# Post-Graduate Qualifications

(as at January 2021)

# Contents

# NEW NQF Levels

| | |
|---|---|
| NQF 10 | PhD, DEng |
| NQF 9 | MSc Eng, MEng, Masters degrees |
| NQF 8 | **BSc Eng**, BEng, PG Diploma, Honours degrees |
| NQF 7 | BTech, Bachelors Degrees, National Higher Diploma (old), BEng Tech (new) |

# Degree Codes

| Degree Name | Program | Plan | NQF |
|---|---|---|---|
| ***Coursework Only*** | | | |
| PG Dip Eng (Aeronautical) – in abeyance (not offered in 2021) | EXA00 | EFAAERO50 | 8 |
| PG Dip Eng (Industrial) | EXA00 | EFAIND50 | 8 |
| PG Dip Eng (Mechanical) | EXA00 | EFAMEC50 | 8 |
| ***Coursework and Research*** | | | |
| Master of Engineering (Professional) Mechanical Engineering | ECA01 | EFAMECN60 | 9 |
| Master of Engineering (Professional) Aeronautical Engineering | ECA01 | EFAAERO60 | 9 |
| Master of Engineering (Professional) Industrial Engineering in the field of Engineering Management | ECA01 | EFAIND61 | 9 |
| Master of Engineering (Professional) Industrial Engineering in the field of Industrial Engineering | ECA01 | EFAIND62 | 9 |
| Master of Engineering (Professional) Industrial Engineering in the field of Systems Engineering | ECA01 | EFAIND63 | 9 |
| MSc Engineering in the field of Mechnical, Industrial and Aernautical Engineering | ECA00 | EFAMIA61 | 9 |
| MSc Aeronautical Engineering | ECA02 | EPAAERO60 | 9 |
| MSc Engineering Management | ECA04 | EPAEMAN60 | 9 |
| MSc Mechanical Engineering | ECA05 | EPAMECN60 | 9 |
| MSc Industrial Engineering | ECA06 | EPAINDE60 | 9 |
| MSc Systems Engineering | ECA07 | EPASYSE60 | 9 |
| ***Research Only degrees*** | | | |
| Master of Science in Aeronautical Engineering | ERA02 | EPAAERO70 | 9 |
| Master of Science in Engineering Management | ERA04 | EPAEMAN70 | 9 |
| Master of Science in Mechanical Engineering | ERA05 | EPAMECN70 | 9 |
| Master of Science in Industrial Engineering | ERA06 | EPAINDE70 | 9 |
| Master of Science in Systems Engineering | ERA07 | EPASYSE70 | 9 |
| MSc Eng MIA Res | ERA00 | EFAMIA70 | 9 |
| Doctor of Philosophy (MIA) | EDA02 | EFAMIA80 | 10 |

# Masters of Science by Research Dissertation

# Masters of Science by Research Dissertation

| | | |
|---|---|---|
| Master of Science in Aeronautical Engineering | ERA02 | EPAAERO70 |
| Master of Science in Engineering Management | ERA04 | EPAEMAN70 |
| Master of Science in Mechanical Engineering | ERA05 | EPAMECN70 |
| Master of Science in Industrial Engineering | ERA06 | EPAINDE70 |
| Master of Science in Systems Engineering | ERA07 | EPASYSE70 |
| MSc Eng MIA Res | ERA00 | EFAMIA70 |

**Please note that when you apply online for any of these qualifications you must have a supervisor and a high-level project topic. Refer to "How to find a supervisor"**

- *NQF level: 9*
- *Total Credits:* ***180***
- *Admission Criteria:*
  - *Bachelor of Science in Engineering 4th year or equivalent cognate qualification (NQF 8) average >= 65% may be admitted to Master of Science*
  - *The 65% may be reviewed if the applicant has relevant working experience equivalent to those described in the DQA tables.*

# Masters of Science by Coursework + Research Report (50/50)

| | | | |
|---|---|---|---|
| MSc Engineering in the field of Mechnical, Industrial and Aernautical Engineering | ECA00 | EFAMIA61 | 9 |
| MSc Aeronautical Engineering | ECA02 | EPAAERO60 | 9 |
| MSc Engineering Management | ECA04 | EPAEMAN60 | 9 |
| MSc Mechanical Engineering | ECA05 | EPAMECN60 | 9 |
| MSc Industrial Engineering | ECA06 | EPAINDE60 | 9 |
| MSc Systems Engineering | ECA07 | EPASYSE60 | 9 |

***(Dual degree with Embry-Riddle Aeronautical University)***

**Please note that when you apply online for any of these qualifications you must have a supervisor and a high-level project topic. Refer to "How to find a supervisor" at the end of this document**

- *NQF level: 9*
- *Total Credits: **180***
- *Coursework Structure: 4 courses (20 credits each) + Research Methods (RM) Course (10 credits) + Research Report (MECN 7018A) (90 credits)*
- *Curricula are set – see appendix*
- *Admission Criteria:*
  - *Bachelor of Science in Engineering 4th year or equivalent cognate qualification (NQF 8) average >= 65% may be admitted to Master of Science*
  - *The 65% may be reviewed if the applicant has relevant working experience equivalent to those described in the DQA tables.*

# Master of Engineering (Professional)

| | | | |
|---|---|---|---|
| Master of Engineering (Professional) Mechanical Engineering | ECA01 | EFAMECN60 | 9 |
| Master of Engineering (Professional) Aeronautical Engineering | ECA01 | EFAAERO60 | 9 |
| Master of Engineering (Professional) Industrial Engineering in the field of Engineering Management | ECA01 | EFAIND61 | 9 |
| Master of Engineering (Professional) Industrial Engineering in the field of Industrial Engineering | ECA02 | EFAIND62 | 9 |
| Master of Engineering (Professional) Industrial Engineering in the field of Systems Engineering | ECA03 | EFAIND63 | 9 |

