

Optimising Performance - the Knowledge Challenge

Ken Mavin & Ray Farrelly
Centre for Pavement Engineering Education
(CPEE)







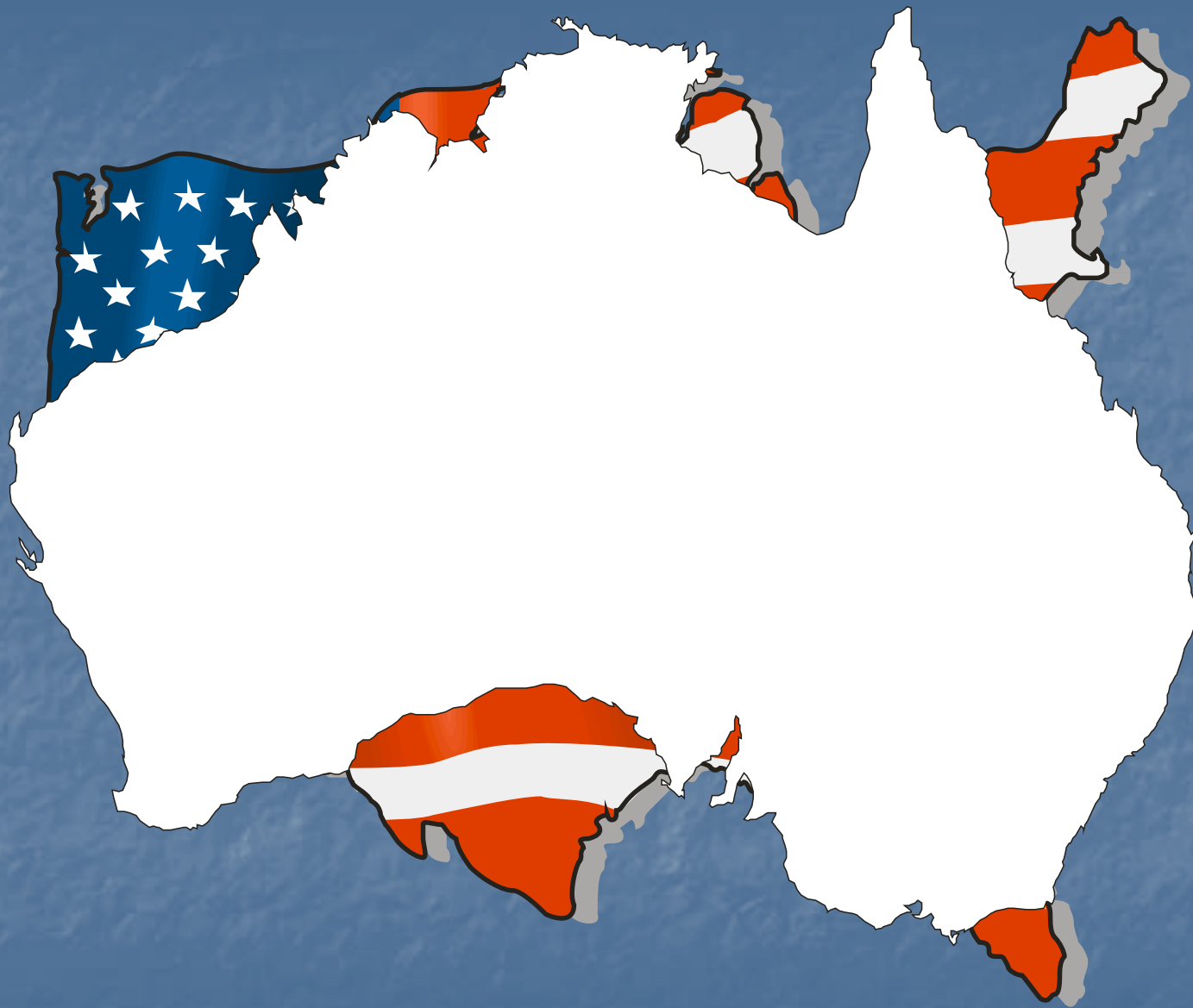




Australia in proportion to Europe







Australian Challenge

- Vast country
- Small population
- Funding difficult
- Varying pavement types
- Innovation important
- Australia relies heavily on roads for transport & freight movement

....of the Challenges

- Limited road funds
- Maintenance largest single recurring component of road agency's costs
- Loss of experience & expertise in key personnel
- Performance

The Next Decade >

- Larger, longer, very high-powered vehicles
- Increased axle/tyre loads, tyre pressures
- Need for better/stronger pavements and mixes
- Minimum maintenance pavements



The Next Decade >>>

n Recycling

- n Increasing use for environmental and cost reasons
- n Recycled products expected to perform as new
- n Increased use of cold recycling

n Cold and Warm Asphalt Mixes

- n Developments in use and performance
- n Need for improved methods of design and assessment

The Next Decade >>>>

- Refinery closures and changes in bitumen quality and performance
- Restricted range of binders

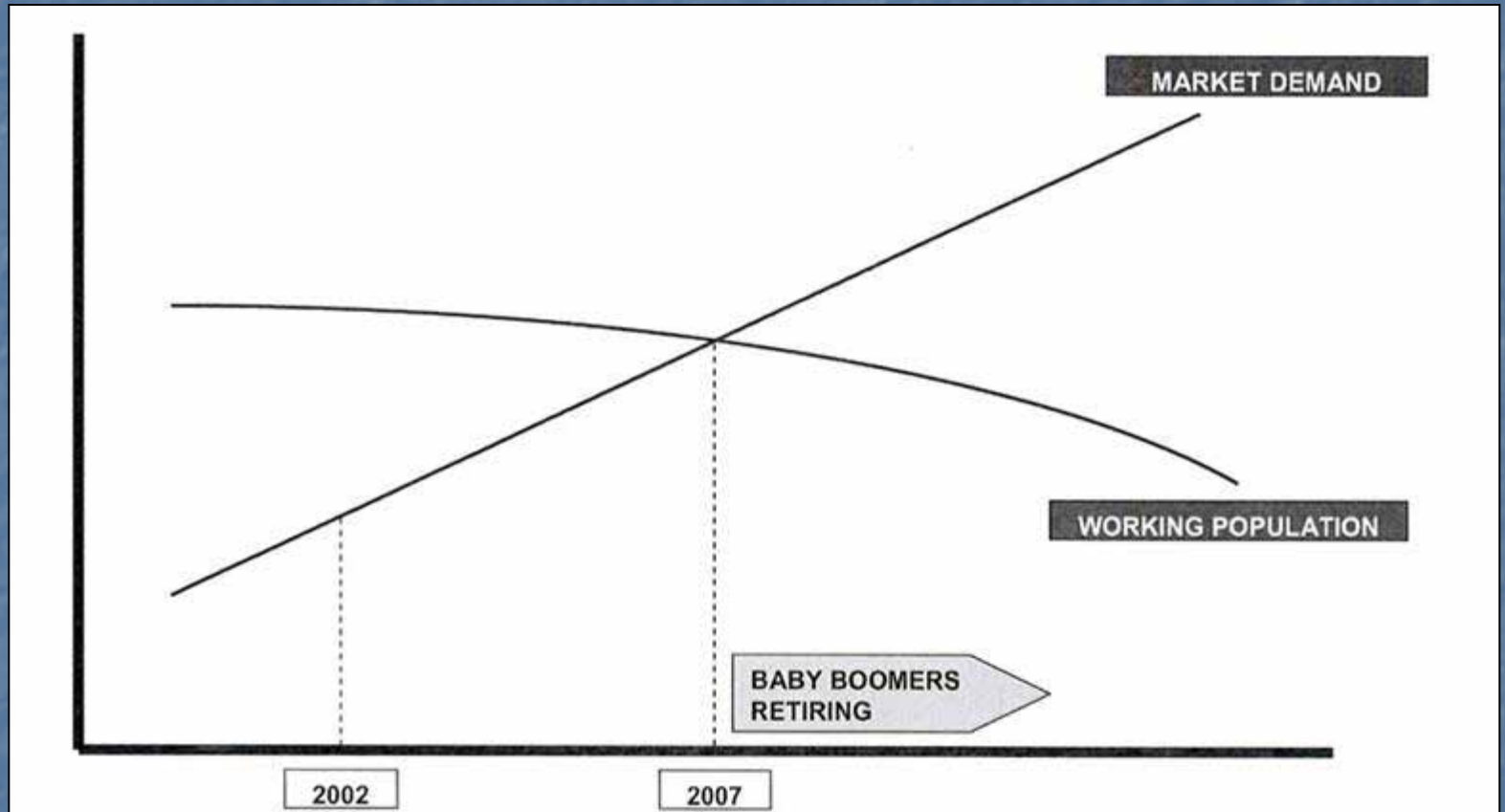
The Next Decade >>>>>>

- n Safety & Environmental issues
- n Innovation
- n People – knowledgeable and skilled

