronic engineering required to develop computer hardware and software. Computer engineers usually have training in electronic engineering (or electrical engineering), software design, and hardware-software integration instead of only software engineering or electronic engineering.
Computer engineers are involved in many hardware and software aspects of computing, from the design of individual microcontrollers, microprocessors, personal computers, and supercomputers, to circuit design. This field of engineering not only focuses on how computer systems themselves work but also how they integrate into the larger picture.

Usual tasks involving computer engineers include writing software and firmware for embedded microcontrollers, designing **v**ery **l**arge **s**cale **i**ntegration (VLSI) chips, designing analog sensors, designing mixed signal circuit boards, and designing operating systems. Computer engineers are also suited for robotics research, which relies heavily on using digital systems to control and monitor electrical systems like motors, communications, and sensors. In many institutions of higher learning, computer-engineering students are allowed to choose areas of in-depth study in their junior and senior year because the full breadth of knowledge used in the design and application of computers is beyond the scope of an undergraduate degree.

Other institutions may require engineering students to complete one or two years of general engineering before declaring computer engineering as their primary focus. Computer engineering is referred to as computer science and engineering at some universities. Most entry-level computer engineering jobs require at least a bachelor's degree in computer engineering (or computer science and engineering). Typically one must learn an array of mathematics such as calculus, algebra and trigonometry and some computer science classes.

2. PURPOSE

The purpose of this research study report is to provide the Research, Policy and Standards Committee with the status of the Computer Engineering qualification nationally and internationally and trends thereof.

3. RATIONALE FOR THE STUDY ON COMPUTER ENGINEERING

The purpose of the study is to investigate the viability of developing Computer Engineering as a new discipline, in addition to the nine current disciplines approved by ECSA. This is also an effort to address not only the scarcity of the skills in this area but to take advantage of the Fourth Industrial Revolution that has ignited buzzwords such as artificial intelligence, robotics, internet-of-things, quantum computing, and biotechnology. Persons achieving this qualification are able to, independently as well as under supervision, integrate analytical and practical engineering techniques and engineering knowledge to solve engineering problems from well-defined to complex.

4. CURRENT STATUS OF COMPUTER ENGINEERING IN SOUTH AFRICAN UNIVERSITIES

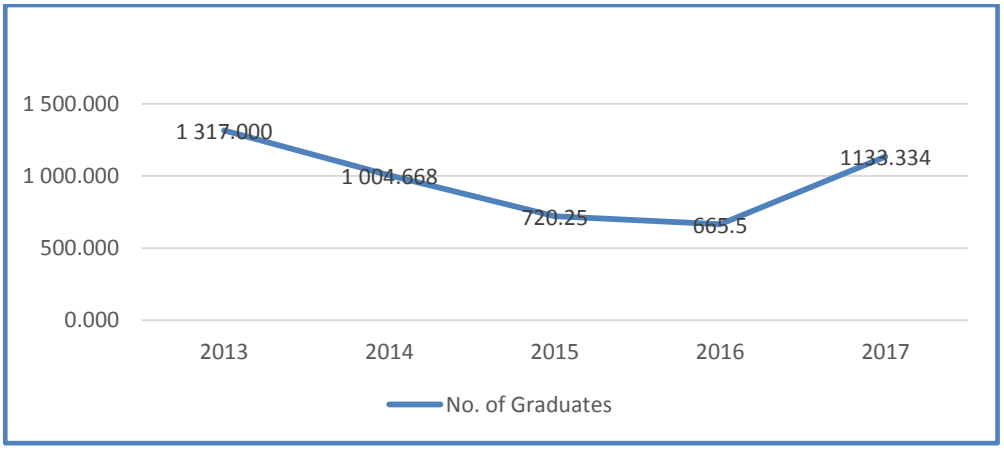
Computer Engineering, also known as computer science and engineering in some institutions is offered in different types of qualification ranging from BEng, BSc Eng, MEng and PhD. Four universities have accredited degrees as meeting the educational requirement for Registration as ECSA Candidate or Professional Engineer namely:

- University of Pretoria - BEng (Hons, Masters, & PhD) Computer Engineering

- University of Kwazulu-Natal - BSc (Eng) (Computer Engineering)
- North West University – BEng Computer & Electronic Engineering
- University of Cape Town - BSc (Eng) (Electrical and Computer Engineering)

Many universities and other institutions worldwide are now offering courses or degrees in Computer Engineering, and it is increasingly recognised that the combination of electrical engineering and computer studies equips graduates with an excellent basis upon which valuable engineering roles in modern industry can be built. UCT and North West University offers this combination as illustrated above. Apart from receiving a thorough grounding in both electrical engineering and computing, the Electrical and Computer Engineering student gains a foundation of understanding in physical science, advanced engineering mathematics, microcomputer technology and systematic engineering design.