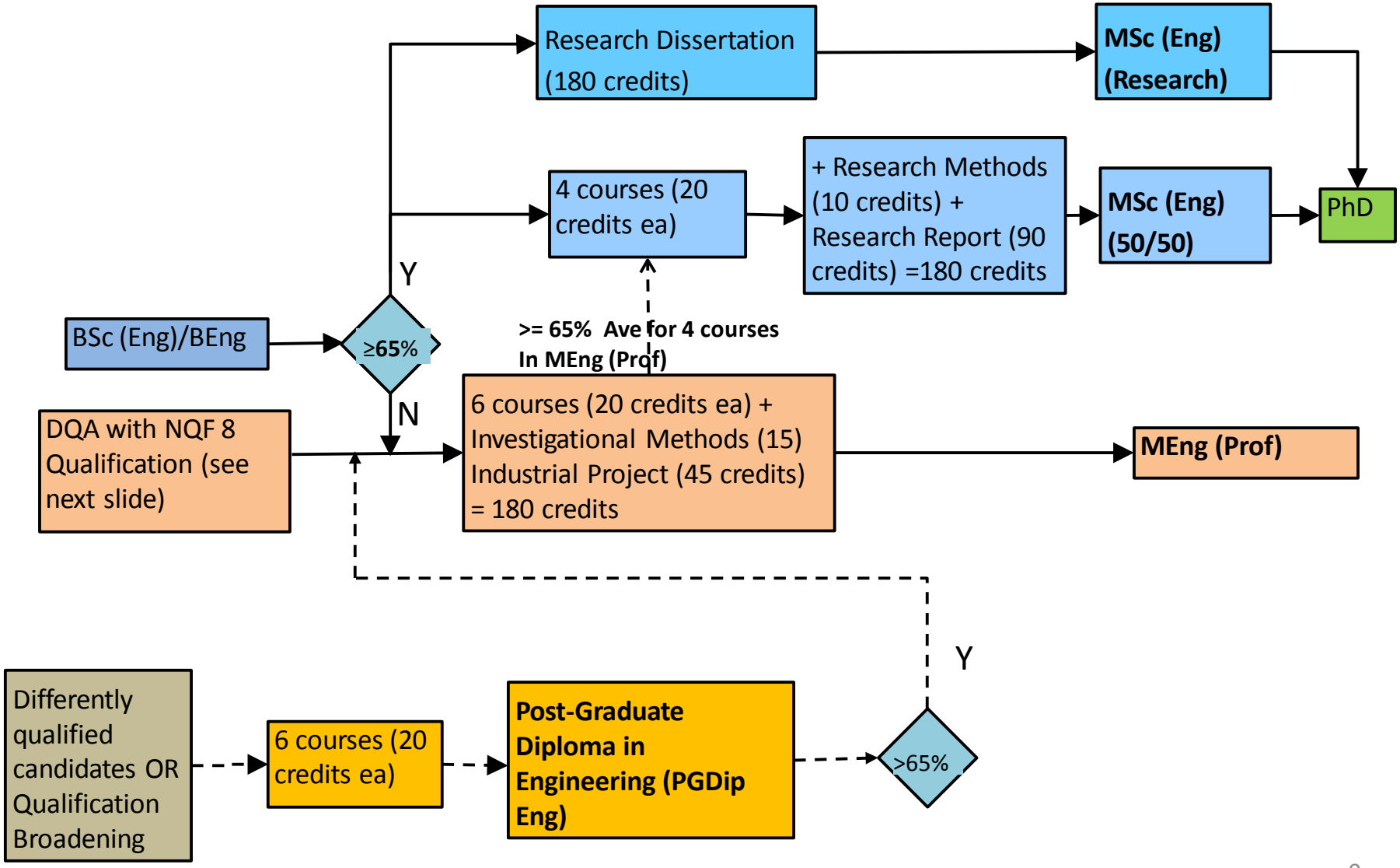
- *NQF level: 9*
- *Total Credits:* ***180***
- *Coursework Structure: 6 courses (20 credits each) + Investigational Methods (15) + Industrial Project (45 credits)*
- *Curricula– see appendix*
- *Admission Criteria:*
  - *Bachelor of Science in Engineering 4th year or equivalent cognate qualification*
  - *PG Dip Eng with average >= 60%*
  - *The 60% may be reviewed if the applicant has relevant working experience equivalent to those described in the DQA tables.*

# Post-Graduate Diploma in Engineering

| | | |
|---|---|---|
| PG Dip Eng (Aeronautical) – *in abeyance for 2021* | EXA00 | EFAAERO50 |
| PG Dip Eng (Industrial) | EXA00 | EFAIND50 |
| PG Dip Eng (Mechanical) | EXA00 | EFAMEC50 |

- *NQF level: 8 (equivalent to 4th year BSc Eng/B Eng)*
- *Total Credits: 120*
- *Structure: 6 courses (20 credits each)*
- *Curricula are set – see appendix*
- *Admission Criteria:*
  - *Relevant NQF 7 qualification or Refer to DQA Tables*

# Pathways to Post-Graduate Qualifications



# Differently Qualified Applicants (DQA) with South African qualifications

| Qualification | Minimum Criteria | Direct access to |
|---|---|---|
| M-Tech NQF 8 | at least 3 years appropriate professional experience in the relevant field (+ discretionary interview) | MEng (Professional) NQF 9 |
| 4 year non-engineering degree in an engineering related field NQF 8 | at least 3 years appropriate professional experience in the relevant field | MEng (Professional) NQF 9 |
| 4 year non-engineering degree in a non- engineering related field NQF 8 | at least 3 years appropriate professional experience in the relevant field (+ Interview) | MEng (Professional) in Industrial Engineering ONLY NQF 9 |
| | No working experience | PG Dip Eng (Industrial-ONLY) NQF 8 |



