School of Engineering

General Notice

A

Medium of instruction

English is the medium of instruction and for writing assignments and examinations. Responses in other languages may be accepted provided that the lecturer concerned consents. A few service subjects are available in Afrikaans.

B

Advice to students

The number of study units for which a student may register at any one time obviously depends on the amount of study time available and the ability of the student. As a general rule students should allow themselves a minimum of one hour of study time per day per subject (over 5 days). This figure should then be kept in mind when selecting the number of study units.

Students are advised to check the following at the time of registration:

- A student may register for a maximum of 5 modules per semester.
- See Calendar 2 for information regarding semester and year modules.

C

Admission requirements

ONE of the following:
1. National Senior Certificate (NSC) with a rating code of 3 (40-49%) or higher AND a rating of at least 4 in:
   (a) Mathematics (not Mathematical Literacy)
   (b) English
   (c) Physical Science AND either an Engineering and Technology or Computer subject
   OR
2. Senior certificate with Mathematics, Physical Science and English with at least an E-symbol on the Higher Grade or a D-symbol on the Standard Grade prior to 2008.
   OR
3. An N3 certificate with Mathematics, Engineering Science and English with a minimum mark of 50% (For Engineering: Chemical, Industrial Chemistry N3 is required as well.)
   OR
4. An N4 certificate with Mathematics and Engineering Science with a minimum mark of 50%. (For Engineering: Chemical, Industrial Chemistry N3 is required as well.)
   OR
5. The equivalent of number 1, 2, 3 or 4 will be considered.
6. Students who do not meet the above requirements may enrol for the Access programme.

D

Provisional admission

Students who do not comply with the admission requirements in terms of the marks obtained for Mathematics, Science or English, will only be permitted to register for the non-mathematical first level study units such as English for academic purposes and End-user computing (practical). Students must improve their marks in Mathematics, Science or English in order to be admitted to the other mathematical study units.

Students who do not satisfy the minimum requirements for Physical Science may register for the SCIENTP for access purposes. As soon as SCIENTP has been passed, the student may register for the National Diploma.

Students can improve their marks for the relevant study units by one of the following options:
1. Registering for Mathematics and/or Engineering Science at N3 level (National Certificate Vocational) at any technical/FET college.
2. Registering for equivalent study units at any other recognised institution.
3. Registering for the appropriate study units contained in the Access Brochure
4. Registering for Access Mathematics (MAT0511) and Science Tertiary Preparation (SCIENTP)

LABORATORY COMPONENT OF STUDY UNITS (PRACTICAL)

Certain study units require compulsory laboratory work. The student can either complete the laboratory component in his working environment or attend a laboratory workshop. Students who choose to attend a laboratory workshop for the particular subject should enquire about the schedule. Additional fees must be paid for the practical session or workshop as it is not covered by the registration fees.

E

Work Integrated Learning Modules (also referred to as Experiential Learning) for Engineering students

E.1 INTRODUCTION
To fulfill the requirements for the National Diploma: Engineering a student must have completed a minimum of one year work integrated learning. This Work Integrated Learning should be under the guidance of a qualified supervisor (in some cases ECSA registered and termed a mentor) according to the syllabus guidelines. These guidelines are given in the respective programme sections.

On completion of the student's work integrated learning period, the employer (supervisor/mentor) must certify that he/she has completed such learning successfully.

E.2 GENERAL

The Work Integrated Learning component for the Engineering and Mining courses is offered as one subject or as multiple subjects. A student must register, and satisfactorily complete the requirements of this subject(s) at some point in his/her studies, before a qualification can be awarded.

The implication for the student is that he/she must be employed at some time in the course of his/her studies by an employer who can offer relevant and necessary Work Integrated Learning. If the student is not able to complete this work integrated learning, he/she will not be awarded the qualification, even though all the academic subjects have been passed.

Work Integrated Learning is usually monitored by means of a log-book and mentor system.

E.3 PLACEMENT OF STUDENTS

In certain cases the academic staff in the School of Engineering will endeavor to facilitate certain placements.

E.4 STUDENT VISITS

A Unisa representative will visit the student and his/her mentor occasionally on a need-to basis.

F Requirements for information technology related study units

Computer facilities are prerequisites for students enrolling for any of the Information Technology related study units. Students must have access to computer facilities or have their own computer with the specific software they will require.