Computer engineers in industry generally possesses expertise across a broad range of engineering disciplines, and are especially well-suited to a career in networking, control & instrumentation, power systems or telecommunications. Computer engineers may also become involved in diverse fields such as bio-medical engineering, machine vision, power electronics and machines, or signal and image processing. The table and graph below illustrates a quick snapshot of the graduate's statistics that have gone through the computer-engineering programme over last few the years across South African institutions. The graph indicates that there have been about 4840 graduates from 2013 to 2017. These numbers were showing a year on year decline from the 2013 high of 1317 to a 2016 low of only 665. However, the 2017 numbers showed a healthy increase to above 1000 mark.



The discussion below will indicate each institution's qualification type, admission criteria and what the qualification entails (modules).

4.1. UNIVERSITY OF PRETORIA

The University of Pretoria (UP) through their Faculty of Engineering, Built Environment and Information Technology, offers BEng (Hons) (Computer Engineering), MEng (Computer Engineering) and PhD (Computer Engineering). The following are key knowledge areas that has been approved by ECSA already for this programme:

- Mathematics, including numerical methods and statistics
- Basic sciences: the natural sciences essential to the programme;
- Engineering sciences;
- Engineering design and synthesis;
- Computing and information technology;
- Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice.

Admission requirements

The following persons will be considered for BEng (Hons) (Computer Engineering) admission:

- A candidate who is in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement;
- A candidate who is a graduate from another tertiary institution or has been granted the status of a graduate of such an institution; and
- A candidate who is a graduate of another faculty at the University of Pretoria.

The Life Orientation is excluded when calculating the Admission Point Score (APS) and Grade 11 results are used in the conditional admission of prospective students. A valid qualification with admission to degree studies is required with minimum subject and achievement requirements. Conditional admission to the four-year programmes in the School of Engineering is only guaranteed if a prospective student complies with certain requirements.

A BEngHons degree or equivalent qualification with an average of 65% is required for admission to the MEng programmes. While for PhD Computer Engineering, a MEng degree awarded by the

University of Pretoria or researched-based master's degree in engineering awarded by another university is required. The applicant must also meet the admission requirements for the BEng Hons degree. The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient. All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).

The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination. A research concept may be required. The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability. Lastly, admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Program Duration

The programme duration for the qualification varies as follows:

- BEng (Hons) (Computer Engineering) – minimum of 4 years
- MEng (Computer Engineering) –minimum of 1 year and
- PhD (Computer Engineering) – minimum of 2 years

Modules

The programmes are designed in accordance with the outcomes-based model as required by the South African Qualifications Authority (SAQA). The core modules can be summed up as follows:

BEng Core Modules	**BEng (Hons) Core Modules**
Computer engineering: Architecture and systems	Intelligent systems
e-Business and network security	Advanced topics in intelligent systems
Project	Introduction to research
Practical training and report	Wireless sensor networks
Research project	Electronic defence - electronic countermeasures
DSP programming and application	Electronic defence - electronic support

Engineering professionalism	Research project: Theory Research project: Design and laboratory Computer networks
MEng – Computer Engineering Dissertation: Computer engineering	**PhD – Computer Engineering** Thesis: Computer engineering

4.2. UNIVERSITY OF KWAZULU-NATAL

The University offers BSc (Eng) in Computer Engineering and its curriculum is designed to prepare students for a career in the fast growing field of computer engineering, where computer systems are applied to the management, control and dissemination of information and the control and management of systems of all forms. The programme is based heavily on the Electronic Engineering programme with different specialisation subjects being offered in the 2nd, 3rd and 4th years of study. This approach provides a broad base of engineering concepts that is essential to the application of computing systems in problem solving.

Admission Criteria

For BSc (**Eng) (Computer Engineering)**, the minimum NSC statutory requirements for degree entry must be met as follows:

- NSC degree pass
- Mathematics and Physical Science Level 6 (70%)
- English and Life Orientation Level 4 (50%)
- Other subjects with at least 2 from the designated list

Program Duration

The program duration is a minimum of 4 years.

Modules

The Computer Engineering curriculum is designed to prepare students for a career in the fast growing field of computer engineering where computer systems are applied to the management, control and dissemination of information and the control and management of systems of all forms.