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# Differently Qualified Applicants (DQA) with South African qualifications (cont'd)

| Qualification | Minimum Criteria | Direct access to |
|---|---|---|
| B-Tech (includes a T5 qualification from previous Technikons) OR National Higher Diploma (NHDip) (includes a T4 or S4 qualification from previous Technikons) NQF 7 | | PG Dip Eng NQF 8 |
| 3 year non-engineering degree in an engineering related field NQF 7 | | PG Dip Eng (Industrial-ONLY) NQF 8 |
| National Diploma (ND) (includes a T3 or S3 qualification from previous Technikons) NQF 6 OR no first degree or formal tertiary education (i.e.. N6, matric or equivalent) NQF 4 | | Undergrad qualifications in Engineering may be applied for OR A technology qualification at a University of Technology (E.g. UJ or TUT) |

# TO APPLY:

# http://www.wits.ac.za/postgraduate/applications/

Email - Bernadette Sunjka - Outl | Study at Wits - Wits University | Applications - Wits University

wits.ac.za/postgraduate/applications/

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**In this section**

- Admission Procedures
- Departmental Forms
- Glossary
- Study Abroad

Apply to Wits


Easy, online applications.

## HOW TO APPLY FOR POSTGRAD STUDY AT WITS

1 Use the course finder on www.wits.ac.za/postgraduate to confirm the entry requirements and closing dates for your programme of study.

2 Complete an online application form at: **www.wits.ac.za/applications/**

3 Certain programmes require additional departmental forms. Complete and return these forms within the timeframes for submission. The University will withdraw incomplete applications.

4 Please note that for all pure research applicants, before being admitted to a research degree, a candidate needs to approach the HOD for the particular school or department to discuss choice of research topic and availability/suitability of a supervisor. This has to be done before an application can be made.

Infographic showing the steps for application for PG students

5 Upload supporting documents (certified within the last three months) *via* the self-service portal:

**https://self-service.wits.ac.za/**

6 Due to the current Coronavirus lockdown, successful applicants will be able to accept an offer without submitting certified hard copies of academic qualifications. However, the University will verify any information/ documents submitted and immediately cancel your registration, record such action against your record, and take necessary legal action in the event that any fraudulent document/s and/or other

https://self-service.wits.ac.za

10:43 AM

# Masters Degree and PG Dip Eng Curricula

# Master of Science in Engineering

## in the branch of Mechanical, Industrial and Aeronautical Engineering

**4) Branch of Mechanical, Industrial and Aeronautical Engineering**

| Degree Code: ECA00 | | NQF Exit Level: 9 | |
|---|---|---|---|
| Plan Code: EFAMIA61 | | Total NQF Credits: 180 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| a) A combination of *courses* listed below yielding 80 credits: | | | |
| MECN7005A | Engineering Economics | 20 | 9 |
| MECN7029A | Mathematical Topics for Engineering Management | 20 | 9 |
| MECN7006A | Production and Ops Management | 20 | 9 |
| MECN7017A | Value Engineering and Analysis | 20 | 9 |
| MECN7020A | Manufacturing Strategy | 20 | 9 |
| MECN7023A | Management of Technology | 20 | 9 |
| MECN7028A | Lean Manufacturing | 20 | 9 |
| MECN7057A | Enterprise Engineering | 20 | 9 |
| MECN7059A | Supply Chain Management | 20 | 9 |
| MECN7065A | Service Engineering | 20 | 9 |
| MECN7001A | Reliability Engineering | 20 | 9 |
| MECN7024A | Maintenance Engineering | 20 | 9 |
| MECN7026A | Finite Element Methods | 20 | 9 |
| MECN7034A | Bulk Solids Storage and Handling | 20 | 9 |
| MECN7035A | Belt Conveying of Bulk Solids | 20 | 9 |
| MECN7054A | Systems Engineering: Hard Systems Methodologies | 20 | 9 |
| MECN7058A | Systems Engineering: Soft Systems Methodologies | 20 | 9 |
| MECN7062A | Systems Engineering: An Overview | 20 | 9 |
| CIVN7038A | Project Management – Part I | 20 | 9 |
| CIVN7039A | Project Management – Part II | 20 | 9 |
| b) Provided that the *Senate* may permit a *candidate* to replace one or more of the above *courses* with one or more other masters *courses* at an *NQF* level 9 that are relevant to the field of study. | | | |
| c) Successfully complete a Research Methods in Engineering *course* (MECN7066A) yielding a minimum of 10 credits at an *NQF* level 9 and a *Research Report* (MECN7018A) yielding 90 credits at an *NQF* level 9 on a topic appropriate to the field of Industrial, Mechanical Engineering or Aeronautical Engineering. | | | |

*Coursework Structure:*
*4 courses (20 credits each) +*
*Research Methods (RM) Course (10 credits) +*
*Research Report (MECN 7018) (90 credits)*

**Not all courses are offered every year Check the timetable to see which courses are on offer**

**Please note that when you apply online for any of these qualifications you must have a supervisor and a high-level project topic. Refer to slides "how to find a supervisor" for supervisors and research interests**