Use the following as a guideline to ensure that you have the minimum computer configuration (or higher):

A personal computer where the following configuration can be used as a guideline for the minimum required for most modules. Some modules have higher requirements and in those cases the requirements will be made available in the first tutorial letter or under module information on MyUnisa.

Configuration:

- PC with a Pentium 233(500) MHz or higher processor
- Windows XP (with SP2) or a later version.
- 512 MB of RAM or higher
- 80 GB hard-disk space
- A CD-ROM (or DVD) drive
- VGA or higher graphics (1024 X 768 resolution).
- A printer that can print both text and graphics (minimum A4 paper size)
- Flash drive or memory stick for your own data

2. National Instructional Programmes: Engineering

2.a Medium of instruction

PLEASE NOTE: The examination papers for most of the study units will be available in English only. This will apply to those study units where the course material and tutorial letters are available in English only.

2.b Availability of study units

Study units marked with an asterisk (*) or a question mark (?) are currently being developed and were not available when this calendar went to press. However, the study material may become available during the year. Students are therefore requested to enquire about the availability, should such a subject be required.

2.c Requirements for Information Technology related study units

Computer facilities are prerequisites for students enrolling for any of the Information Technology related study units. Students must have access to computer facilities or have their own computer with the specific software they will require.

Use the following as a guideline to ensure that you have the minimum computer configuration (or higher):
an IBM compatible machine using a Windows 2000/NT/XP operating system.
- 20GB harddisk drive
- 128MB RAM
- Colour SVGA screen with 4MB controller
- A mouse
- Stiﬀy drive
- CD-ROM drive (54 speed)/ DVD drive
- Printer (Deskjet or Laser Printer)
- Access to e-mail facilities and occasional Internet accesses on ﬁrst year level
- Access to e-mail and Internet facilities on higher levels

**NB**
*Please note that less than the mentioned minimum conﬁguration will not be sufﬁcient.*

### 2.d  Advice to students

The number of study units for which a student may register at any one time obviously depends on the amount of study time available and the ability of the student. As a general rule students should allow themselves a minimum of one hour of study time per day per subject (over 5 days). This ﬁgure should then be kept in mind when selecting the number of study units.

Students are advised to check the following at the time of registration:

- A student may register for a maximum of six modules per semester.
- A ‘Y’ after the module name means that it is a year module.
- A ‘S’ after the module name means that such a module is offered over a period of a semester (6 months). Such a module will be offered during both the 1st and 2nd semesters of 2010. Two registration periods therefore exist for such a module, before the ﬁrst semester commences or in the middle of the year before the 2nd semester commences.

### 2.10 Baccalaureus Technologiae: Engineering: Electrical

*Programme code: BTELN*

#### A  Admission requirements

*One of the following:*

(i) National Diploma: Engineering: Electrical (S4) with Mathematics III
   OR
(ii) National Diploma In Electrical Engineering (T3) with Mathematics III
    PLUS the Bridging Subject: Design Project III (DPJ391U)
    OR
(iii) National Higher Diploma in Electrical Engineering (T4) with Mathematics III,
    PLUS the Bridging Subject: Design Project III (DPJ391U)
    OR
(iv) equivalent relevant qualiﬁcation.

The following minimum requirements for the degree should be met:

1. Compulsory study units:
   - IPR401E Industrial Project IV
   - EMT401E Engineering Mathematics IV

#### B  Purpose and outcomes of qualiﬁcation

Students will be competent to design, implement and control production, testing, planning, construction, commissioning and maintenance in the ﬁeld of Electrical Engineering by applying technical knowledge, engineering principles, innovative design, problem-solving techniques and managerial skills. They will be capable of exercising independent technological judgement and responsible decision making by taking into account the relevant ﬁnancial, economic, commercial, social, environmental and statutory factors. A qualiﬁed person will be able to register with the Engineering Council of South Africa (ECSA) as a Professional Technologist in the ﬁeld of Electrical Engineering.

**QUALIFICATION OUTCOMES AND ASSESSMENT CRITERIA**

Specific exit level outcomes and associated assessment criteria for this qualiﬁcation are available in separate internal departmental documents.