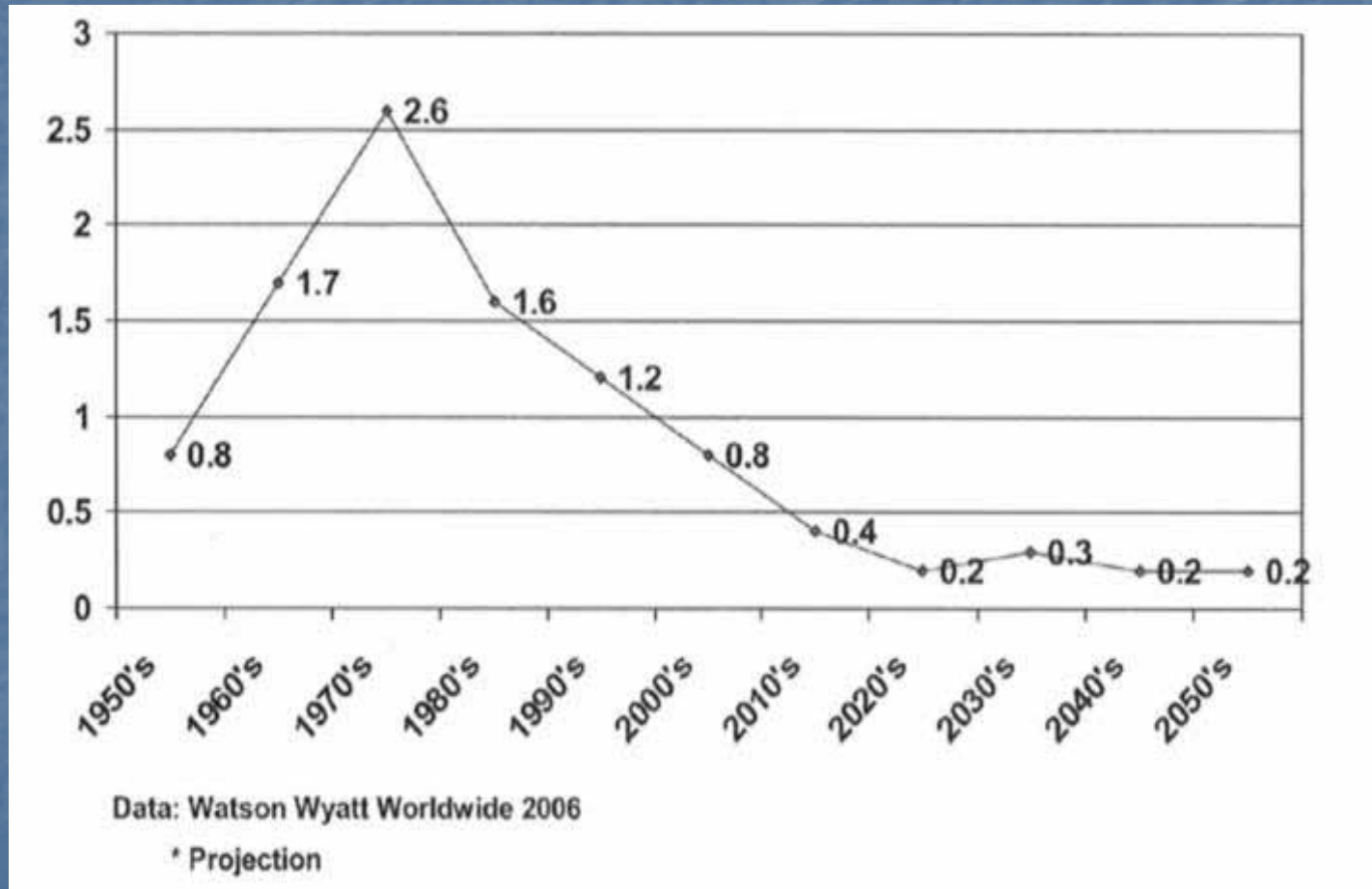
Do we have the people?