| Degree Code: ECA02 | | NQF Exit Level: 9 | |
|---|---|---|---|
| Plan Code: EPAAERO60 | | Total NQF Credits: 180 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| a) The following *courses* are prescribed: | | | |
| MECN7094A | The Air Transportation System | 20 | 9 |
| MECN7095A | Human Factors in the Aviation/Aerospace Industry | 20 | 9 |
| b) *Course(s)* selected from the list of elective *courses* below yielding a minimum of 20 or maximum 40 credits as may be offered in any year: | | | |
| MECN7096A | Advanced Aerodynamics | 20 | 9 |
| MECN7097A | Earth Observation and Remote Sensing | 20 | 9 |
| MECN7098A | Aviation/Aerospace Simulation Systems | 20 | 9 |
| MECN7099A | Applications in Crew Resource Management | 20 | 9 |
| MECN7100A | Unmanned Aerospace Systems | 20 | 9 |
| MECN7101A | Applications in Space: Commerce Defence and Exploration | 20 | 9 |
| MECN7102A | Advanced Rotorcraft Operations | 20 | 9 |
| MECN7103A | Aircraft and Space Craft Development | 20 | 9 |
| MECN7104A | Aerospace Accident Investigation and Analysis | 20 | 9 |
| MECN7105A | Airport Safety and Certification | 20 | 9 |
| MECN7106A | Management of Research and Development for the Aerospace Industry | 20 | 9 |
| c) Should a total of 20 credits have been selected in b) above, then one *course* yielding 20 credits may be selected from the list of elective *courses* below as may be offered in any year: | | | |
| MECN7001A | Reliability Engineering | 20 | 9 |
| MECN7006A | Production and Operations Management | 20 | 9 |
| MECN7017A | Value Engineering and Analysis | 20 | 9 |
| MECN7020A | Manufacturing Strategy | 20 | 9 |
| MECN7023A | Management of Technology | 20 | 9 |
| MECN7024A | Maintenance Engineering | 20 | 9 |
| MECN7026A | Finite Element Methods | 20 | 9 |
| MECN7028A | Lean Manufacturing | 20 | 9 |
| MECN7054A | Systems Engineering: Hard Systems Methodologies | 20 | 9 |
| MECN7058A | Systems Engineering: Soft Systems Methodologies | 20 | 9 |
| MECN7059A | Supply Chain Management | 20 | 9 |
| MECN7062A | Systems Engineering: An Overview | 20 | 9 |
| MECN7065A | Service Engineering | 20 | 9 |
| d) Successfully complete a Research Methods in Engineering *course* (MECN7066A) yielding a minimum of 10 credits at an *NQF* level 9 and a *Research Report* (MECN7018A) yielding 90 credits at an *NQF* level 9 on a topic appropriate to the field of Aerospace engineering. | | | |

# Master of Science in Aeronautical Engineering

## Dual Degree

Candidates may present themselves for a dual degree offered in Collaboration with Embry Riddle Aeronautical University. Candidates who elect this option will be required to follow the following curriculum.

## *Coursework Structure:*

*4 courses (20 credits each) +*
*Research Methods (RM) Course (10 credits) +*
*Research Report (MECN 7018) (90 credits)*

**Not all courses are offered every year**
**Check the timetable to see which courses are on offer**

**Please note that when you apply online for any of these qualifications you must have a supervisor and a high-level project topic. Refer to slides "how to find a supervisor" for supervisors and research interests**

## 1. Syllabus, Duration of degree and Conversion of Grades

The minimum duration of the dual degree will be 3 semesters. The degree structure is shown below:

| | Taught by Wits | Taught by ERAU |
|---|---|---|
| Semester 1 | **MECN7066** Research Methods in Engineering[2] | **ASCI 602** Air Transportation System (Airline Analysis)<br>**ASCI 604** Human Factors in the Aviation/Aerospace Industry |
| Semester 2 | **Any one of the following:**<br>**MECN 7006** Production and Operations Management<br>**MECN 7017** Value Engineering and Analysis<br>**MECN 7020** Manufacturing Strategy<br>**MECN 7023** Management of Technology<br>**MECN 7028** Lean Manufacturing<br>**MECN7059** Supply Chain Management<br>**MECN7065** Service Engineering<br>**MECN 7001** Reliability Engineering<br>**MECN 7024** Maintenance Engineering<br>**MECN 7026** Finite Element Methods<br>**MECN7054** Systems Engineering: Hard Systems Methodologies<br>**MECN7058** Systems Engineering: Soft Systems Methodologies, or<br>**MECN7062** Systems Engineering: An Overview<br><br>*Alternately a course may be selected from the ERAU list of courses* | **At least one of the following:**<br>**ASCI 509** Advanced Aerodynamics<br>**ASCI 511** Earth Observation and Remote Sensing<br>**ASCI 515** Aviation/Aerospace Simulation Systems<br>**ASCI 516** Applications in Crew Resource Management<br>**ASCI 530** Unmanned Aerospace Systems<br>**ASCI 560** Advanced Rotorcraft Operations<br>**ASCI 601** Applications in Space: Commerce, Defense, and Exploration<br>**ASCI 603** Aircraft and Spacecraft Development<br>**ASCI 615** Aviation/Aerospace Accident Investigation and Analysis<br>**ASCI 617** Airport Safety and Certification<br>**ASCI 638** Human Factors in Unmanned Aerospace Systems<br>**ASCI 643** Management of Research and Development for the Aviation/Aerospace Industry |
| Semester 3 | **MECN7018** Research Report | **ASCI 700a** Thesis I<br>**ASCI 700b** Thesis II |

Grade conversion

| Agreed Grade | Wits | ERAU | Grade Point Average |
|---|---|---|---|
| A | ≥ 75% | ≥ 90% | 4 |
| B | 65% - 74.9% | 80% - 89.9% | 3 |
| C | 60% - 65% | 70% - 79.9% | 2 |

Grade Point Average (GPA) 4 is defined as a distinction.

## 2. Additional Administrative Arrangements

2.1. While taking ERAU courses students must maintain a 3.0 GPA and cannot go below for more than one semester. Students whose cumulative grade point average (CGPA) with ERAU falls below 3.00 are placed on academic warning and must raise their CGPA to 3.00 within the next term of graduate work or will be dismissed from the program.

