The Communication and Electronics Engineering Program Benchmarks

1. Introduction

The Engineering Profession is a diverse discipline which has made a major positive impact on society, yet it is seldom defined in a manner which covers all contributing activities. Communication and Electronics Engineering Profession is one of the engineering disciplines which rightly claim the seats at the engineering table in Philadelphia University. It combines the fundamentals of electronics and wired/wireless communication together in such discipline. Therefore, it is involved in many aspects from the basics of the electronic and communication systems to very advance aspects in the profession fields.

The field of communications and electronics engineering which include, mobile phone systems, data communication, digital broadcasting and microelectronics technologies, continues to be one of the fastest growing engineering fields.
All Communications systems require the design of electronic subsystems, so that, the communications and Electronics Engineering program cover aspects of both electronic and Communication systems analysis and design. Such program aim to:

- Provide students with broad communication and electronic skills that will enable their career and professional accomplishments.
- Give students strong abilities in the fundamentals of communications and electronics engineering.
- Provide the opportunity for students to apply their knowledge to systematically solve engineering problems using appropriate tools and modern technology.
- Provide student with a comprehensive training in laboratory techniques, the skills of investigation, planning and handling of experimental apparatus, project design and its practical implementation.
- Provide student with training in the communication and electronic fields in different related enterprises and to offer the opportunity to develop related skills and knowledge to a high level.
- Enable students to understand the structures and processes of communication systems and the design of their electronic subsystems and to adapt to the rapidly changing technology.
- Provide students with knowledge of modern data acquisition and data communication techniques for a variety of engineering applications.
- Make students applying the design and laboratory skills expected of practicing communication and electronic Engineers.

In addition the students will acquire and develop many valuable skills such as the ability to use different engineering tools and equipment in order to analyze, evaluate, select and design an innovative System for the purpose of problem solving. The student will acquire many practical skills through the design and implementation of different communication and electronic projects circuits and to provide an acceptable prototype for such a project.

The knowledge and skills will prepare the student for further study or employment either in communication field, in electronics field or in both of them.
The outcome of the Communication and Electronics Engineering is a product, or perhaps a process or service; it is this that distinguishes it from Science and Mathematics. Learning outcomes describe what student should know and be able to do if he makes full use of the opportunities for learning that the department provides. Thus, the criteria of content of this degree set out as follows in Table 1.

The primary purposes of the Benchmarking Statements are to assist:

- Higher education institutions in designing and validating programs of study;
- Academic reviewers and external examiners in verifying and comparing standards;
- Where appropriate, professional bodies during accreditation and review process;
- Students and employers when seeking information about higher education provision.

2. Assessment

In developing an assessment strategy some key factors should be considered:

- There must be sufficient clearly identified opportunities for students to demonstrate that they have met the threshold in all components of the benchmark;
- Achievement of threshold standards may, in some cases, be implicit in the learning process (eg. The completion of a project may demonstrate attainment of some general transferable skills);
- Achievement of threshold standards should be possible without an individual student being required to pass all units of assessment [2]. For example, a particular unit may include the assessment of only one element of the benchmark. A student may achieve the threshold in this element but not achieve a pass mark in the unit as a whole.
- Careful selection from a wide range of assessment methods (annex a) can make the process more efficient and effective;
- It is important that the strategy provides sufficient opportunity for the best students to exhibit the level of innovation and creativity associated with excellence.

3.Recommendations

- The Benchmark Statements set out in Table 2 and based upon the rationale provided by the Criteria for Content above should be used to guide the academic review of programs in engineering.
- Individual disciplines within engineering should use the generic criteria of content in Table 1 to provide an interpretation of content and balance of attainment for their own discipline.

- Professional Engineering Institutions when setting criteria for their discipline and for the sections of the Engineering Council Register for which they hold responsibility, should relate them to the generic criteria and the appropriate discipline-specific interpretation.

Table 1: Benchmark Statements:

Engineering practice	*Threshold*	*Good*	*Excellent*
Knowledge and understanding of ▪ Manufacturing and/or operational practice ▪ Codes of practice and the regulatory framework ▪ Requirements for safe operation	has a basic knowledge of current practice has knowledge of specific codes of practice in routine problems, including the role of design factors has a basic knowledge of codes of practice relating to hazards and operational safety understands the need for operational safety by design and good working practices	has a wide knowledge and good understanding of current practice has knowledge and some understanding of specific codes of practice, with some understanding of the limitations of the techniques and design factors involved has knowledge and understanding of codes of practice relating to hazards and operational safety and can apply these to familiar and some unfamiliar situations	has a comprehensive understanding of current practice, its limitations, and likely new developments has understanding of appropriate codes of practice, with wide understanding of the limits of the code and design factors involved has a comprehensive knowledge and understanding of codes of practice relating to hazards and operational safety, and can apply these to a wide range of situations
Intellectual abilities Ability to produce solutions to problems through the application of engineering knowledge and	can integrate knowledge of mathematics, science, information technology, design, business context and engineering practice, to solve	can integrate knowledge of mathematics, science, information technology, design, business context and engineering practice to solve problems, some of	can integrate knowledge of mathematics, science, information technology, design, business context and engineering practice, to solve a wide range of engineering

understanding Ability to undertake technical risk evaluation	routine problems as taught can evaluate typical technical risks, using the appropriate tools as taught	which are unfamiliar and require good understanding can evaluate technical risks, even in some unfamiliar circumstances	problems applying profound understanding to novel and challenging situationsis aware of limitations of solution methods can make general evaluations of technical risks, through an understanding of the basis of such risks
Practical skills Ability to apply engineering techniques taking account of industrial and commercial constraints Project management	has some experience of applying engineering techniques taking account of commercial and industrial constraints can develop a project plan, identifying the resource requirements, and the timescales involved	has experience of applying engineering techniques taking account of a range of commercial and industrial constraints can apply standard management techniques to plan and allocate resources to projects	has experience of applying engineering techniques taking account of a wide range of commercial and industrial constraints can develop, monitor and update a plan, to reflect a changing operating environment
General transferable skills The engineering approach to the solution of problems Time and resource management Teamwork and leadership	can solve some general problems through systematic analysis and design methods can develop a personal plan of work to meet a deadline and to identify the main	can solve some general problems through systematic analysis and design methods and where necessary learn new theories, concepts, methods etc in an unfamiliar situation outside	can solve some general problems through systematic analysis design and planning, and where necessary, learn new theories, concepts, methods etc in an unfamiliar situation outside the

	external constraints can work as part of a team	the discipline area can identify the critical activities within a personal plan of work can undertake many of the roles within a team	discipline area can monitor and adjust a personal program of work on an on-going basis can undertake most of the roles within a team including leadership