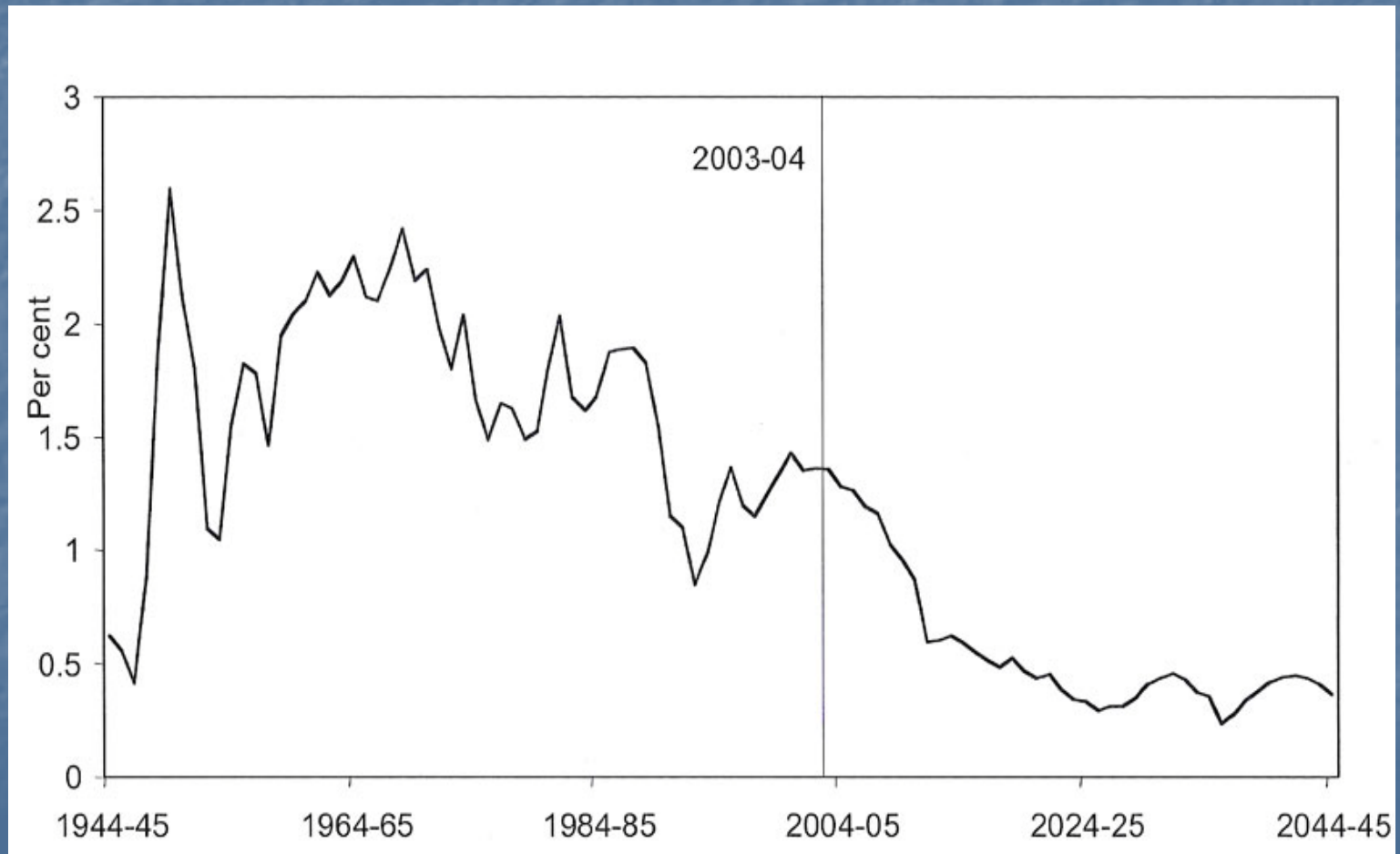
Evolving Job Market



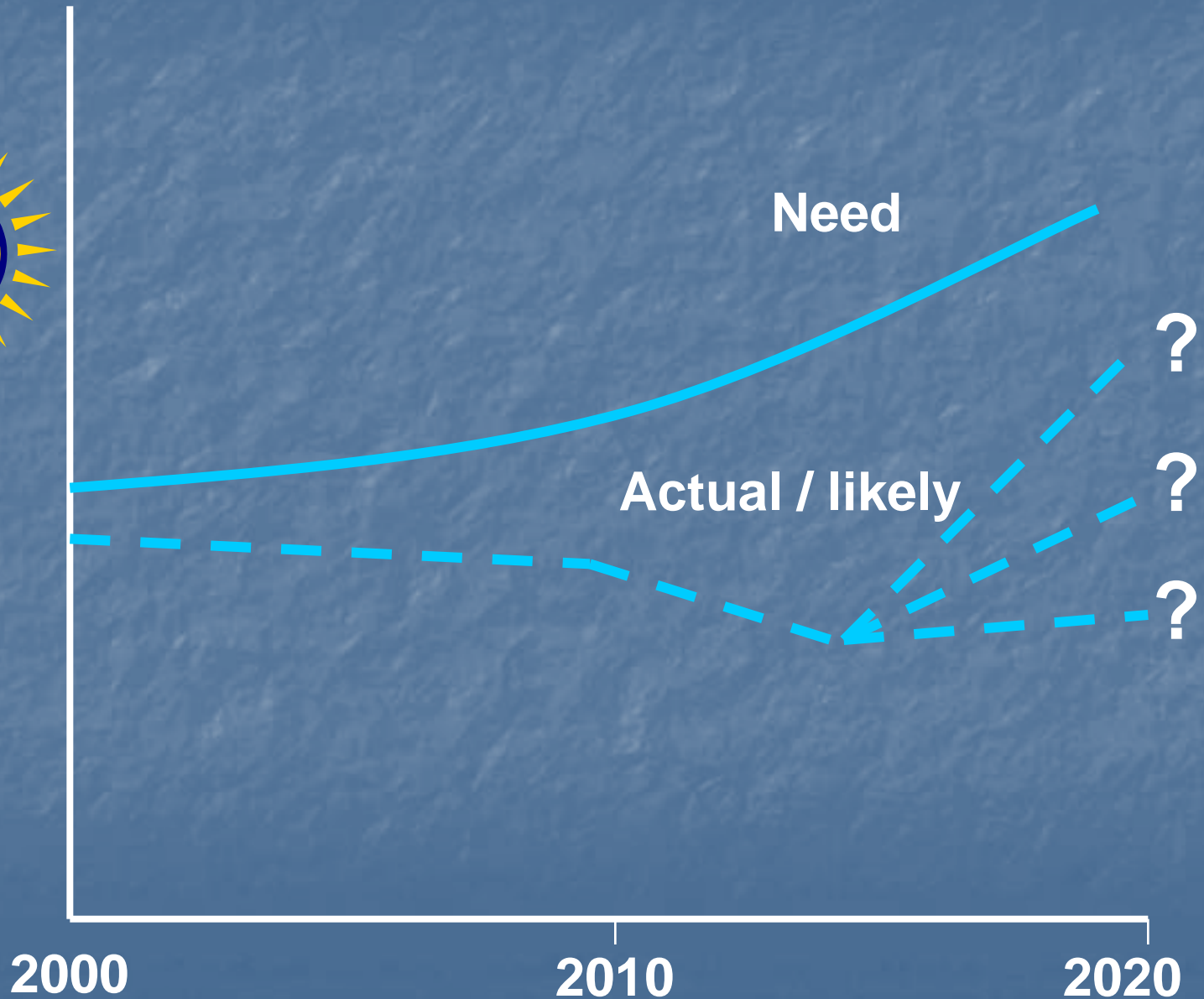
Compound Annual Labour-Force Growth Per Decade



Looking Forward: Growth in Population of Working Age



The knowledge gap is widening...



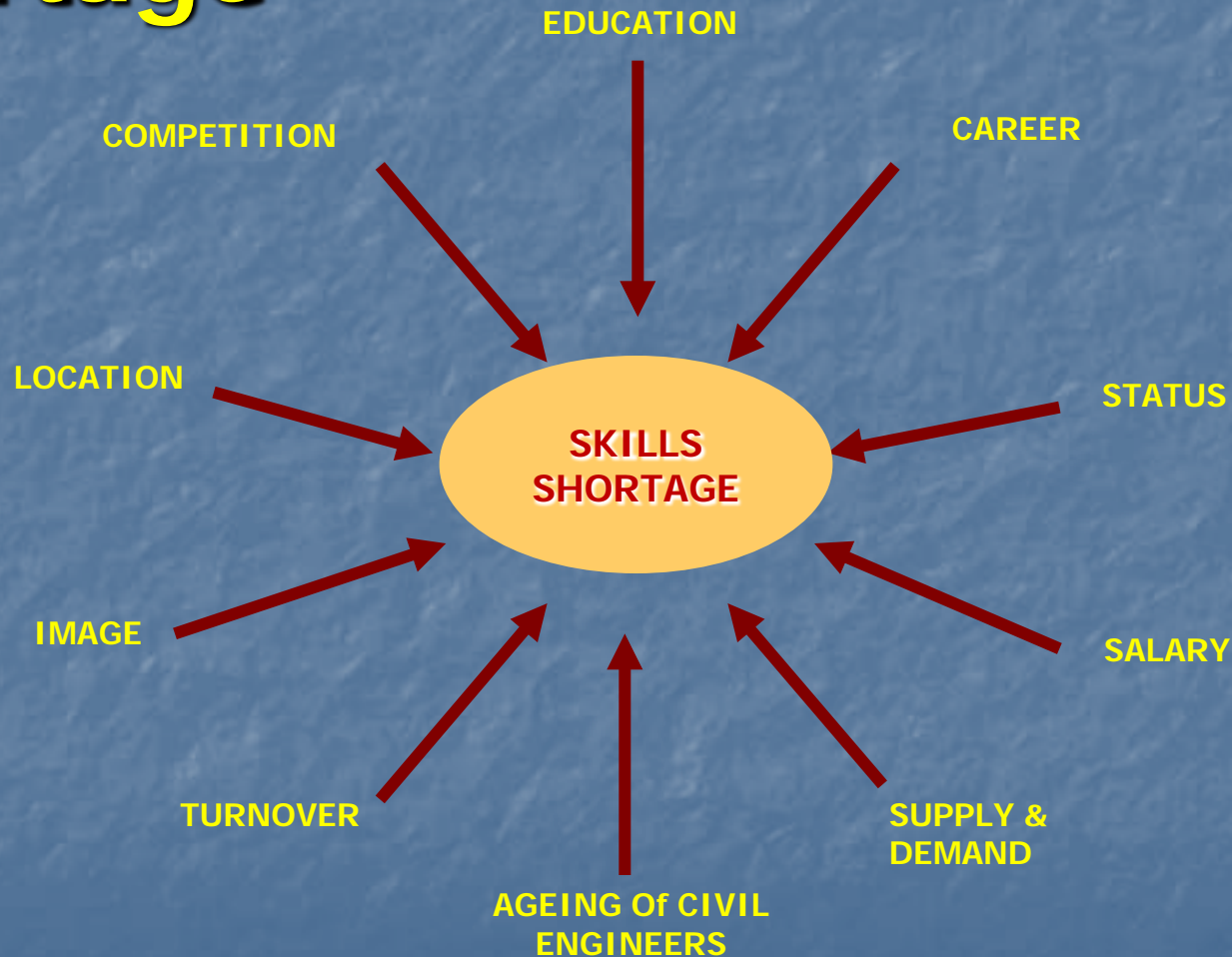
Engineering Skills Shortage

- Not just traditional trades
- Shortage of professional engineers/technologists
- Shortage of engineering graduates
- 'Imported' solution not long term answer

Specialised 'Boutique' Knowledge

- Graduate engineers & technicians lack knowledge of pavements engineering
- Companies need to 'upgrade' employees
- Diminishing industry expertise a concern

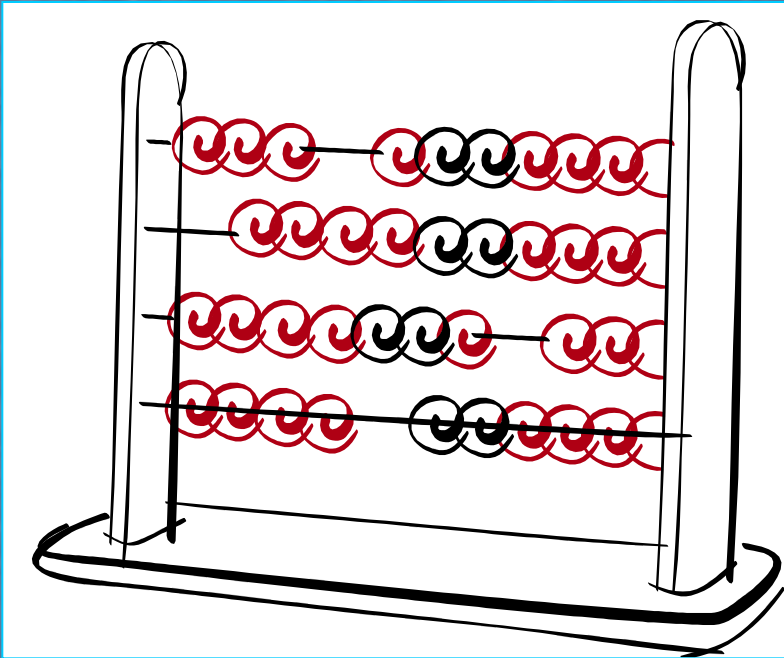
Issues Impacting on Skills Shortage



Quality outcomes
require quality people!

