# ROAD CONSTRUCTION AND DRAINAGE PRINCIPLES – UNIT SPECIFICATION

| Programs          | Master of Pavement Technology (MPT) (AQF Level 9)  
|                  | Graduate Certificate in Pavement Technology (GCPT) |
| Unit Name        | Road Construction and Drainage Principles          |
| Unit Code        | 613                                                 |
| Duration         | One semester                                        |
| Credit Points    | 1                                                   |
| Delivery Mode    | Online                                              |
| Prerequisites    | Nil                                                 |
| Co requisites   | Unit 600: Fundamentals of Roads and Pavements       |
| Unit Chair       | Ken Russell                                         |

**Synopsis**

This unit provides fundamental knowledge for professional work with road construction and as a pathway to further learning. It will impart cognitive skills to think critically about the selection of materials and the methods used to construct a range of road facilities. The unit will also provide specialised technical and creative skills relevant to current and future professional practice. It will further develop the basic skills and knowledge imparted in the core unit Introduction to Pavements.

The purpose of Road Construction & Drainage Principles is to provide the student with both the practical and theoretical knowledge of the practices, procedures and equipment necessary for road construction, required by professional engineers.

**Unit Topics**

- Topic 1: Aspects of Route Selection and Alignment
- Topic 2: Preliminary Site Investigations
- Topic 3: Construction Management Overview
- Topic 4: Risk, Value Management, Estimates & Programs
- Topic 5: Environmental Issues & Impact of Land Transport
- Topic 6: Earthworks
- Topic 7: Subgrade Improvement
- Topic 8: Water Management
- Topic 9: Road Drainage
- Topic 10: Subbase and Base Construction
- Topic 11: Roadsides
Unit Learning Outcomes (ULOs)

After completing this unit students will be able to:

1. Critically analyse financial and contract management, resource planning and monitoring, land acquisition and community parameters inherent in road construction and communicate those outcomes through professional reports.
2. Synthesise planning, design, site investigation, construction control methodologies and earthworks for flexible pavement construction.
3. Determine and recommend quality and environmental management plans for road construction.
4. Distinguish the critical material characteristics including modification options and integrate those with the selection and application of plant and equipment for placement in the road structure.
5. Assess and evaluate the impact that water may have within the transport corridor and recommend appropriate options to control and manage water movement to protect the pavement.
6. Assess, evaluate and recommend road signage, furniture and environmental landscaping within adjacent road reserves.

Assessment Tasks and Weightings

To obtain a pass grade in this Unit 50% overall must be achieved and at least 40% in Assignment 3.

Unit Assessment consists of items, including a critical review of a road construction contract and a detailed professional report as summarised below. Students must also refer to the Assignments and the Unit Assessment Guide for Road Construction & Drainage Principles, provided on the CPEELMS. Detailed information is provided for each assignment.

Assignment 1 involves undertaking a critical review of a pre-construction activities for a road construction project. The assignment is to be presented as a professional engineering report. It is worth 30% of the total marks for the Unit.

Assignment 2 requires the synthesis and critical analysis of a number of aspects of road construction and drainage principles. The assignment is worth 30% of the total marks for the Unit.

Assignment 3 requires the synthesis and critical analysis of a number of aspects of road construction and drainage principles. The assignment is to be presented as a professional engineering report and a YouTube clip addressed to the project constructor providing advice on a number of key steps in a nominated project. It is worth 40% of the total marks for the Unit.
Program Learning Outcomes for the MPT (PLOs)

The overarching objectives for the MPT is to graduate students who are skilled in the knowledge and application of pavement technology and who have the capacity to become outstanding professionals and leaders in the road engineering field. The MPT learning outcomes listed below contribute to achieving these outcomes.

1. The CPEE MPT graduate will have advanced knowledge across the design, construction and maintenance systems related to pavements and understand the impact of their engineering solutions in global and societal contexts.

2. Graduates will possess a thorough knowledge of the economic and environmental consequences of the implementation of pavement technology and how to implement this knowledge in their professional work by developing technical solutions to best benefit all stakeholders.

3. MPT graduates will be able to synthesise technical knowledge, undertake complex analysis and design in order to identify, formulate and solve problems of professional importance. They will be able to apply existing theories, methods and interpretations, and to work independently and within teams on practical and theoretical problems.

4. The graduate will be able to research and critically evaluate various sources of information using mathematical and computational tools and apply outcomes to structure and formulate professionally sound arguments and judgements. They will identify and utilise state of the art developments within pavement technology as well as apply relevant national and international standards.

5. Graduates will be able to research and apply knowledge, information and skills in new and emerging areas of road and pavement technology and its related fields, in order to carry out advanced assignments and projects and contribute to innovation in pavement technology.

6. Graduates will demonstrate the capacity to effectively communicate through multiple media and share knowledge at all levels including, with specialists, the engineering team and the general public.

CPEE Graduate Attributes

The CPEE Graduate Attributes underpin Programs that seek to graduate students who are thinkers, innovators, communicators, leaders and are socially, cultural, ethically and environmentally aware.

1. In-depth knowledge & skills in a discipline area: an in-depth knowledge within the field of study, based on current and emerging national and international practice.

2. Judgement, analysis and problem solving: the ability to define, analyse and create viable solutions to a range of problems and to reflect on potential outcomes.

3. Creativity and inventiveness: the ability to generate creative and innovative solutions to discipline and social challenges.

4. Effective communication and collaboration: the abilities to collaborate, communicate and present information and concepts clearly, fluently and within context to diverse audiences via multiple media.

5. Sustainability, socially and ethically focussed: the ability to respond appropriately to discipline issues with a commitment to sustainability, social and high ethical standards.

6. Information and digital literacy: the ability to recognise when information is needed and to locate, interpret, evaluate, and effectively use the information as required.

7. Lifelong learning to increase self-potential: the ability to pursue personal and work based development in a changing environment through self-managed learning.
Mapping Assessment to ULOs, PLOs and GAs

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<tr>
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<td>3,4,6</td>
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<tr>
<td>Assignment 3</td>
<td>1,3,4,5,6</td>
<td>1,2,3,5,6</td>
<td>All</td>
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Student Workload

**Total** 150 hours

- Assessment: 50 to 70 hours
- Directed Study: 100 to 80 hours

Required Facilities

Students must have access to the internet, email and word processing and spreadsheet programs.

Prescribed Text(s)


Recommended Text(s)


Generic References

All students are advised to source material from the CPEE, “*Student Learning Resources Guidelines to Accessing Contemporary International Literature*”, available on the CPEELMS, which provides a rich library resource of seminal and contemporary scholarly publications. It is highly recommended that the sites are accessed where appropriate in the preparation of written assessment tasks.

Information Resources

Information resources are identified and made available throughout the various Topics, typically through web links.