#### C  Subject prerequisites and co-requisites

A pre-requisite subject is a subject that must be passed before the student can enrol for another subject. A co-requisite implies that the student must register for these study units together with the subject under consideration.
Compulsory subject: Industrial Project IV

Since the subject Industrial Project IV is based on theoretical knowledge gained at BTech level, it is required that at least four technical electrical study units on the BTech level be registered for before registration for Industrial Project IV is allowed.

Practical study units

The student must register for the practical and related theoretical study units simultaneously. Registration fees are payable for all the practical study units. The student can do the practical work either in his/her working environment or attend a practical workshop (ONLY in Gauteng). More details are given in the tutorial letters.

Industrial project IV

Industrial Project IV is the project subject of the BTech: Engineering: Electrical integrating and applying various technologies. This subject is also based on solving an industry-related problem. Students have to identify a suitable mentor in the working environment and together with the mentor identify a field of study that finds application in his/her working environment. Due to the industrial nature of the subject UNISA cannot provide a student with a project or a mentor.

The field of study as well as the mentor will be approved by a UNISA supervisor. The field of study forms the basis for the first stage of the project namely a literature study. During this phase the student familiarises him/herself with all relevant technologies in the field. Only in the next stage will the student together with his/her mentor and based on the literature study define a specific project title. The actual project then commences under the supervision of the UNISA supervisor and the guidance of the mentor. Progress reports form the basis of evaluating the student's progress and providing the necessary supervision. The final evaluation takes the form of a presentation which is evaluated by a panel of experts from Unisa and industry according to the standards required by the Engineering Council of South Africa.

Prescribed books

The books prescribed for each subject are specified in the first tutorial letter of each subject. Tutorial letters are also available on myUnisa.

Suggested curricula

Any non-compulsory study units can be chosen in the composition of a curriculum, as long as the minimum requirements are met. The curriculum would however normally be composed in order to prepare the student for a specific field of specialisation. Suggested fields of specialisation for curricula are the following:

1. Computer Systems
2. Power Engineering
3. Process Instrumentation
4. Telecommunication
5. Clinical Engineering

2.10.1 Computer Systems
(Programme code: BTELN – COS)

Suggested curriculum

1. COMPULSORY STUDY UNITS

<table>
<thead>
<tr>
<th>CODE</th>
<th>PREREQUISITE / NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. IFR401E</td>
<td>Industrial Project IV Design Project III (DPJ391U) and 4 level IV technical electrical study units. See par. F</td>
</tr>
<tr>
<td>2. EMT401E</td>
<td>Engineering Mathematics IV Mathematics III (MAT301W)</td>
</tr>
</tbody>
</table>

2. CHOOSE SIX FROM THE FOLLOWING:

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>3. INF303D</td>
<td>Principles of databases</td>
<td>ICT2612 &amp; ICT2613 or PRG2M1E &amp; PRG2M2E</td>
</tr>
<tr>
<td>4. CMN401E</td>
<td>Computer Networks IV (2010 only)</td>
<td>Network Systems III (ICT3631 or NSY311E)</td>
</tr>
<tr>
<td>5. ICT3631</td>
<td>Software Systems IV</td>
<td>ICT3611 and ICT3612, ICT1541 AND ICT1521</td>
</tr>
<tr>
<td>6. INF305F</td>
<td>Advanced systems development</td>
<td>ICT3611 and ICT3612, ICT1541 AND ICT1521</td>
</tr>
<tr>
<td>CODE</td>
<td>PREREQUISITE / NOTES</td>
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<td>7.</td>
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<tr>
<td>DSP401E</td>
<td>Digital Signal Processing IV (Theory)</td>
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<tr>
<td>DSP4PRA</td>
<td>Digital Signal Processing IV (Practical)</td>
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<td></td>
<td>Mathematics III (MAT301W)</td>
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<td>8.</td>
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<tr>
<td>OPE401E</td>
<td>Opto-Electronics IV (Theory)</td>
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<tr>
<td>OPE4PRA</td>
<td>Opto-Electronics IV (Practical)</td>
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<tr>
<td></td>
<td>Electronics III (Theory &amp; Practical)/ECT381A and ECT3PRA</td>
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<td>9.</td>
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<tr>
<td>CAN401E</td>
<td>Circuit Analysis IV (Theory)</td>
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<tr>
<td>CAN4PRA</td>
<td>Circuit Analysis IV (Practical)</td>
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<td></td>
<td>Mathematics III (MAT301W)</td>
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<tr>
<td>10.</td>
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<tr>
<td>ENT401I</td>
<td>Entrepreneurship IV or Management IV</td>
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<tr>
<td>ENM4PRA</td>
<td>The project for Entrepreneurship IV must be engineering-oriented.</td>
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<td>11.</td>
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<tr>
<td>ECT401E</td>
<td>Electronics IV (Theory)</td>
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<tr>
<td>ECT4PRA</td>
<td>Electronics IV (Practical)</td>
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<tr>
<td></td>
<td>Electronics III (Theory &amp; Practical)/ECT381A and ECT3PRA</td>
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</tbody>
</table>