Improved
training & education
needed

We need to keep up
with 'new technology'



Educational Aims

To improve pavement studies opportunities for graduate and postgraduate engineering students as well as industry personnel seeking continuing education

Austroroads – AAPA

**(State Road
Authorities)**

**(Asphalt
Industry)**

Unique outcome from innovative approach



**Centre for Pavement
Engineering Education**

United Kingdom

Scandinavia

Europe

Canada

USA

Asia

South Africa

Australia

New Zealand





+



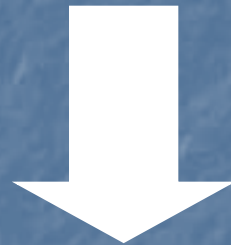
+



Government

Industry

Universities



**Centre for Pavement
Engineering Education**



Centre for Pavement
Engineering Education

CPEE

The Centre for Pavement Engineering Education (CPEE)

- Accredited private provider of Tertiary education



Models of Learning

- Formal Lectures
- Tutorials
- Flexible Learning

CPEE Model of Learning

■ Work-Integrated Learning

CPEE

Candidate

Workplace

- P/G candidate
- Self-teaching study materials
- Candidate acquires knowledge/skills
- Interaction with work colleagues
- Enhances knowledge/skills

CPEE Distance Learning

- Adds value to knowledge transfer by providing p/g qualifications
- Raises status of pavement engineering and technology



CPEE Programs

- Master of Engineering in Pavements (12 study units including research work)*
- Master of Technology in Pavements (8 study units)*
- Graduate Certificate in Pavement Technology (4 study units)
- Single unit study available

*Awarded thru LaTrobe University

CPEE Initiatives

- LMS introduced to further develop student engagement
- Study materials available electronically

CPEE Future Directions

- Attract quality graduates to CPEE courses
- Create pathways into CPEE higher education courses



CPEE Study Units

- Introduction to Pavements
- Pavement Design
- Flexible Pavement Construction
- Pavement Wearing Surfaces
- Asphalt Mix Design
- Pavement Maintenance and Rehabilitation
- Fundamentals of Road Construction
- Project Evaluation
- Water Management in Transport Corridors Road
- Industrial and Heavy Duty Pavements
- In Situ Stabilisation
- Road Asset Management
- Rigid Pavement Construction
- Managing the Road Environment
- Pavement Management
- Asset Management Fundamentals
- Asset Management Practices

CPEE Independently has "University standing"

- Registered provider of higher education
- Independently awards
 - Graduate Certificate
 - Master of Technology



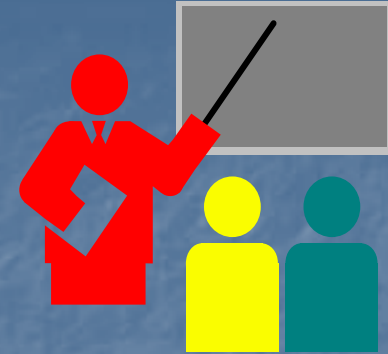
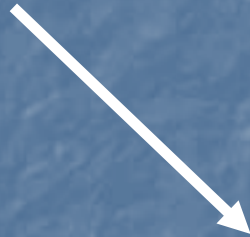
Study Materials

n Practical bias

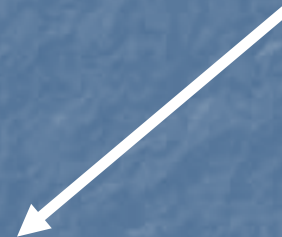
- n developed by industry expert teams
- n based on current industry best practice/Austrroads Guides
- n reviewed to reflect changes to standards and practice



Distance Education



Short Courses



**Graduate Certificate
or Masters units**

Graduate Certificate

- **Four units of study**

Master of Technology (Pavements)

- **Eight units of study**

Master of Engineering (Pavements)

- **Twelve units of study**

(incl. a 2 unit research and thesis)

**– All CPEE units, or
mix of CPEE and University units**



+



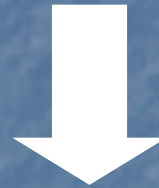
+



CPEE

IPWEA

University



Infrastructure Asset Management:

Graduate Certificate & Graduate Diploma

- Asset Management Fundamentals
- Elective – Group A (3 of)
- Asset Management Practices
- Elective – Group B (3 of)

Graduate Certificate

- **Infrastructure Asset Management**

Commenced July 2009

- Asset Management Fundamentals
- Elective – Group A (3 of)
 - - Pavement Management
 - - Pavement Maint. & Rehabilitation
 - - Project Evaluation
- Asset Management Practices
- Elective – Group B (3 of)
 - - Financial Management
 - - Eng. Risk Management
 - - Managing Information Systems

Unit/Course Delivery

- n Comprehensive study package (guide & material)
- n Expert tutor/consultant lecturers from industry/govt./universities
- n Study in any location
- n No attendance at University
- n Examinations local
- n Study material updated regularly

Student Support

- n User-friendly printed notes & readings
- n Comprehensive study schedule
- n Tutors contacted by phone/fax/email
- n CPEE Administration Centre
- n CPEE web page
- n CPEE Newsletter