First year: The foundation subjects common to Computer, Electrical and Electronic Engineering Programmes are taken in the first year.

Second year: The specialisation subjects start with a module on Data Structures and Algorithms, which complements the two standard Computer Methods programming modules taken by all three programmes.

Third year: Further specialist modules in Software Engineering, Advanced Programming and Discrete Mathematics are taken along with two Computer Engineering Design modules.

Fourth year: Final specialisation takes place with prescribed modules in Advanced Computer Engineering, Embedded Systems, Operating Systems, and Real Time Computing, plus three optional modules taken from subjects such as Ecommerce Systems, Security and Encryption, Internet Engineering, Artificial Intelligence, and Image Processing. Students undertake two Computer Engineering design projects; one of them (the second semester) is a major project.

4.3. NORTH WEST UNIVERSITY

The North West University offer the BEng Computer & Electronic Engineering.

Admission Criteria

The number of students allowed into a school or programme may be restricted. For admission to BEng degree studies, the following apply:

- Full matriculation exemption, with an APS count of at least 31, Mathematics level 6 (70-79%) and Physical Sciences level 5 (60-69%);
- The Language requirement is a pass at level 5 (60-69%) in the language of instruction on either the Home or First Additional Language level.

Program duration

This is a 4-year programme and for the first year of study consists mainly of natural science modules, namely Chemistry, Mathematics, Applied Mathematics, Physics and Computer Programming. Certain introductory engineering modules are also presented in the first year. These include Professional Practice I in which the work of engineers in the different disciplines, the principles and theory of project management, the principles and theory of systems engineering,

computer programmes such as Word, Excel and Power Point and learning, listening, reading and writing strategies are presented.

In the second year of study, more engineering science modules are offered, together with selected natural science modules, which differ for the different branches. The curricula for the third and fourth years of study consist mainly of engineering science modules with a few science and management modules. In the final year the emphasis is on design and synthesis, with design and project modules fulfilling an important part. While formal modules in computer science and information technology are offered up to second year level, great emphasis is placed throughout the curriculum on computer applications in engineering.

Modules

The BEng Computer Engineering covers the following modules:

First Year	**Second Year**
Academic Literacy Development	Electrotechnique II
Statics and Mathematical Modelling	Signal Theory I
Programming for Engineers	Electricity and Magnetism
Electrotechnique I	Electronics I
Engineering Graphics I	Dynamics I
Materials Science I	Linear Systems
Introductory Algebra, Calculus I & Calculus II	Differential Equations
Introductory Algebra and	Numerical Methods
Basic Physics I & Basic Physics II	Advanced Calculus I
Introduction to Digital Systems	Engineering Analysis
Introduction to Microcontrollers	Linear Algebra I & Applied Linear Algebra
Practical Engineering Practice	Algorithms and Optimisation
	Embedded Systems
	Understanding the Technological World
	Fundamental Engineering
	Application Programme II (year module)
Third Year	**Fourth Year**
Electromagnetics	Signal Theory III

Control Theory I	Data Analysis
Electronics II	Telecommunication Systems
Embedded Operating Systems	Vacation Training seniors
Network Fundamentals	Control Theory II
Computer Engineering Design	Engineering Management
Object-oriented Software Development	Databases and Web-programming
Signal Theory II	Project (year module)
Engineering Statistics	Vacation Training
Principles of Measurement	
Science, Technology and Society	

4.4. UNIVERSITY OF CAPE TOWN (UCT)

The University of Cape Town currently offers a BSc (Eng) (Electrical and Computer Engineering) over the period of 4 years. Electrical and Computer Engineering is an interdisciplinary branch of engineering which combines a fundamental study in electrical engineering with computing. .

Admission Criteria

For an undergraduate engineering programme, a minimum of Senior Certificate or an equivalent qualification must be obtained. Further, the applicant will be considered for admission to the programme, if any of the following qualifications has been completed:

- Faculty Points Score (FPS) 500
- Mathematics ≥ 80% Physical Sciences ≥ 70%
- National Benchmark Test (NBT) scores of Proficient for AL, QL and Maths

Program Duration

The University of Cape Town currently offers a BSc (Eng) (Electrical and Computer Engineering) over the period of 4 years. The university does however, allow for the 5th year for those who chooses to do so at no further cost.