NOTES:
1. A total of eight study units must be passed.
2. See requirements for IT related study units.

2.10.2 Power Engineering
(Programme code: BTELN – PEN)

1. COMPULSORY STUDY UNITS

<table>
<thead>
<tr>
<th>CODE</th>
<th>PREREQUISITE / NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>IPR401E</td>
<td>Industrial Project IV</td>
</tr>
<tr>
<td></td>
<td>Design Project III and 4 level IV technical electrical study units. See par. F</td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>EMT401E</td>
<td>Engineering Mathematics IV</td>
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<tr>
<td></td>
<td>Mathematics III (MAT301W)</td>
</tr>
</tbody>
</table>

2. CHOOSE SIX FROM THE FOLLOWING:

<table>
<thead>
<tr>
<th>CODE</th>
<th>PREREQUISITE / NOTES</th>
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</thead>
<tbody>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>HVE401E</td>
<td>High Voltage Engineering IV (Theory)</td>
</tr>
<tr>
<td></td>
<td>High Voltage Engineering IV (Practical)</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering III &amp; Electrical Protection III</td>
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<tr>
<td>4.</td>
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<tr>
<td>PRT401E</td>
<td>Protection Technology IV (Theory)</td>
</tr>
<tr>
<td></td>
<td>Protection Technology IV (Practical)</td>
</tr>
<tr>
<td></td>
<td>Electrical Protection III (Theory &amp; Practical) (ELM381Z and ELM3PRA)</td>
</tr>
<tr>
<td>5.</td>
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</tr>
<tr>
<td>ELM401E</td>
<td>Electrical Protection IV (Theory)</td>
</tr>
<tr>
<td></td>
<td>Electrical Protection IV (Practical)</td>
</tr>
<tr>
<td></td>
<td>Electrical Protection III (Theory &amp; Practical) (ELM381Z and ELM3PRA) See note.</td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>EMM401E</td>
<td>Electrical Machines IV (Theory)</td>
</tr>
<tr>
<td></td>
<td>Electrical Machines IV (Practical)</td>
</tr>
<tr>
<td></td>
<td>Electrical Machines III (Theory &amp; Practical) (EMM371R and EMM3PRA)</td>
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<tr>
<td>7.</td>
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<tr>
<td>PSY401E</td>
<td>Power Systems IV (Theory)</td>
</tr>
<tr>
<td></td>
<td>Power Systems IV (Practical)</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering III (Theory &amp; Practical) (ELE391X and ELE3PRA) and Electrical Distribution III (Theory &amp; Practical) (ELD371R and ELD3PRA)</td>
</tr>
<tr>
<td>CODE</td>
<td>PREREQUISITE / NOTES</td>
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</tr>
</tbody>
</table>
| 8. PCE401E | Power Electronics IV (Theory)  
              Power Electronics IV (Practical)  
       Power Electronics III (Theory & Practical) (PCE3PRA and PCE361U) |
| PCE4PRA |                                                                                     |
| 9. DCS401E | Digital Control Systems IV (Theory)  
              Control Systems IV (Theory)  
       Control Systems III (Theory & Practical) (DCS221X and DCS2PRA) |
| CSY401E |                                                                                     |
| CSY4PRA |                                                                                     |
| 10. ECT401E | Electronics IV (Theory)  
              Electronics IV (Practical)  
       Electronics III (Theory & Practical) (ECT381A and ECT3PRA) |
| ECT4PRA |                                                                                     |
| 11. OPE401E | Opto-Electronics IV (Theory)  
              Opto-Electronics IV (Practical)  
       Electronics III (Theory & Practical) (ECT381A and ECT3PRA) |
| OPE4PRA |                                                                                     |
| 12. CAN401E | Circuit Analysis IV (Theory)  
              Circuit Analysis IV (Practical)  
       Mathematics III (MAT301W) |
| CAN4PRA |                                                                                     |
| 13. ENT401I | Entrepreneurship IV or Engineering Management IV  
              The project for Entrepreneurship IV must be engineering-oriented. |

NOTES:

1) A total of eight study units must be passed.
2) ELM401E, ELM4PRA is available for exemption purposes only.