2.2. Examination procedures will meet the rules and regulations of each Partner.

2.3. Examination of the MECN7018 Research Report, in terms of Wits examination rules, cannot be assessed by either the Wits supervisor or the ERAU supervisor. One other examiner internal to Wits and one external examiner, who might be employed by ERAU, will be appointed.



2.4. Examination of the ASCI 701 and ASCI 702 thesis will be performed according to the rules of ERAU. If ERAU wishes the participation of the Wits supervisor, Wits will permit such participation.

# Master of Science in Mechanical Engineering

*Coursework Structure: 4 courses (20 credits each) + Research Methods (RM) Course (10 credits) + Research Report (MECN 7018A) (90 credits)*

| Degree Code: ECA05 | | NQF Exit Level: 9 | |
|---|---|---|---|
| Plan Code: EPAMECN60 | | Total NQF Credits: 180 | |
| Course Code | Course Description | NQF Credits | NQF Level |
| a) *Courses* selected from the list of elective *courses* below yielding a minimum of 60 credits as may be offered in any year: | | | |
| MECN7001A | Reliability Engineering | 20 | 9 |
| MECN7013A | Principles of Air Conditioning | 20 | 9 |
| MECN7014A | Principles of Refrigeration | 20 | 9 |
| MECN7019A | Internal Combustion Engine Analysis | 20 | 9 |
| MECN7021A | Analysis of Composite Structures | 20 | 9 |
| MECN7024A | Maintenance Engineering | 20 | 9 |
| MECN7026A | Finite Element Methods | 20 | 9 |
| MECN7033A | Automotive Engineering | 20 | 9 |
| MECN7034A | Bulk Solids Storage and Handling | 20 | 9 |
| MECN7035A | Belt Conveying of Bulk Solids | 20 | 9 |
| MECN7061A | Extended Finite Element Methods and Meshfree Methods | 20 | 9 |
| b) One elective *course* selected from *courses* at a Masters level from Industrial Engineering, Systems Engineering or the Branch of Aeronautical Engineering, as may be offered in any year, yielding 20 credits. | | | |
| c) Successfully complete a Research Methods in Engineering *course* (MECN7066A) yielding a minimum of 10 credits at an *NQF* level 9 and a *Research Report* (MECN7018A) yielding 90 credits at an *NQF* level 9 on a topic appropriate to the field of Mechanical Engineering. | | | |

**Not all courses are offered every year Check the timetable to see which courses are on offer**

**Please note that when you apply online for any of these qualifications you must have a supervisor and a high-level project topic. Refer to slides "how to find a supervisor" for supervisors and research interests**

# Master of Science in Systems Engineering

*Coursework Structure: 4 courses (20 credits each) + Research Methods (RM) Course (10 credits) + Research Report (MECN 7018A) (90 credits)*

| Programme Code: ECA07 | | NQF Exit Level: 9 | |
|---|---|---|---|
| Plan Code: EPASYSE60 | | Total NQF Credits: 180 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| a) The following *courses* are prescribed: | | | |
| MECN7055A | Requirements Analysis in Systems Engineering | 20 | 9 |
| MECN7056A | Systems Engineering: Architecture | 20 | 9 |
| MECN7058A | Systems Engineering: Hard Systems | 20 | 9 |
| b) *Courses* selected from the list of elective *courses* below yielding 20 credits as may be offered in any year: | | | |
| MECN7000A | Operations Research | 20 | 9 |
| MECN7053A | Systems Engineering Management | 20 | 9 |
| MECN7054A | Systems Engineering: Soft Systems Methodologies | 20 | 9 |
| c) Successfully complete a Research Methods in Engineering *course* (MECN7066A) yielding a minimum of 10 credits at an *NQF* level 9 and a *Research Report* (MECN7018A) yielding 90 credits at an *NQF* level 9 on a topic appropriate to the field of Systems Engineering. | | | |



**Please note that when you apply online for any of these qualifications you must have a supervisor and a high-level project topic. Refer to slides "how to find a supervisor" for supervisors and research interests**

**Not all courses are offered every year**
**Check the timetable to see which courses are on offer**

# Master of Science in Industrial Engineering

*Coursework Structure: 4 courses (20 credits each) + Research Methods (RM) Course (10 credits) + Research Report (MECN 7018A) (90 credits)*

| Degree Code: ECA06 | | NQF Exit Level: 9 | |
|---|---|---|---|
| Plan Code: EPAINDE60 | | Total NQF Credits: 180 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| a) *Courses* selected from the list of elective *courses* below yielding a minimum of 60 credits as may be offered in any year: | | | |
| MECN7000A | Operational Research Methods | 20 | 9 |
| MECN7006A | Production and Operations Management | 20 | 9 |
| MECN7060A | Operations Management for Mining Systems | 20 | 9 |
| MECN7016A | Quality Management | 20 | 9 |
| MECN7017A | Value Engineering and Analysis | 20 | 9 |
| MECN7020A | Manufacturing Strategy | 20 | 9 |
| MECN7023A | Management of Technology | 20 | 9 |
| MECN7027A | Discrete Event Simulation | 20 | 9 |
| MECN7028A | Lean Manufacturing | 20 | 9 |
| MECN7029A | Mathematical Topics for Engineering Management | 20 | 9 |
| MECN7054A | Systems Engineering: Soft Systems Methodologies | 20 | 9 |
| MECN7062A | Systems Engineering: An Overview | 20 | 9 |
| MECN7057A | Enterprise Engineering | 20 | 9 |
| MECN7059A | Supply Chain Management | 20 | 9 |
| MECN7065A | Service Engineering | 20 | 9 |
| b) One elective *course* selected from *courses* at a Masters level from Engineering Management or Mechanical Engineering, as may be offered in any year, yielding 20 credits. | | | |
| c) Successfully complete a Research Methods in Engineering *course* (MECN7066A) yielding a minimum of 10 credits at an *NQF* level 9 and a *Research Report* (MECN7018A) yielding 90 credits at an *NQF* level 9 on a topic appropriate to the field of Industrial Engineering. | | | |

