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| **Cape Peninsula University of Technology** |
| **Faculty** | Engineering |
| **Department** | Electrical, Electronic and Computer Engineering |

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| **Qualification information** |
| **HEQSF Qualification type & title** | Master of Engineering in Satellite Systems and ApplicationsMEng (Satellite Systems and Applications) |
| **Total number of SAQA credits** | 180 |
| **NQF level (exit)** | 9 |

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| **Subject information** |
| **Level of study****e.g. Year 1, 2, etc.** | **Name of subject****Consult CPUT Subject naming convention (2014)** | **SAQA credits** | **NQF level** | **Compulsory/elective subject** |
| 5 | Research Methodology | 15 | 9 | Compulsory |
| **Description of subject content****Provide a short description of the subject content to be covered – NOT a list of topics only, but a narrative explaining the nature, purpose and focus of the subject and its relationship with other subjects at the same level of study.** |
| The subject teaches participants the ability to demonstrate higher order cognitive skills, an ability to critically reflect on different theoretical perspectives and an ability to evaluate complex ideas and concepts at an abstract level relevant to the discipline and/or field of study. Participants gain the tools to contribute to the body of knowledge in the discipline and/or field of study by completing a research project using appropriate research design principles and methods. The subject equips students with the ability to work both autonomously and collaboratively as a novice researcher in the field of study and/or professional practice and communicate effectively with a range of audiences using appropriate methods of communication. Participants will be able to demonstrate an ability to solve problems in creative and innovative ways and make decisions in challenging situations. |
| **Learning outcomes of subject****Consult the SAQA level descriptors and Blooms’ taxonomy to define the learning outcomes to be achieved by students.** | **Associated assessment criteria****Use the CPUT guidelines on how to write learning outcomes and associated assessment criteria.****A learning outcome may have more than one assessment criterion.** |
| 1. Understand the research process. Understand the foundations, paradigms and nature of research relevant to the academic discipline, field of study and professional practice.
 | * Locate, analyse, critically appraise and synthesise information from a wide variety of sources in order to compile the literature review of the research proposal and to make informed decisions regarding research design and methodology.
* Differentiate between the nature of research in terms of foundations, paradigms and nature of research.
* An understanding of how to apply such knowledge in a particular study and professional practice.
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| 1. Describe the key aspects of research design such as exploration, description and explanation and the research process in order to plan and execute a research project
 | * Locate, analyse, critically appraise and synthesise information from a wide variety of sources in order to compile the literature review of the research proposal and to make informed decisions regarding research design and methodology
* Apply the key aspects of research design such as exploration, description, explanation and the research process.
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| 1. Access, process and manage information. Synthesise the learned material and formulate a research topic

Locate, analyse, critically appraise and synthesise information from a wide variety of sources in order to compile the literature review of the research proposal and to make informed decisions regarding research design and methodology. | * Demonstrate understanding of the use of appropriate research methods and techniques relevant to the field of study including aspects such as qualitative, quantitative and mixed-methods research methods, sampling techniques, data generation and data analysis, including statistical methods (if relevant to field of study
* Evaluate the suitability of the research topic using criteria relevant to the field of study such as scope, relevance, significance, feasibility, ethics, objectivity, originality, etc. in consultation with supervisor(s).
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| 1. Formulate a clear and concise research problem statement and sub-problems using appropriate criteria and guidelines relevant to the field of study and in consultation with supervisor
 | * Demonstrate an understanding of the use of appropriate research methods and techniques relevant to the field of study including aspects such as qualitative, quantitative and mixed-methods research methods, sampling techniques, data generation and data analysis, including statistical methods (if relevant to the field of study).
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| 1. Compile a research proposal based on institutional and faculty criteria, procedures and guidelines relevant to the field of study and in consultation with supervisor(s).

Management of own learning. | * Demonstrate the ability to use a range of advanced and specialised skills and discourses appropriate to the field of study, discipline and professional practice to present the research proposal in written and oral format to a range of audiences, including peers and examiners
* Demonstrate the ability to operate independently and to take full responsibility for his/her own work while managing resources (e.g. time, budget, technology, equipment, etc.) in compiling the research proposal
* Locate, analyse, critically appraise and synthesise information from a wide variety of sources in order to compile the literature review of the research proposal and to make informed decisions regarding research design and methodology.
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| 1. Understand research within the ethical framework as defined in the institutional criteria and guidelines.