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### 2.10.3 Process Instrumentation

(Programme code: BTELN – PIN)

1. Suggested curriculum

#### 1. COMPULSORY STUDY UNITS

<table>
<thead>
<tr>
<th>CODE</th>
<th>PREREQUISITE / NOTES</th>
</tr>
</thead>
</table>
| 1. IPR401E | Industrial Project IV  
              Design Project III and 4 level IV technical electrical study units |
| 2. EMT401E | Engineering Mathematics IV  
              Mathematics III (MAT301W) |

#### 2. CHOOSE SIX FROM THE FOLLOWING:

<table>
<thead>
<tr>
<th>CODE</th>
<th>PREREQUISITE / NOTES</th>
</tr>
</thead>
</table>
| 3. PRS401E | Process Instrumentation IV (Theory)  
              Process Instrumentation IV (Practical) (PRS341Z and PRS3PRA) |
| PRS4PRA |                                                                                     |
| 4. DCS401E | Digital Control Systems IV (Theory)  
              Control Systems III and Digital Systems II |
| 5. CSY401E | Control Systems IV (Theory)  
              Control Systems IV (Practical) (CSY391B and CSY3PRA) |
| CSY4PRA |                                                                                     |
| 6. ECT401E | Electronics IV (Theory)  
              Electronics IV (Practical)  
       Electronics III (Theory & Practical) (ECT381A and ECT3PRA) |
| ECT4PRA |                                                                                     |
| 7. DSP401E | Digital Signal Processing IV (Theory)  
              Digital Signal Processing IV (Practical)  
       Mathematics III (MAT301W) |
| DSP4PRA |                                                                                     |
## 1. COMPULSORY STUDY UNITS

<table>
<thead>
<tr>
<th>CODE</th>
<th>PREREQUISITE / NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPR401E</td>
<td>Industrial Project IV Design Project III and 4 level IV technical electrical study units</td>
</tr>
<tr>
<td>EMT401E</td>
<td>Engineering Mathematics IV Mathematics III (MAT301W)</td>
</tr>
</tbody>
</table>

## 2. CHOOSE SIX FROM THE FOLLOWING:

<table>
<thead>
<tr>
<th>CODE</th>
<th>PREREQUISITE / NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECM401E</td>
<td>Electronic Communication IV (Theory) Radio Engineering III (Theory &amp; Practical) (RAE341X and RAE3PRA)</td>
</tr>
<tr>
<td>ECM4PRA</td>
<td>Electronic Communication IV (Practical)</td>
</tr>
<tr>
<td>RAE401E</td>
<td>Radio Engineering IV (Theory) Radio Engineering IV (Theory &amp; Practical) (RAE341X and RAE3PRA)</td>
</tr>
<tr>
<td>RAE4PRA</td>
<td>Radio Engineering IV (Practical)</td>
</tr>
<tr>
<td>DSP401E</td>
<td>Digital Signal Processing IV (Theory) Mathematics III (MAT301W)</td>
</tr>
<tr>
<td>DSP4PRA</td>
<td>Digital Signal Processing IV (Practical)</td>
</tr>
<tr>
<td>ECT401E</td>
<td>Electronics IV (Theory) Electronics IV (Practical) Electronics III (Theory &amp; Practical) (ECT381A and ECT3PRA)</td>
</tr>
<tr>
<td>ECT4PRA</td>
<td>Electronics IV (Practical)</td>
</tr>
<tr>
<td>MWE401E</td>
<td>Microwave Engineering IV (Theory) Radio Engineering III (Theory &amp; Practical) (RAE341X and RAE3PRA)</td>
</tr>
<tr>
<td>MWE4PRA</td>
<td>Microwave Engineering IV (Practical)</td>
</tr>
<tr>
<td>SCM401E</td>
<td>Satellite Communications IV (Theory) Radio Engineering III (Theory &amp; Practical) (RAE341X and RAE3PRA)</td>
</tr>
<tr>
<td>SCM4PRA</td>
<td>Satellite Communications IV (Practical)</td>
</tr>
<tr>
<td>OPE401E</td>
<td>Opto-Electronics IV (Theory) Opto-Electronics IV (Practical) Electronics III (Theory &amp; Practical) (ECT381A and ECT3PRA)</td>
</tr>
<tr>
<td>OPE4PRA</td>
<td>Opto-Electronics IV (Practical)</td>
</tr>
</tbody>
</table>
10. CAN401E  
   Circuit Analysis IV  
   (Theory)  
   Circuit Analysis IV  
   (Practical)  
   Mathematics III  
   (MAT301W)