Modules

The modules are broken down as follows:

First Year	**Second Year**
Computer Science	Analogue Electronics
Introduction to Electronic Engineering	Embedded Systems I
Mathematics IA for Engineers	Professional Communication for Electrical Engineering
Engineering Drawing	Vector Calculus for Engineers
Physics A for Engineers	Introduction to Engineering Mechanics
Culture, Identity & Globalization in Africa	Introduction to Power Engineering
Computer Science	Signals and Systems I
Introduction to Electrical Engineering	Linear Algebra and DEs for Engineers
Mathematics IB for Engineers	Project Management
Physics B for Engineers	Electromagnetism for Engineers
Practical Training	
Third Year	**Fourth Year**
Computer Science 2001	Engineering System Design
Electrical Engineering Design Principles	Law for Engineers
Electromagnetic Engineering	Professional Communication Studies
Electronic Devices and Circuits	New Venture Planning
Signals & Systems II	Industrial Ecology
Embedded Systems	Final Year Project
Engineering Design: Electrical & Computer Engineering	Process Control & Instrumentation
Practical Training	High Performance Digital Embedded Systems
Approved Complementary Studies Elective F/S	Mobile and Wireless Networks
Computer Science 2002	
Communication & Network Engineering	
Control Systems Engineering	

5. COMPUTER ENGINEERING INTERNATIONALLY

The ECSA is part of global community, therefore, it is imperative to benchmark and compare the South Africa computer engineering with other international institutions. The institutions were selected randomly to get an insight of how the programme is structured outside South African boarders. The institutions selected are Florida International University in Miami United States, Massey University – New Zealand and University of Manchester in the United Kingdom.

5.1. FLORIDA INTERNATIONAL UNIVERSITY (FIU) – MIAMI USA

The Department of Electrical and Computer Engineering offers a combined Bachelor and Masters of Science in Computer Engineering.

Admission Criteria

The requirement to be considered for admission to the combined bachelor's/master's degree program, students must have completed at least 75 but not more than 90 of the credits required for the bachelor's degree program at FIU. The students must have earned at least a 3.2 GPA on both overall and upper division courses, and meet the admissions criteria for the graduate degree program to which they are applying.

Program duration

This five-year program seamlessly combines a baccalaureate degree in Computer Engineering with the Master's in Computer Engineering.

Modules:

Computer Engineering students must choose elective classes from area of concentration from the following list and take the corresponding courses as their Electives. Students may choose any class from any concentration as long as they fulfil the prerequisite(s) and co-requisite(s). Students must choose at least two concentrations, at least nine credits from at each of these two concentrations.

Bio-Engineering:

(Electronics I, Electronics I, Laboratory 1, Filter Design 3, Medical Instrumentation: Application and Design 4, Introduction to Digital Signal Processing 3, Introduction to Nanofabrication 3)

Communications:

(Communication Systems 3, Communication Systems Lab 1, Introduction to RF Circuit Design 3, Antennas 3, Introduction to Digital Signal Processing 3, Advanced Communication Systems 3, Introduction to Wireless Digital, Communications with USRP Applications 4)

Autonomous Systems and Control:

(Control Systems 3, Introduction to Autonomous Systems 3, Control Systems II 3, Systems Laboratory 1, Industrial Control Systems 3, Sensors, Perception, and Robotic Manipulation 3)

Integrated Nano-technology:

(Electronics I 3, Electronics I Laboratory 1, Introduction to Solid State Devices 3, Electronics II 3, Electronics II Lab 1, Integrated Circuits and Systems 3, Integrated Circuits Laboratory 1, Introduction to Nanofabrication 3)

Power/Energy:

(Power Systems I 3, Energy Conversion Lab 1, Power Systems II 3, Power Systems III 3, Power Electronics 3, Sustainable and Renewable Energy Source and Their Utilization 3)

Computer Architecture and Microprocessor Design:

(Introduction to Digital Electronics 3, Computer Design 3, Microcomputers I 3, Microcomputers I Lab 1, Reduced Instruction Set Computing, Processors 3, Microcomputers II (RISC) Lab 1)

Data System Software (CS Oriented):

(Discrete Mathematics 3, Programming I 4, Computer Programming II 3, Data Structures 3, Programming III 3, Operating Systems Principles 3, Mobile Application Development 3)

Embedded System Software:

Computer Applications in Electrical Engineering 3, Programming Embedded Systems 3, Embedded Operating Systems 3, Embedded Computing Systems 3, Embedded GUI Programming 3)

Networking and Security:

(Telecommunication Network Security 3, Telecommunication Networks 3, Telecommunication Network Analysis and Design 3, Principles of Network Management and Control Standards 3, Data Computer Communications 3, Introduction to Security of Internet of Things and Cyber-Physical Systems 3)