Understand the terms plagiarism, copyright, confidentiality, professionalism and ownership. | * Demonstrate a critical awareness of the need to act professionally and ethically, to exercise judgement and take responsibility within own limits of competence and where appropriate to account for leading and initiating processes and implementing systems, ensuring good resource and governance practices.
* Obtain ethical clearance from relevant authorities.
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| **Prescribed books****Include a short list of prescribed books/reading material. Use the Harvard referencing system for this purpose. Use the latest editions of these publications.l** |
| Kothari, C.R. (2004). *Research Methodology, methods and techniques*. 2nd Ed. New Age International. Thiel, D.V. (2015). *Research Methods for Engineers*. 1st Ed. Cambridge university Press.  |
| **Teaching & learning strategy for subject****Include details about the teaching-learning methods that will be adopted on this subject.** |
| * Teaching will be through lectures and industrial case studies. Includes individual and group projects and project preparation, and participation in student-led project presentations, and critical reflection.
* Various methods will enhance the students’ thinking skills, including industrial case studies allowing application of knowledge to real-life scenarios.
* As a postgraduate programme, this will build on expertise acquired in BTech and National Diploma courses.
* A number of teaching and learning strategies will be used in this course. Emphasis has been placed on spreading the learning strategies over as many learning categories as possible.
* Direct instruction will form part of the teaching strategy through formal lectures, slide presentations, explicit teaching, guided and shared reading as well as the use of multimedia.
* Interactive instruction will be incorporated in the form of debate, peer assessment, class discussion, tutorials and team-based learning.
* Indirect learning instruments will also be used in the form of case studies, problem-solving, reflective discussion, concept formation and concept mapping.
* The content has been developed in such a way as to give students ample opportunity to practice monitoring their learning and adapting as necessary.
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| **Assessment strategy****Include details about the assessment strategy (assessment methods & techniques, etc.)** |
| **Provide details on formative and summative assessment methods** |
| * **Methods of assessment:**

Class tests, assignments, tutorials, presentations* **Formative:**

Here the feedback provided supports the expected learning.There will be no grading for the formative evaluations.* + Students will develop appropriate processes of information gathering. These will be assessed on an ongoing basis when used in defence of chosen methods in group discussion and one on one discussions.
	+ There will be ongoing assessment and appraisal of proposal progress where students will be guided through group discussion until completion of the proposal.
	+ The student must critically discuss concepts individually and as part of a group.
* **Summative:**

Here we want to assess the extent to which the student has achieved curricular objectives. The grade will form part of the overall grade at the end of the study unit.* + Students will have to submit a project proposal.
	+ Students will present their projects and findings in class, communicating their own ideas and opinions, to be questioned and critiqued my a mixed audience.
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| **Provide details on assessment techniques (e.g. written test) and assessment tasks** |
| The students will be assessed using assignments, and a presentation of the research proposal.

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| **Assessment Type** | **Assessment Weight** |  |
| Class Tests | 0% |  |
| Assignments  | 80% | Assignments leading to a full research proposal. |
| Practical work | 0% |  |
| Tutorials | 0% |  |
| Presentations + Integrated Project | 20% | Proposal presentation  |
| FISA | 0% |  |
| Total | 100% |  |

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**Please note: The subject information should be completed for each subject of the qualification. Copy and paste the master template with the subject information for the number of subjects in the programme.**

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| **NAME OF SUBJECT/COURSE** | **THIRD ORDER CESM** | **SAQA CREDIT** | **HEMIS CREDIT** | **NQF LEVEL** |
| **MEng:Satellite Systems and Applications** |   |   |   |   |
| YEAR 1 - Compulsory modules |   |   |   |   |
| Satellite Applications | 080901 | 18 | 0.100 | 9 |
| Satellite Mission Analysis and Design | 080101 | 18 | 0.100 | 9 |
| Engineering for Space Environment | 080101 | 21 | 0.116 | 9 |
| Satellite Subsystems | 080101 | 18 | 0.100 | 9 |
| Research Methodology | 0899 | 15 | 0.083 | 9 |
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| YEAR 2 - Compulsory module |   |   |   |   |
| Mini Thesis | 080101 | 75 | 0.417 | 9 |
|   |   |   |   |   |
| Student can elect either group 1 or group 2 |   |   |   |   |
| ***Elective group 1*** |   |   |   |   |
| General History of Africa | 200302 | 7.5 | 0.042 | 9 |
| Gender and Human Rights | 120107 | 7.5 | 0.042 | 9 |
| ***Elective group 2*** |  |  |  |  |
| Management of Space Technology | 040199 | 15 | 0.084 | 9 |
|   |   |   |   |   |
| **Total MEng** |  | **180** | **1.000** |   |