**Not all courses are offered every year Check the timetable to see which courses are on offer**

**Please note that when you apply online for any of these qualifications you must have a supervisor and a high- level project topic. Refer to slides "how to find a supervisor" for supervisors and research interests**

# Master of Science in Engineering Management

*Coursework Structure: 4 courses (20 credits each) + Research Methods (RM) Course (10 credits) + Research Report (MECN 7018A) (90 credits)*

| Degree Code: ECA04 | | NQF Exit Level: 9 | |
|---|---|---|---|
| Plan Code: EPAEMAN60 | | Total NQF Credits: 180 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| a) *Courses* selected from the list of elective *courses* below yielding a minimum of 60 credits as may be offered in any year: | | | |
| MECN7005A | Engineering Economics | 20 | 9 |
| MECN7007A | Elements of Commercial and Industrial Law | 20 | 9 |
| MECN7008A | Financial Management (pre-requisite MECN 7011) | 20 | 9 |
| MECN7009A | Principles of Management | 20 | 9 |
| MECN7010A | Human Resource Management | 20 | 9 |
| MECN7011A | Accounting and Financial Statements | | |
| MECN7029A | Mathematical Topics for Engineering Management | 20 | 9 |
| MECN7032A | Management Accounting | 20 | 9 |
| MECN7051A | Business to Business Marketing | 20 | 9 |
| MECN7113A | Strategic Management in Engineering | 20 | 9 |
| b) One elective *course* selected from *courses* at a Masters level from Industrial Engineering, as may be offered in any year, yielding 20 credits. | | | |
| c) Successfully complete a Research Methods in Engineering *course* (MECN7066A) yielding a minimum of 10 credits at an *NQF* level 9 and a *Research Report* (MECN7018A) yielding 90 credits at an *NQF* level 9 on a topic appropriate to the field of Engineering Management. | | | |

**Not all courses are offered every year Check the timetable to see which courses are on offer**

**Please note that when you apply online for any of these qualifications you must have a supervisor and a high-level project topic. Refer to slides "how to find a supervisor" for supervisors and research interests**

# Master of Engineering (Professional)- Aeronautical Engineering

Coursework Structure:
6 courses (20 credits each) +
Investigational Methods (IM) Course (15 credits) +
Research/Industry Project (45credits)

**Not all courses are offered every year Check the timetable to see which courses are on offer**

| Degree Code: ECA01 | | NQF Exit Level: 9 | |
|---|---|---|---|
| Plan Code: EFAAERO60 | | Total NQF Credits: 180 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| a) The following *courses* are prescribed | | | |
| MECN7094A | The Air Transportation System | 20 | 9 |
| MECN7095A | Human Factors in the Aviation/Aerospace Industry | 20 | 9 |
| b) At least two *courses* selected from the list of elective *courses* below as may be offered in any year: | | | |
| MECN7096A | Advanced Aerodynamics | 20 | 9 |
| MECN7097A | Earth Observation and Remote Sensing | 20 | 9 |
| MECN7098A | Aviation/Aerospace Simulation Systems | 20 | 9 |
| MECN7099A | Applications in Crew Resource Management | 20 | 9 |
| MECN7100A | Unmanned Aerospace Systems | 20 | 9 |
| MECN7101A | Applications in Space: Commerce Defence and Exploration | 20 | 9 |
| MECN7102A | Advanced Rotorcraft Operations | 20 | 9 |
| MECN7103A | Aircraft and Space Craft Development | 20 | 9 |
| MECN7104A | Aerospace Accident Investigation and Analysis | 20 | 9 |
| MECN7105A | Airport Safety and Certification | 20 | 9 |
| MECN7106A | Management of Research and Development for the Aerospace Industry | 20 | 9 |
| c) At least two *courses* selected from the list of elective *courses* below as may be offered in any year: | | | |
| MECN7001A | Reliability Engineering | 20 | 9 |
| MECN7006A | Production and Operations Management | 20 | 9 |
| MECN7017A | Value Engineering and Analysis | 20 | 9 |
| MECN7020A | Manufacturing Strategy | 20 | 9 |
| MECN7023A | Management of Technology | 20 | 9 |
| MECN7024A | Maintenance Engineering | 20 | 9 |
| MECN7026A | Finite Element Methods | 20 | 9 |
| MECN7028A | Lean Manufacturing | 20 | 9 |
| MECN7054A | Systems Engineering: Hard Systems Methodologies | 20 | 9 |
| MECN7058A | Systems Engineering: Soft Systems Methodologies | 20 | 9 |
| MECN7059A | Supply Chain Management | 20 | 9 |
| MECN7062A | Systems Engineering: An Overview | 20 | 9 |
| MECN7065A | Service Engineering | 20 | 9 |
| d) Provided that the *Senate* may permit a *candidate* to replace the *courses* in above with *courses* from the fields of Industrial Engineering, Engineering Management and Systems Engineering or the Branch of Mechanical Engineering. | | | |
| e) Successfully complete an Engineering Investigational Methods (MECN7112A) *course* yielding a minimum of 15 credits at an *NQF* level 9 and a Research/Industrial Project (MECN7111A) yielding 45 credits at an *NQF* level 9 on a topic appropriate to the field of Aerospace engineering. | | | |