Cyber Security:

(Ethical Hacking and Countermeasures 3, Introduction to Digital Forensics Engineering 3, Introduction Malware Reverse Engineering 3)

Digital Forensics:

(Ethical Hacking and Countermeasures 3**,** Introduction to Digital Forensics Engineering 3, Introduction to Mobile Forensics 3, Introduction to Image and Video Forensics 3, Introduction to Network Forensics and Incident Response 3)

Internet of Things:

(Telecommunication Networks 3, Introduction to Digital Signal Processing 3, Operating Systems Principles 3, Mobile Application Development 3, Introduction to Security of Internet of Things 3, Embedded Computing Systems 3, Ubiquitous and Embedded Sensor, and Network-Centric Telecommunications 3)

Entrepreneurship:

(Engineering Entrepreneurship 3, Engineering Business Plan Development 3, Economic Decision-making in Engineering 3)

Artificial Intelligence and Big Data:

(IoT & Sensor Big Data Analytics 3, IoT & Sensor Data Visualization 3, IoT & Sensor Programming with Python 3, IoT & Analytics with Cloud Services 3, IoT Applied Machine Learning 3, Sensor & IoT Data Analysis with Deep Learning 3, Sensor IoT Analytics 3).

5.2. MASSEY UNIVERSITY – NEW ZEALAND (NZ)

Massey University offers the BE (Hons) programme has accreditation by Engineering NZ as a professional engineering degree under the Washington Accord. The distinctive feature of the engineering course at Massey is that much of the teaching is based in the laboratory where the focus is hands-on practice. There is also a strong emphasis on embedding computing & electronics technologies in every-day consumer products and the importance of the user interface.

Admission Criteria

Entry into the Bachelor of Engineering with Honours will be guaranteed to applicants who gain University Entrance and appropriate level specified below.

- Mathematics normally including standards in algebra, differentiation and integration (16 credits).
- Physics (16 credits)

If a student did not achieve the required entry standard that will guarantee selection into the Bachelor of Engineering with Honours, their application will be given individual consideration and assessed on a case-by-case basis.

Program duration

This is 4-year degree with unique feature of constant engineering practice through projects. A student become technically proficient. There is also an opportunity to learn to work in teams, leadership, communication and project management.

Modules

Year One

Provides underpinning knowledge required for subsequent years in mathematics and the engineering sciences, i.e. the fundamental technical techniques that can be used to solve engineering problems. To help with application of these fundamentals there are two projects.

Project 1: Provides tangible benefits for a third-world community. Student projects have helped communities in Vietnam, Timor-Leste and Nepal. Massey has won National Challenges 2 years running and represented NZ at the Australian challenge finals in Melbourne.

Project 2: This project designs for the year 2070. Develop products, processes or technologies that may be applicable in the future for a theme such as transportation or food preparation.

Year Two

A choice of a major happens on the second year, and students will delve deeper into the specifics of the major. A strong technical base for learning this year to enable students to make more difficult engineering or technical decisions.

Project 3: Help a real New Zealand company develop a concept for a new product.

Project 4: Design and develop a prototype and its manufacturing process for a new coffee creamer, or perhaps a new coil winder.

Year Three

In the year three, the programme concentrates on providing the specialist knowledge unique to each major. In addition, a student will do a year-long project and rely on the technical knowledge that have been up so far. The project's focus is on developing either products or process (depending on the major) that minimize the environmental impact and tests student's ability to trade off profit against functionality and social considerations.

Year Four

In the final year the programme prepare a student for a career as well as grappling with advanced technical knowledge, all students will work on a capstone project, which gets them as close as their will get during their study to working like a real engineer.

5.3. THE UNIVERSITY OF MANCHESTER – UNITED KINGDOM

The University of Manchester offers BEng and MEng Computer Systems Engineering.

Admission Criteria

Grades A*A*A including A*A* in mathematics and a science subject, either Computer Science, Further Mathematics, Biology, Chemistry or Physics. The Mathematics should contain a significant pure element (the Use of Mathematics or Core Mathematics does not satisfy this requirement). General Studies is welcome, but is not normally included as part of the standard offer. Applicants must demonstrate a broad general education including 5 GCSES at Grade A/7 or B/6 (both numeric and letter grade) including:

- Mathematics (please note we do not accept Applied GCSE Mathematics courses e.g. WJEC Mathematics - Numeracy).
- Two science subjects from computer science, physics, chemistry, biology or science and additional science.