Student Assessment

- Assignment 1 20%
- Assignment 2 20%
- Examination (3 hours) 60%

Overview

**MASTER OF
ENGINEERING**

MASTER OF TECHNOLOGY

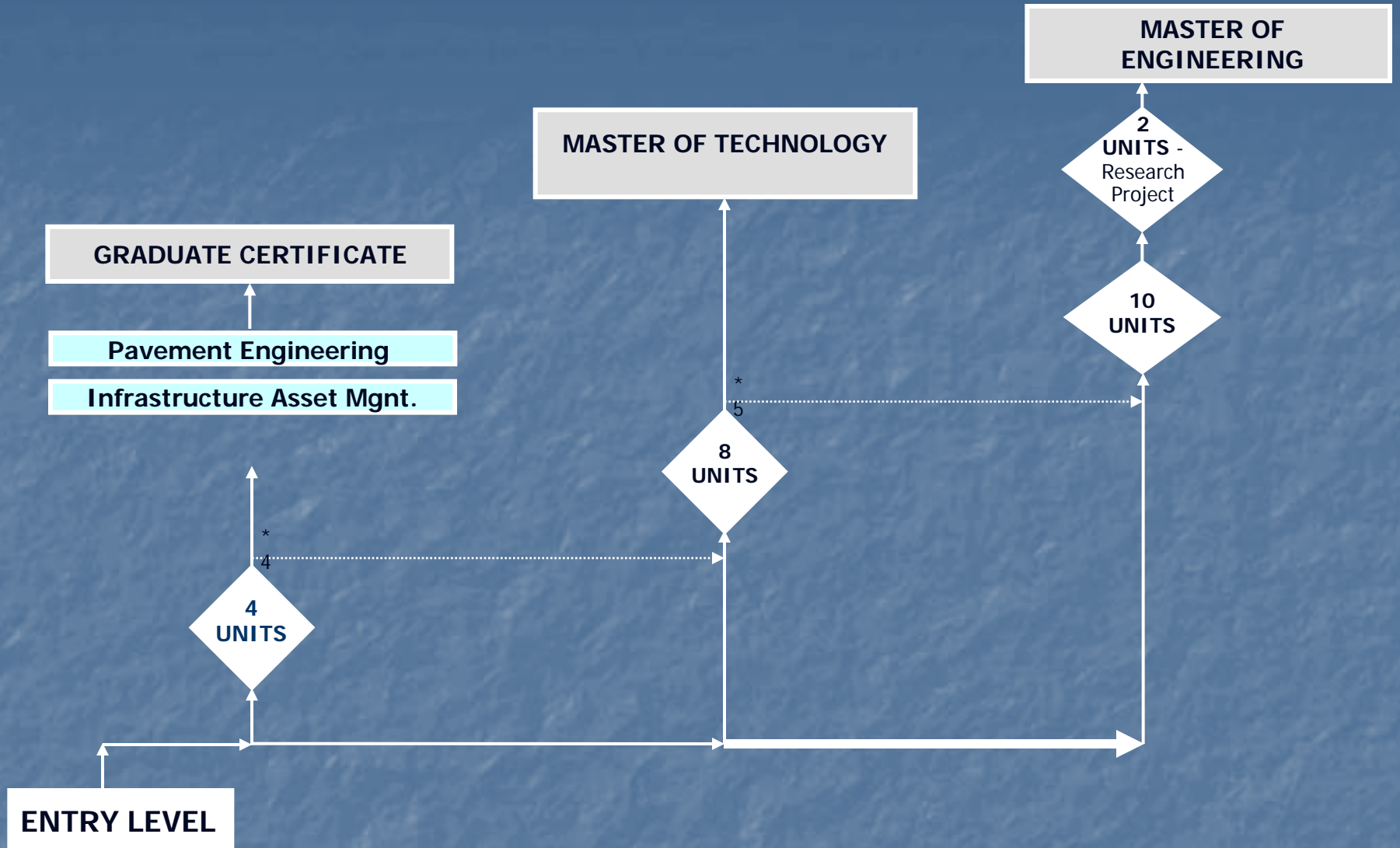
GRADUATE CERTIFICATE

ENTRY LEVEL

No
require-
ment

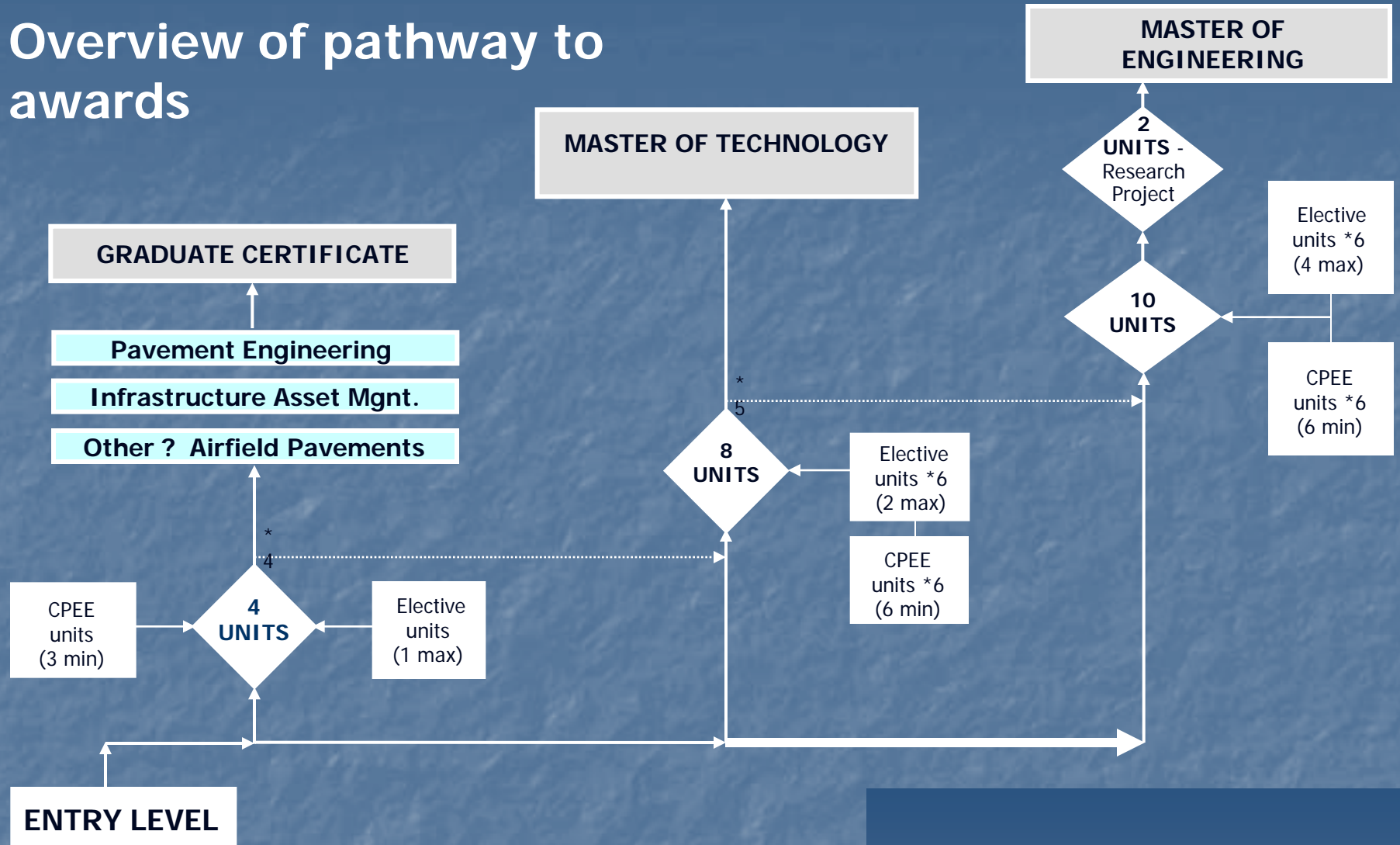
Any CPEE individual unit

**Single
units**



Overview of pathway to awards

Overview of pathway to awards





Government

+



Industry

+



University



**Centre for Pavement
Engineering Education**



Other





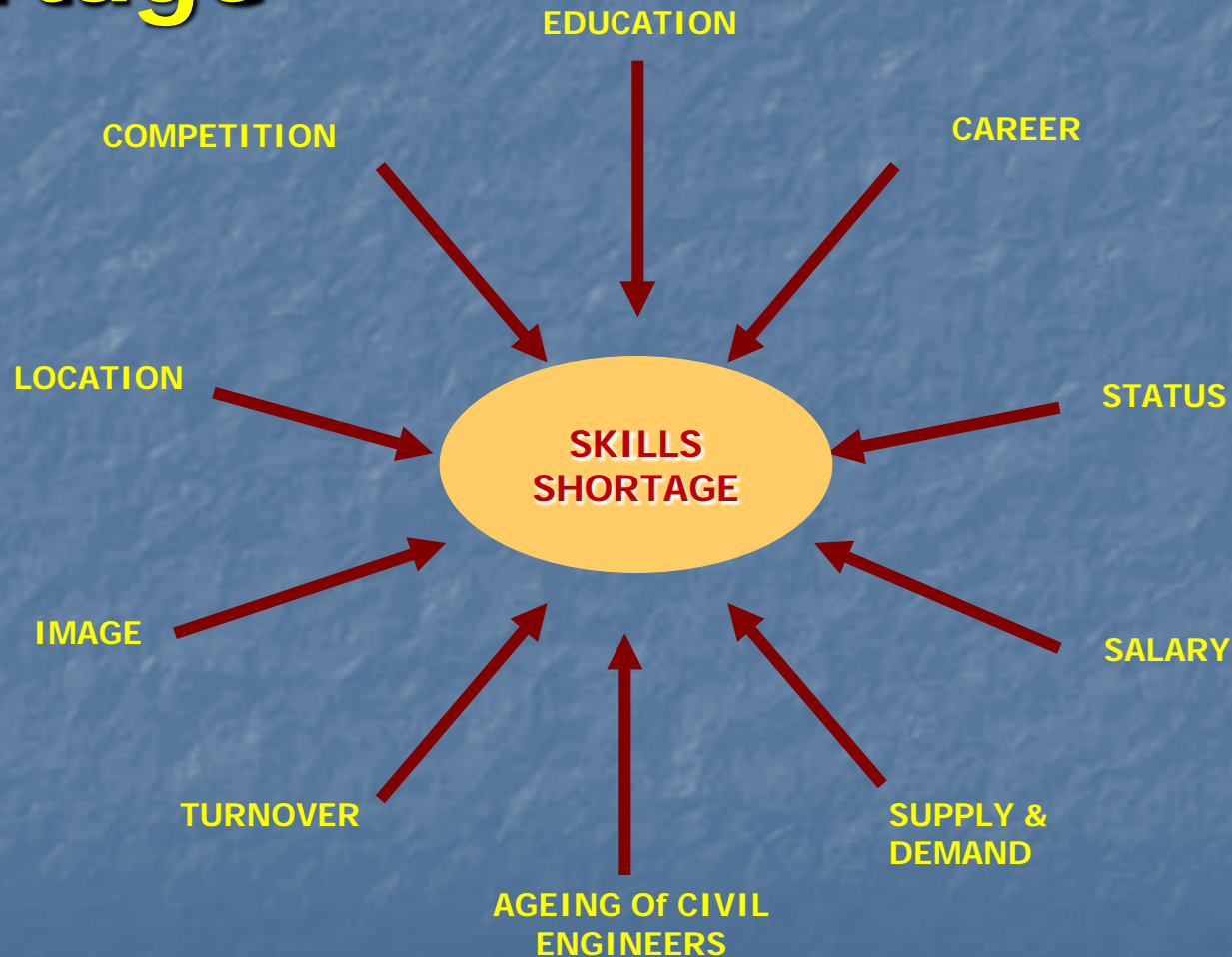
Centre for Pavement Engineering Education (CPEE)

*– a fraternity of qualified pavement engineers
recognised as meeting required and agreed
levels of higher technical skills, knowledge
and experience*