# Master of Engineering (Professional)- Mechanical Engineering

Coursework Structure: 6 courses (20 credits each) + Investigational Methods (IM) Course (15 credits) + Research/Industry Project (45credits)

| Degree Code: ECA01 | | NQF Exit Level: 9 | |
|---|---|---|---|
| Plan Code: EFAMECN60 | | Total NQF Credits: 180 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| a) A combination of the *courses* listed below yielding 120 credits: | | | |
| MECN7001A | Reliability Engineering | 20 | 9 |
| MECN7013A | Principles of Air Conditioning | 20 | 9 |
| MECN7014A | Principles of Refrigeration | 20 | 9 |
| MECN7019A | Internal Combustion Engine Analysis | 20 | 9 |
| MECN7021A | Analysis of Composite Structures | 20 | 9 |
| MECN7024A | Maintenance Engineering | 20 | 9 |
| MECN7026A | Finite Element Methods | 20 | 9 |
| MECN7033A | Automotive Engineering | 20 | 9 |
| MECN7034A | Bulk Solids Storage and Handling | 20 | 9 |
| MECN7035A | Belt Conveying of Bulk Solids | 20 | 9 |
| MECN7061A | Extended Finite Element Methods and Meshfree Methods | 20 | 9 |
| MECN7109A | The Mechanics of Heavy Vehicles | 20 | 9 |
| MECN7110A | Vehicle Dynamics and Automotive Engineering | 20 | 9 |
| b) Provided that the *Senate* may permit a *candidate* to replace one of the *courses* in a) above with one other masters *course* from the field of Industrial Engineering, Engineering Management and Systems Engineering or the Branch of Aeronautical Engineering. | | | |
| c) Successfully complete an Engineering Investigational Methods (MECN7112A) course yielding a minimum of 15 credits at an *NQF* level 9 and a Research/Industrial Project (MECN7111A) yielding 45 credits at an *NQF* level 9 on a topic appropriate to the field of Mechanical Engineering. | | | |

**Not all courses are offered every year Check the timetable to see which courses are on offer**

# Master of Engineering (Professional)- Industrial Engineering In the field of Engineering Management

Coursework Structure: 6 courses (20 credits each) + Investigational Methods (IM) Course (15 credits) + Research/Industry Project (45credits)

| Degree Code: ECA01 | | NQF Exit Level: 9 | |
|---|---|---|---|
| Plan Code: EFAIND61 | | Total NQF Credits: 180 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| a) A combination of the *courses* listed below yielding 120 credits: | | | |
| MECN7005A | Engineering Economics | 20 | 9 |
| MECN7007A | Elements of Commercial and Industrial Law | 20 | 9 |
| MECN7008A | Financial Management (pre-requisite MECN 7011A) | 20 | 9 |
| MECN7009A | Principles of Management | 20 | 9 |
| MECN7010A | Human Resource Management | 20 | 9 |
| MECN7011A | Accounting and Financial Statements | 20 | 9 |
| MECN7029A | Mathematical Topics for Engineering Management | 20 | 9 |
| MECN7032A | Management Accounting | 20 | 9 |
| MECN7051A | Business to Business Marketing | 20 | 9 |
| MECN7113A | Strategic Management in Engineering | 20 | 9 |

b) Provided that the *Senate* may permit a *candidate* to replace one of the *courses* in a) above with one other masters *course* from the field of Industrial Engineering.

c) Successfully complete an Engineering Investigational Methods (MECN7112A) *course* yielding a minimum of 15 credits at an *NQF* level 9 and a Research/Industrial Project (MECN7111A) yielding 45 credits at an *NQF* level 9 on a topic appropriate to the field of Engineering Management.

**Not all courses are offered every year Check the timetable to see which courses are on offer**

# Master of Engineering (Professional)- Industrial Engineering In the field of Systems Engineering

| Degree Code: ECA01 | | NQF Exit Level: 9 | |
|---|---|---|---|
| Plan Code: EFAIND61 | | Total NQF Credits: 180 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| a) The following *course* is prescribed | | | |
| MECN7058A | Systems Engineering: Hard Systems | 20 | 9 |
| b) *A combination of courses* listed below yielding 100 credits, as may be offered in any year: | | | |
| MECN7053A | Systems Engineering Management | 20 | 9 |
| MECN7054A | Systems Engineering: Soft Systems Methodologies | 20 | 9 |
| MECN7062A | Systems Engineering: An Overview | 20 | 9 |
| MECN7055A | Requirements Analysis in Systems Engineering | 20 | 9 |
| MECN7056A | Systems Engineering: Architecture | 20 | 9 |
| MECN7063A | Systems Engineering – Modelling and Simulation: Principles and Approaches | 20 | 9 |
| MECN7064A | Systems Engineering: Integration, Verification and Validation | 20 | 9 |
| MECN7113A | Strategic Management in Engineering | 20 | 9 |
| c) Provided that the *Senate* may permit a *candidate* to replace one of the *courses* in a) above with one other masters *course* from the field of Industrial Engineering, Engineering Management or the Branch of Mechanical or Aeronautical Engineering. | | | |
| d) Successfully complete an Engineering Investigational Methods (MECN7112A) course yielding a minimum of 15 credits at an *NQF* level 9 and a Research/Industrial Project (MECN7111A) yielding 45 credits at an *NQF* level 9 on a topic appropriate to the field of Systems Engineering. | | | |

Coursework Structure:
6 courses (20 credits each) +
Investigational Methods (IM) Course (15 credits) +
Research/Industry Project ( (45credits)