English Language is required at GCSE level with a minimum Grade of C / 4. GCSE English Literature will not be accepted in lieu of GCSE English Language.

Program duration

Students can choose to take either the three-year BEng or the four-year MEng, Computer Systems Engineering degree on this programme.

Modules

The programme covers the following modules:

First Year	**Second Year**
First Year Team Project	Processor Microarchitecture
Mathematical Techniques for Computer Science	Microcontrollers
Fundamentals of Computation	Fundamentals of Databases
Fundamentals of Computer Engineering	Software Engineering 1
Data Science	Software Engineering 2
Fundamentals of Computer Architecture	Operating Systems
Operating Systems	System Architecture
Programming 1	Algorithms and Imperative Programming
	Mobile Systems

Programming 2	Fundamentals of Management
Third Year	**Fourth Year**
Third Year Project Laboratory	Summer Industrial Project
Implementing System-on-Chip Designs	Business Feasibility Study
Chip Multiprocessors	
Enterprise Management for Computer Scientists	
Managing Finance in Enterprises for Computer Scientists	
The Internet of Things: Architectures and Applications	
User Experience	
Agile Software Engineering	
AI and Games	
Natural Language Systems	

6. THE CASE FOR COMPUTER ENGINEERING

Computer engineering is a discipline that embodies the science and technology of design, construction, implementation, and maintenance of software and hardware components of modern computing systems, computer-controlled equipment, and networks of intelligent devices. Traditionally, computer engineering is some combination of both electrical engineering (EE) and computer science (CS). It has evolved over the past four decades as a separate discipline, although intimately related to computer science and electrical engineering. Computer engineering is solidly grounded in the theories and principles of computing, mathematics, science, and engineering and it applies these theories and principles to solve technical problems through the design of computing hardware, software, networks, and processes. Historically, the field of computer engineering has been widely viewed as “designing computers.” In fact, the design of computers themselves has been the province of relatively few highly skilled engineers whose goal was to push forward the limits of computer and microelectronics technology. The successful miniaturization of silicon devices and their increased reliability as system building blocks and

complete systems on chips have created an environment in which computers have become pervasive and replaced more conventional electronic devices.

These applications manifest themselves in the proliferation of mobile smart phones, tablet computers, multimedia and location-aware devices, wireless networks, and similar products. Computer engineering also reveals itself in the myriad of applications involving embedded systems, namely those computing systems that appear in applications such as automobiles, control systems, major appliances, and the internet of things. Increasingly, computer engineers are involved in the design of computer-based systems to address highly specialized and specific application needs. Computer engineers work in most industries, including the computer, automobile, aerospace, telecommunications, power production, and manufacturing, defense, and electronics industries. They design high-tech devices ranging from tiny microelectronic integrated-circuit chips, to powerful systems that utilize those chips and efficient telecommunication systems that interconnect those systems.

Computer engineers also work on distributed computing environments—local and wide area networks, wireless networks, internets, intranets—and embedded computer systems—such as in aircraft, spacecraft, and automobile control systems where they perform various functions. A wide array of complex technological systems, such as power generation and distribution systems and modern processing and manufacturing plants, rely on computer systems developed and designed by computer engineers. Technological advances and innovation continue to drive computer engineering. There is now a convergence of several established technologies (such as multimedia, computer, and networking technologies) resulting in widespread and ready access to information on an enormous scale. This convergence of technologies and the associated innovation lie at the heart of economic development and the future of many organizations, creating many opportunities and challenges for computer engineers. The situation bodes well for a successful career in computer engineering.

7. RECOMMENDATION

It is recommended that the ECSA consider adding Computer Engineering to the nine existing engineering disciplines. The Engineering Profession Act, Act 46 0f 2000, commands ECSA in terms of section 14(f) to encourage and itself to undertake research into matters relating to the engineering profession.

8. CONCLUSION

A new discipline specific requirement should be considered, and the required panels and registration processes should be investigated to include Computer Engineering Professional registration. Though this allowance will push present procedural boundaries, it will set the trend for future developments in Engineering, and ensure that the entire field and present professional bodies do not stagnate and miss the mark with technological organisational evolution.

9. REFERENCE LIST

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The Feasibility Study Report for:

Computer Engineering

Revision 0 dated 30 September 2019 and consisting of 22 pages was reviewed for adequacy by the Business Unit Manager and is approved by the Executive: Research, Policy and Standards (RPS).

Business Unit Manager — 30/09/2020 Date

Business Unit Manager — 30/09/2020 Date

This definitive version of the policy is available on our website.