Technology uptake vital for future

■ Thank you for your attendance

Issues Impacting on Skills Shortage



Overview

**MASTER OF ENGINEERING
(PAVEMENTS)**

**MASTER OF TECHNOLOGY
(PAVEMENTS)**

**GRADUATE CERTIFICATE IN
PAVEMENT ENGINEERING**

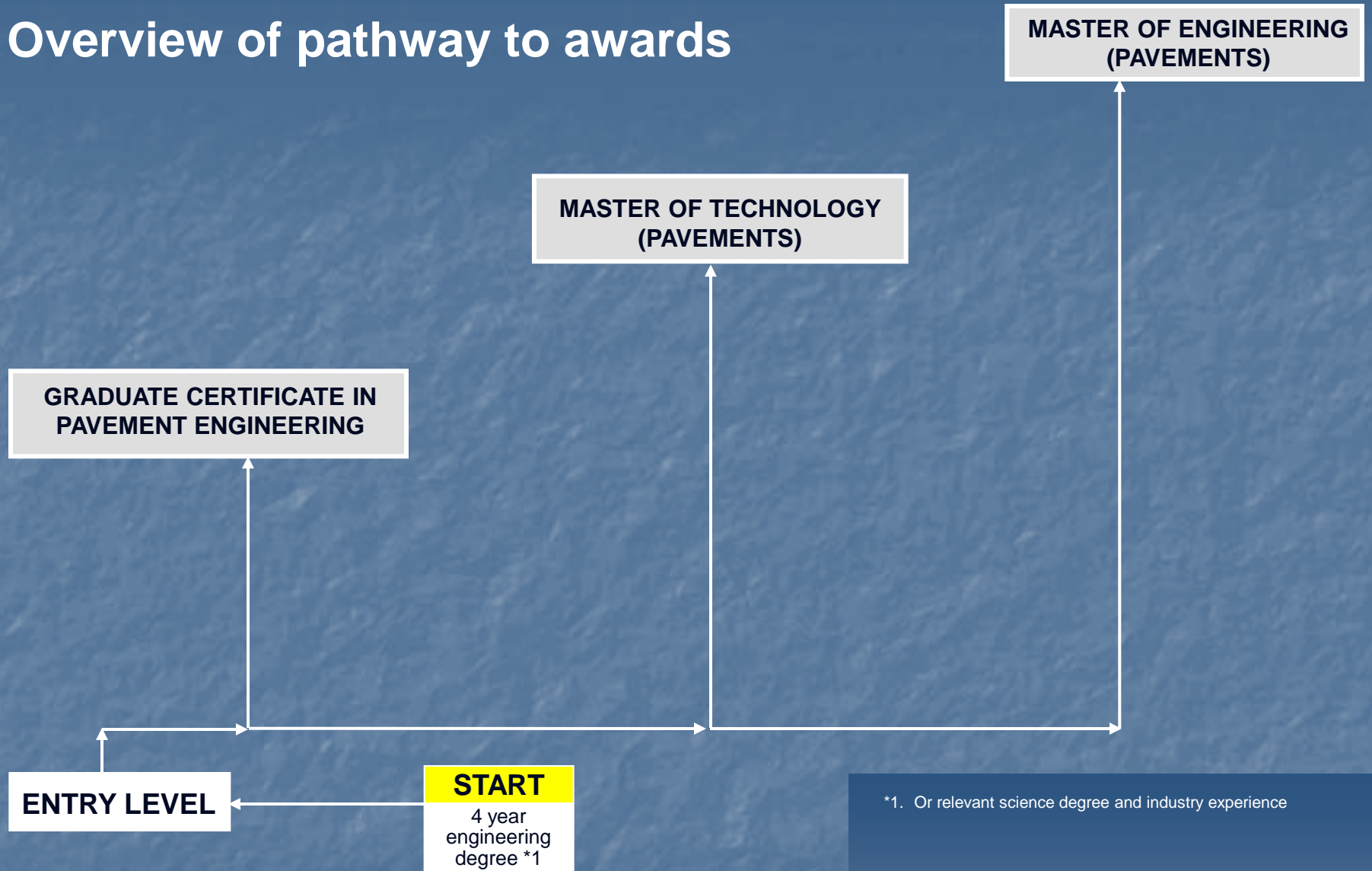
ENTRY LEVEL

No
require-
ment

Any CPEE individual unit

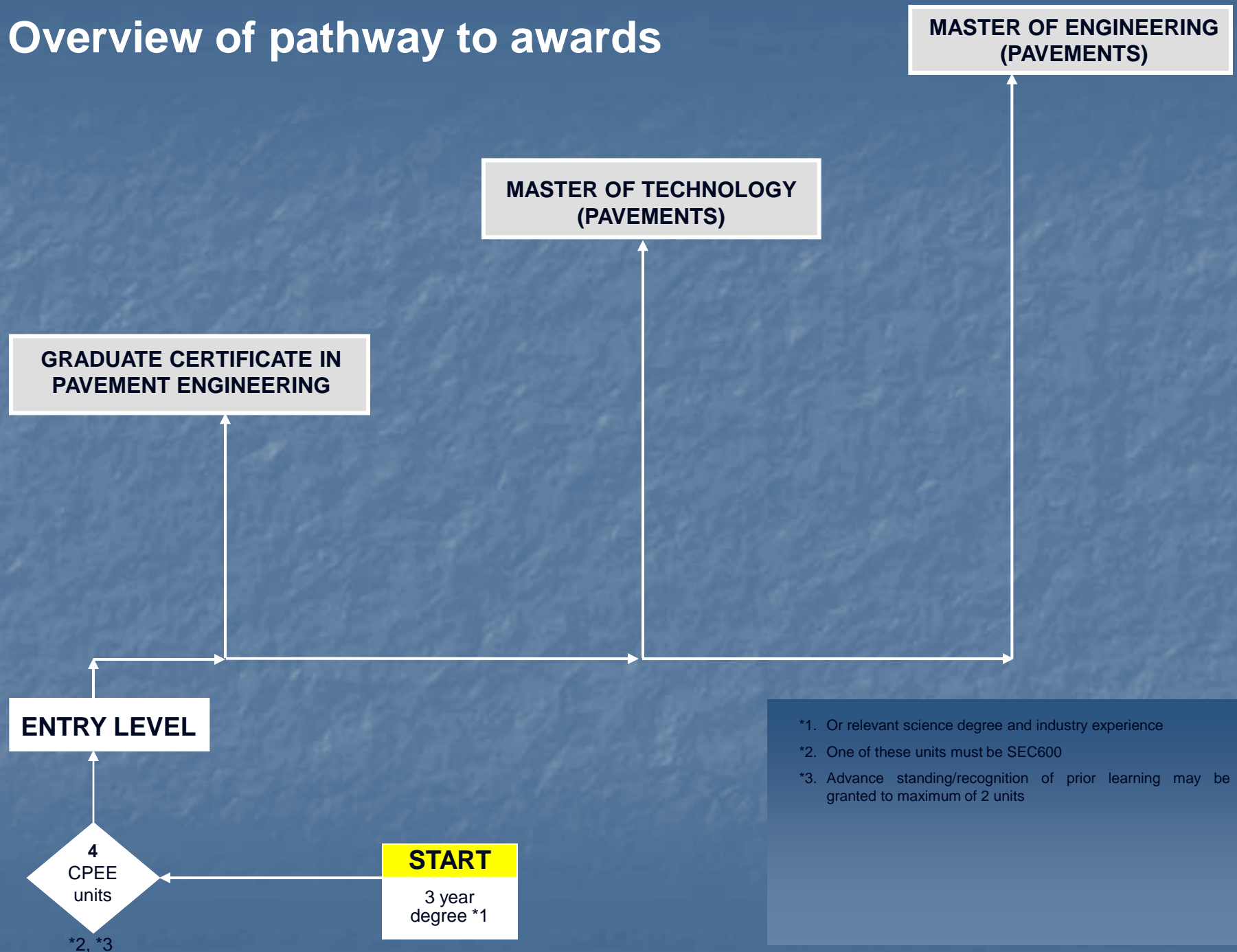
**Single
units**

Overview of pathway to awards

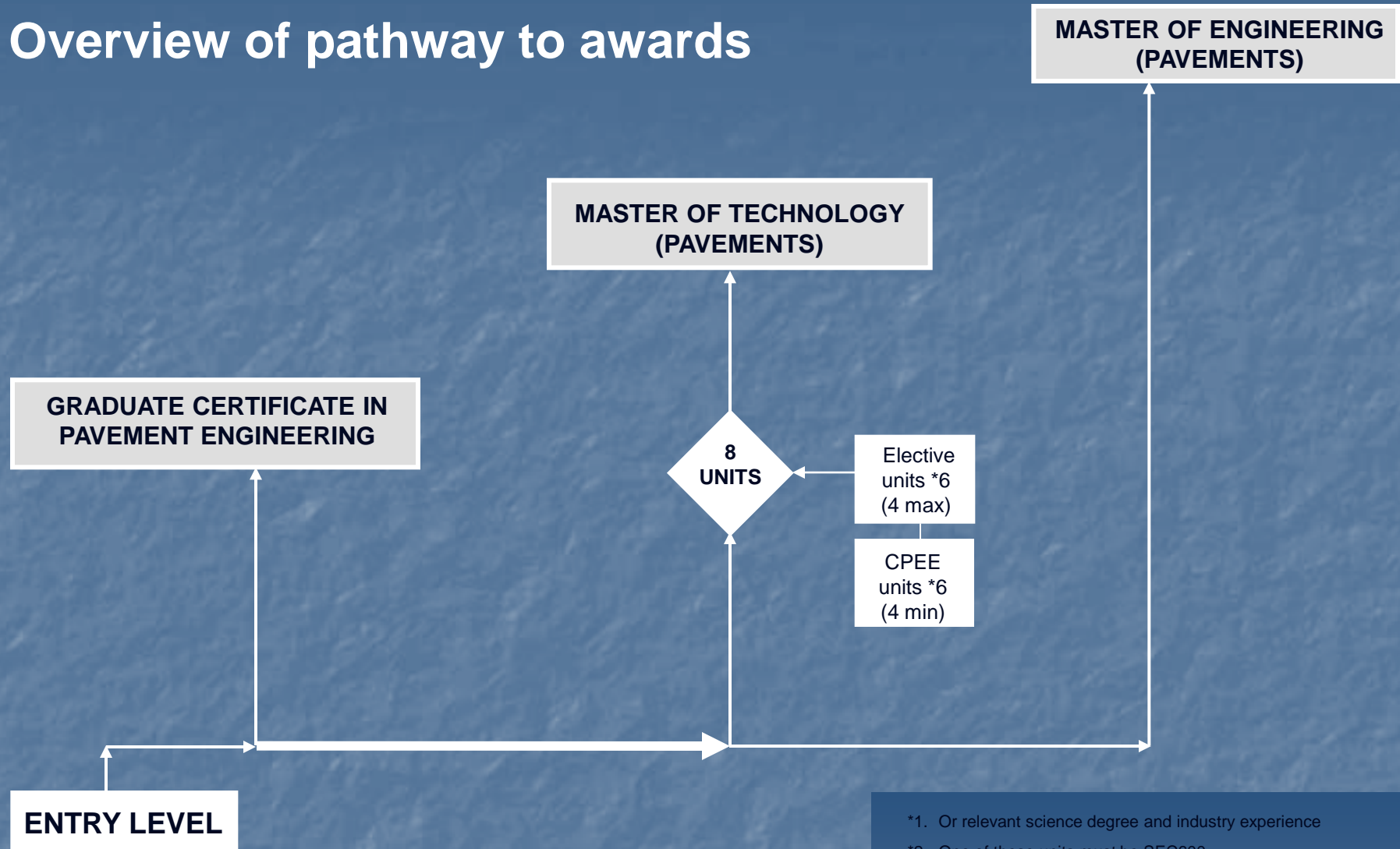