11. CMN401E  
   Computer Networks IV  
   Network Systems III  
   (ICT3631)

12. ENT401I  
   Entrepreneurship IV  
   or  
   Engineering Management IV  
   The project for Entrepreneurship IV must be engineering-oriented

NOTES:

1. A total of eight study units must be passed.
2. See requirements for IT related study units.

2.10.5 Clinical Engineering  
(Programme code: BTELN – CEN)

1 Suggested curriculum

1. COMPULSORY STUDY UNITS

<table>
<thead>
<tr>
<th>CODE</th>
<th>PREREQUISITE / NOTES</th>
</tr>
</thead>
</table>
| 1. IPR401E | Industrial Project IV  
   Design Project III and  
   3 level IV Clinical Engineering study units |
| 2. EMT401E | Engineering Mathematics IV  
   Mathematics III  
   (MAT301W) |

2. CHOOSE SIX FROM THE FOLLOWING:

<table>
<thead>
<tr>
<th>CODE</th>
<th>PREREQUISITE / NOTES</th>
</tr>
</thead>
</table>
| 3. MEQ4018  
   MEQ4P1F | Medical Equipment IV A  
   (Theory)  
   Medical Equipment IV A  
   (Practical)  
   Medical Equipment III A  
   (Theory)  
   Medical Equipment III A  
   (Practical)  
   (MEQ3116)  
   (MEQ3P1C) |
| 4. MEQ4029  
   MEQ4P2G | Medical Equipment IV B  
   (Theory)  
   Medical Equipment IV B  
   (Practical)  
   Medical Equipment III B  
   (Theory)  
   Medical Equipment III B  
   (Practical)  
   (MEQ3128)  
   (MEQ3P1C) |
| 5. CET401J | Clinical Engineering Technology Management IV  
   Medical Equipment III A  
   (Theory)  
   Medical Equipment III A  
   (Practical)  
   (MEQ3116)  
   (MEQ301C) |
| 6. ENM401E | Engineering Management IV |
| 7. DSP401E  
   DSP4PRA | Digital Signal Processing IV  
   (Theory)  
   Digital Signal Processing IV  
   (Practical)  
   Mathematics III  
   (MAT301W) |
| 8. OPE401E  
   OPE4PRA | Opto-Electronics IV  
   (Theory)  
   Opto-Electronics IV  
   (Practical)  
   Electronics III (Theory & Practical)  
   (ECT381A and ECT3PRA) |
| 9. CAN401E  
   CAN4PRA | Circuit Analysis IV  
   (Theory)  
   Circuit Analysis IV  
   (Practical)  
   Mathematics III  
   (MAT301W) |
| 10. ECT401E  
    ECT4PRA | Electronics IV (Theory)  
   Electronics IV (Practical)  
   Electronics III (Theory & Practical)  
   (ECT381A and ECT3PRA) |
| 11. MWE401E  
    MWE4PRA | Microwave Engineering IV  
   (Theory)  
   Microwave Engineering IV  
   (Practical)  
   Radio Engineering III (Theory & Practical)  
   (RAE341X and RAE3PRA) |
<table>
<thead>
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<th>CODE</th>
<th>PREREQUISITE / NOTES</th>
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<td>Electronic Communication IV (Theory)</td>
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<td>Radio Engineering III (Theory &amp; Practical)</td>
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<td>The project for Entrepreneurship IV must be engineering-oriented</td>
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**NOTES:**
1. A total of eight study units must be passed.
2. See requirements for IT related study units.