**Not all courses are offered every year Check the timetable to see which courses are on offer**

# Master of Engineering (Professional)- Industrial Engineering
# In the field of Industrial Engineering

Coursework Structure: 6 courses (20 credits each) + Investigational Methods (IM) Course (15 credits) + Research/Industry Project (45credits)

| Degree Code: ECA01 | | NQF Exit Level: 9 | |
|---|---|---|---|
| Plan Code: EFAIND61 | | Total NQF Credits: 180 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| a) A combination of the *courses* listed below yielding 120 credits: | | | |
| MECN7000A | Operational Research Methods | 20 | 9 |
| MECN7006A | Production and Operations Management or | 20 | 9 |
| MECN7060A | Operations Management for Mining Systems | 20 | 9 |
| MECN7016A | Quality Management | 20 | 9 |
| MECN7017A | Value Engineering and Analysis | 20 | 9 |
| MECN7020A | Manufacturing Strategy | 20 | 9 |
| MECN7023A | Management of Technology | 20 | 9 |
| MECN7027A | Discrete Event Simulation | 20 | 9 |
| MECN7028A | Lean Manufacturing | 20 | 9 |
| MECN7029A | Mathematical Topics for Engineering Management | 20 | 9 |
| MECN7054A | Systems Engineering: Soft Systems Methodologies | 20 | 9 |
| MECN7062A | Systems Engineering: An Overview | 20 | 9 |
| MECN7057A | Enterprise Engineering | 20 | 9 |
| MECN7059A | Supply Chain Management | 20 | 9 |
| MECN7065A | Service Engineering | 20 | 9 |
| MECN7108A | Lean Management of Health Care Systems | 20 | 9 |
| MECN7113A | Strategic Management in Engineering | 20 | 9 |
| b) Provided that the *Senate* may permit a *candidate* to replace one of the *courses* in a) above with one other masters *course* from the field of Engineering Management, Systems Engineering or in the Branch of Mechanical Engineering. | | | |
| c) Successfully complete an Engineering Investigational Methods (MECN7112A) course yielding a minimum of 15 credits at an *NQF* level 9 and a Research/Industrial Project (MECN7111A) yielding 45 credits at an *NQF* level 9 on a topic appropriate to the field of Industrial Engineering. | | | |

**Not all courses are offered every year Check the timetable to see which courses are on offer**

# Post-Graduate Diploma in Engineering

*– in abeyance for 2021*

**1) Branch of Aeronautical Engineering:**

| Degree Code: EXA00 | | NQF Exit Level: 8 | |
|---|---|---|---|
| Plan Code: EFAAERO50 | | Total NQF Credits: 120 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| The following *courses* are prescribed: | | | |
| MECN5008A | Aerodynamics | 20 | 8 |
| MECN5009A | Flight Dynamics and Control | 20 | 8 |
| MECN5010A | Aircraft Structures | 20 | 8 |
| MECN5011A | Compressible Flow and Propulsion | 20 | 8 |
| MECN5005A | Systems Management | 20 | 8 |
| MECN5007A | Engineering Investigation | 20 | 8 |

# Post-Graduate Diploma in Engineering

## 4) Branch of Industrial Engineering:

| Degree Code: EXA00 | | NQF Exit Level: 8 | |
|---|---|---|---|
| Plan Code: EFAIND50 | | Total NQF Credits: 120 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| The following *courses* are prescribed: | | | |
| MECN5002A | Operations Management | 20 | 8 |
| MECN5003A | Operations Research Methods | 20 | 8 |
| MECN5004A | Manufacturing Technology Principles | 20 | 8 |
| MECN5005A | Systems Management | 20 | 8 |
| MECN5006A | Business Planning Studies | 20 | 8 |
| MECN5007A | Engineering Investigation | 20 | 8 |

# Post-Graduate Diploma in Engineering

## 5) Branch of Mechanical Engineering:

| Degree Code: EXA00 | | NQF Exit Level: 8 | |
|---|---|---|---|
| Plan Code: EFAMEC50 | | Total NQF Credits: 120 | |
| **Course Code** | **Course Description** | **NQF Credits** | **NQF Level** |
| The following *courses* are prescribed: | | | |
| MECN5013A | Thermal System | 20 | 8 |
| MECN5014A | Fluid Dynamics | 20 | 8 |
| MECN5015A | Mechatronics | 20 | 8 |
| MECN5012A | Mechanics of Solids | 20 | 8 |
| MECN5007A | Engineering Investigation | 20 | 8 |
| MECN5005A | Systems Management | 20 | 8 |

# How to find a supervisor

in
the School of Mechanical, Industrial and Aeronautical Engineering

# You need to find a supervisor before you apply on line

- Your application will only be processed for a decision if you have provided a supervisor and topic in your application for the following degrees:

| Degree Name | Program | Plan | NQF |
|---|---|---|---|
| ***Coursework and Research*** | | | |
| MSc Engineering in the field of Mechnical, Industrial and Aernautical Engineering | ECA00 | EFAMIA61 | 9 |
| MSc Aeronautical Engineering | ECA02 | EPAAERO60 | 9 |
| MSc Engineering Management | ECA04 | EPAEMAN60 | 9 |
| MSc Mechanical Engineering | ECA05 | EPAMECN60 | 9 |
| MSc Industrial Engineering | ECA06 | EPAINDE60 | 9 |
| MSc Systems Engineering | ECA07 | EPASYSE60 | 9 |
| ***Research Only degrees*** | | | |
| Master of Science in Aeronautical Engineering | ERA02 | EPAAERO70 | 9 |
| Master of Science in Engineering Management | ERA04 | EPAEMAN70 | 9 |
| Master of Science in Mechanical Engineering | ERA05 | EPAMECN70 | 9 |
| Master of Science in Industrial Engineering | ERA06 | EPAINDE70 | 9 |
| Master of Science in Systems Engineering | ERA07 | EPASYSE70 | 9 |
| MSc Eng MIA Res | ERA00 | EFAMIA70 | 9 |
| Doctor of Philosophy (MIA) | EDA02 | EFAMIA80 | 10 |

# To find a supervisor in the area of study you are interested in

- Review the School website: https://www.wits.ac.za/mia/research/potential-supervisors/
- Identify possible supervisors
- Email the possible supervisors to find out if they are available for supervision
- If the potential supervisor responds, then set up a meeting with that supervisor to discuss a topic and whether the supervisor is prepared to take you as a student
- If the supervisor agrees to take you as a student, then upload a Word document as part of your application indicating the supervisors name and the topic your have agreed on