*1. Or relevant science degree and industry experience

Overview of pathway to awards



Overview of pathway to awards



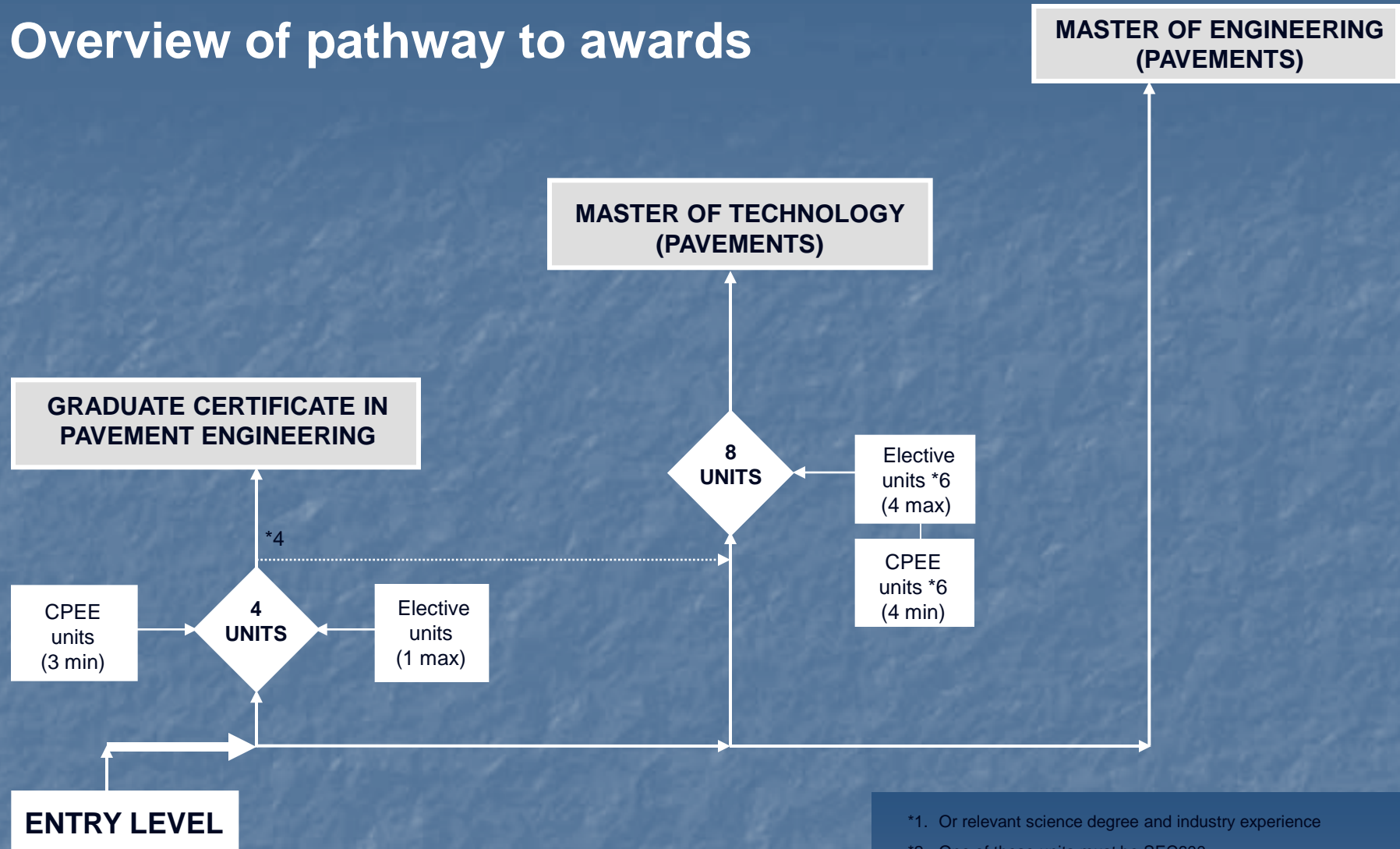
*1. Or relevant science degree and industry experience

*2. One of these units must be SEC600

*3. Advance standing/recognition of prior learning may be granted to maximum of 2 units

*6. Advance standing/recognition of prior learning may be granted to maximum of 1 unit

