HEAVY DUTY PAVEMENTS - UNIT SPECIFICATION

Programs
Master of Pavement Technology (MPT) (AQF Level 9)
Graduate Certificate in Pavement Technology (GCPT)

Unit Name
Heavy Duty Pavements

Unit Code
606

Duration
One semester

Credit Points
1

Delivery Mode
Online

Prerequisites
Unit 600: Fundamentals of Roads and Pavements
Unit 613: Road Construction & Drainage Principles
Unit 601: Road Pavement Design

Co requisites
Nil

Unit Chair
Dr Greg White

Synopsis
This Unit deals with heavy duty pavement. In general, heavy duty pavements are similar to road and highway pavements but are required to service vehicles with much higher wheel loads and different performance requirements. Although different nomenclatures are used by various jurisdictions and authorities, the following terms are used in this Unit:

- Heavy duty pavements. General term encompassing all of the non-road and highway pavements that are addressed in this Unit.
- Heavy duty road pavements. Designed for road-like vehicles but of much larger wheel loads, such as vehicles on forestry and quarry roads.
- Airport pavements. Used by aircraft other than small general aviation aircraft.
- Port and Industrial Pavements. Used by port vehicles, including container terminals and intermodal port facilities.

Unit Topics

Topic 1 – Introduction
Topic 2 – Heavy Duty Pavement Design Concepts
Topic 3 – Heavy Duty Road Pavement Design
Topic 4 – Airport Pavement Design - Flexible
Topic 5 – Airport Pavement Design - Rigid
Topic 6 – Port & Industrial Pavement Design
Topic 7 – Heavy Duty Pavement Construction
Topic 8 – Contemporary & Emerging Issues
Unit Learning Outcomes (ULOs)

Upon completion of this Unit students will be able to:

1. Evaluate the major differences between highway pavements and the various types of heavy duty pavements.
2. Analyse the different functional requirements applicable to different heavy duty pavements.
3. Understand key concepts for mechanistic-empirical pavement design of heavy duty pavements.
4. Understand and apply the principles and method for heavy duty haul road design and construction.
5. Understand and apply the principles and method for flexible and rigid airport pavement design and construction.
6. Understand and apply the principles and method for post pavement design and construction.
7. Investigate various contemporary and emerging issues for heavy duty pavements and analyse the opportunities for their application.

Assessment Tasks and Weightings

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

Unit Assessment consists of three assignments as summarised below. Students must also refer to the Assignments and other information for Heavy Duty Pavements, provided on the CPEELMS. Detailed information is provided for each assignment.

**Assignment 1** The assessment task will develop students’ ability to critically consider factual information before synthesising it and presenting it as an internal memo. The memo presents the benefits and dis-benefits of an established road pavement engineering consultancy entering into the field of heavy duty pavement design.

The assignment covers Topics 1-3. It is worth 30% of the total marks for the Unit.

**Assignment 2** This assessment task requires students to develop the application of pavement design in the context of a conceptual pavement design for a new airport development. The report will be prepared as though the student is a pavement engineer who has been commissioned to prepare a conceptual pavement design report for a proposed new airport in a regional area.

It covers Topic 4-6. The assignment is worth 30% of the total marks for the Unit.

**Assignment 3: Major assignment** This assessment task will develop research, analytical thinking and reporting skills. A report will be prepared discussing the possibility of implementing an innovative technology to a heavy duty pavement design or construction scenario. The report will include details of the technology, including its benefits and risks.

It covers the whole Unit. The major assignment is worth 40% of the total marks for the Unit.
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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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Student Workload

Total 150 hours

Assessment 30 to 50 hours

Directed Study 120 to 100 hours

Required Facilities

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

Students must download and install the following softwares:


Prescribed Text(s)


Recommended Text(s)

N/A

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.