Overview of pathway to awards



*1. Or relevant science degree and industry experience

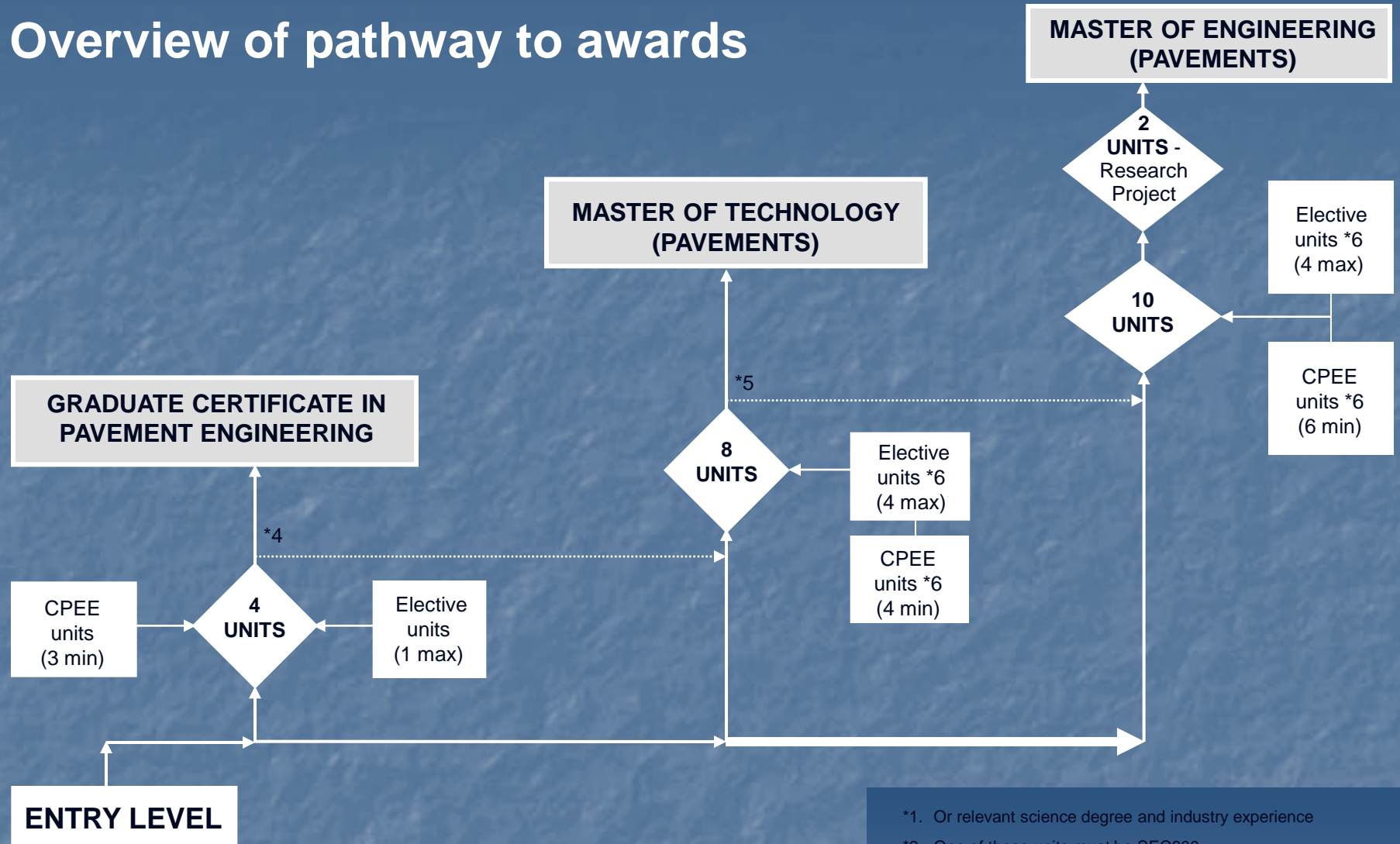
*2. One of these units must be SEC600

*3. Advance standing/recognition of prior learning may be granted to maximum of 2 units

*4. Entry to Master of Pavement Technology stream can only occur prior to award of Grad. Cert. in Pavement Engineering

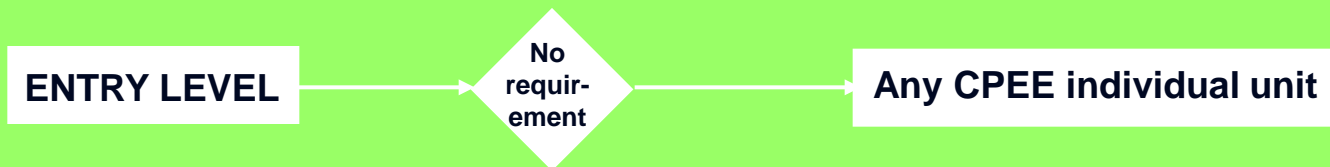
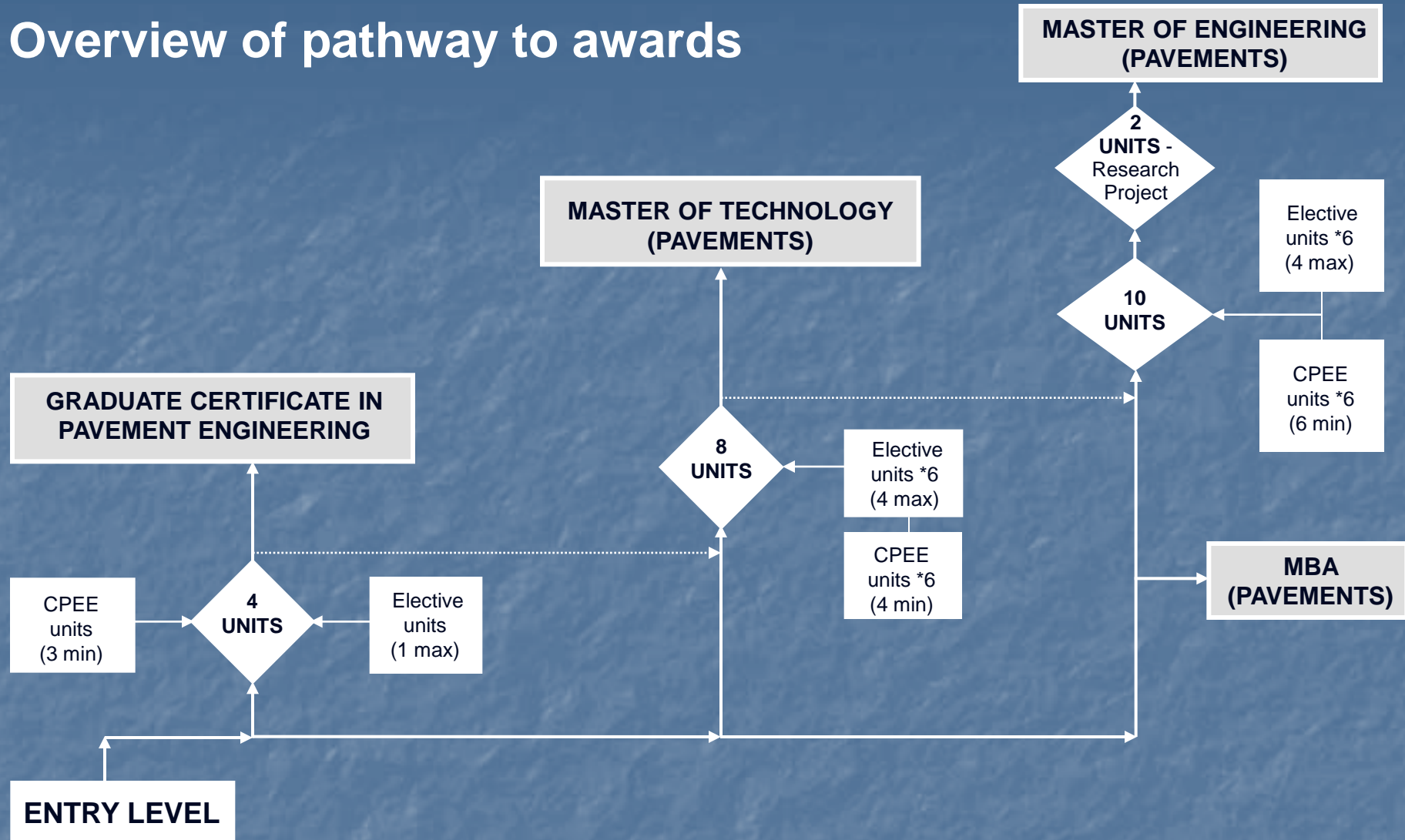
*6. Advance standing/recognition of prior learning may be granted to maximum of 1 unit

Overview of pathway to awards



- *1. Or relevant science degree and industry experience
- *2. One of these units must be SEC600
- *3. Advance standing/recognition of prior learning may be granted to maximum of 2 units
- *4. Entry to Master of Pavement Technology stream can only occur prior to award of Grad. Cert. in Pavement Engineering
- *5. Entry to Master of Pavement Engineering stream can only occur prior to award of Master of Pavement Technology
- *6. Advance standing/recognition of prior learning may be granted to maximum of 1 unit

Overview of pathway to awards



Single units

Centre for Pavement Engineering Education Inc

CPEE Education Program

Formal Education Delivery

Unit Development, Revision and Short Course Delivery

Undergraduate Courses

Graduate Certificate

Masters of Technology

Masters of Engineering

Unit Development

Unit Revision

Customised Short Courses *

Short Course Units *

Up to 3 Units as
electives in final
year civil

4 Units from 13
CPEE units

8 Units
6 from 13 CPEE, 2
from 22 APESMA

12 Units
6 from 13 plus "2
Units" Research
Project, CPEE, 4
from 22 APESMA

Structure & Content
of proposed unit

Identify revised
changes to study
materials

Face to Face
delivery following
discussions with
client

Face to Face
delivery using
distance learning
study materials

CPEE &
Individual
University

CPEE

CPEE
APESMA
LATROBE Uni

CPEE
APESMA
LATROBE Uni

Selection of
writer(s)

Selection of
writer(s)

Course materials
prepared

Study material
prepared & edited

Study material
prepared & edited

Course delivered

Instructional design
prior to release of
unit

Instructional design
prior to release of
unit

* Completion of unit inclusive of
assignment/ examination/ work
experience can provide pass in
subject toward a qualification.



Flexible Pavements – 'Unplugged'

Centre for Pavement Engineering Education Inc.

