Programme Specification
Level 3

MCE01-3 Engineering Drawing
工程繪圖

Unit Aim

To teach learners how to create professional-quality drawings and to introduce to learners the principles and techniques in engineering drawing.

Unit Introduction

In this unit, learners are guided to understand the techniques used in the production of graphical information and apply the drawing practice used in engineering and construction. Emphasis is given on the understanding of basic engineering production information.

Learning Outcomes

After successful completion of this unit, the learners should be able to:
LO-1 Understand the theory of orthographic projection and practice
LO-2 Use the constructive imagination and to visualize objects in space
LO-3 Apply the general principles for the preparation of working drawings
LO-4 Produce typical civil, structural, and building services engineering drawings

Reference Readings

- Simmons, C. (2012) Manual of Engineering Drawing, Butterworth-Heinemann.
- Madsen, D.A. and Madsen, D.P. (2012) Engineering Drawing and Design, 5th edition, Cengage Learning.
- Frederick, E. G., Alva, M. and Henry, C.S. (2016) Technical Drawing with Engineering Graphics, 15th edition, Peachpit Press.
- Standard Drawings, HKSAR Government.

Programme Specification
Level 3

MCE02-3 Engineering Materials
工程材料

Unit Aim

To provide basic knowledge in engineering materials and the techniques used to produce such materials.

Unit Introduction

In this unit, learners are guided to understand the principal properties, behavior, merits and drawbacks of common materials in engineering and construction. Emphasis is given on the understanding of the techniques used to prevent the materials' deterioration. This unit also introduces the common testing methods for construction materials.

Learning Outcomes

After successful completion of this unit, the learners should be able to:
LO-1 Understand the properties and behavior of common materials in construction
LO-2 Evaluate the performance of common materials in construction
LO-3 Apply the techniques used to prevent the materials' deterioration
LO-4 Develop the ability to test and select materials for construction

Reference Readings

- Marotta, T.W. (2010) Basic Construction Materials, 8th edition, Prentice Hall.
- Gambhir, M.L. (2014) Building and Construction Materials, McGraw Hill.
- Spence, W.P. and Kultermann, E. (2011) Construction Materials, Methods and Techniques, 3rd edition, Cengage Learning.
- Construction Standards, HKSAR Government.

MCE03-3 Structural Mechanics
結構力學

Unit Aim

To introduce the general principles of structural analysis in statically determinate structures and to develop learners' skills to carry out structural design.

Unit Introduction

In this unit, learners are guided to understand and apply the fundamental principles of mechanics of structures including statically determinate structures. This unit intends to develop learners' ability to apply theories and principles to solve basic engineering problems.

Learning Outcomes

After successful completion of this unit, the learners should be able to:
LO-1 Understand the behavior of statically determinate structures
LO-2 Analyze common structural form
LO-3 Calculate forces and moments acting on a structural member by an external force system
LO-4 Determine deflection for statically determinate beams

Reference Readings

- Hibbeler, R.C. (2016) Mechanics of Materials, 10th edition, Pearson.
- Gere, J.M. and Goodno, B.J. (2012) Mechanics of Materials Brief, SI edition, Cengage Learning.
- Kassimali A. (2014) Structural Analysis, 5th edition, CL Engineering.

MCE04-3 Structural Design
結構設計

Unit Aim

To introduce the philosophy of limit state design and to develop learner's skills to carry out structural design of reinforced concrete and steel structures.

Unit Introduction

In this unit, learners are guided to understand and apply the philosophy of limit state design. This unit intends to introduce the theories and behavior of reinforced concrete and steel structures and how to carry out structural design accordingly.

Learning Outcomes

After successful completion of this unit, the learners should be able to:

LO-1 Understand the philosophy of limit state design
LO-2 Acquire the knowledge on reinforced concrete and steel that serves as a common structural material
LO-3 Carry out structural design for various reinforced concrete elements
LO-4 Carry out structural design for various steel elements

Reference Readings

- Bill Mosley, John Bungey & Ray Hulse (2012). Reinforced Concrete Design, 7th edition, Macmillan Publishers Limited.
- Lam, D., Ang, T.C. and Chiew, S.P. (2013) Structural Steelwork: Design to Limit State Theory, 4th edition, CRC Press.
- B.D. (2011). Code of Practice for Structural Use of Steel, Buildings Department, Government of HKSAR.
- B.D. (2013). Code of Practice for Structural Use of Concrete, Buildings Department, Government of HKSAR.

MCE05-3 Environmental Engineering and Management
環境工程及管理

Unit Aim

To provide the knowledge in the interdisciplinary study of environmental problems, as well as their causes and why they are of concern. This unit also introduces the principles of environmental system and mechanism of control system.

Unit Introduction

In this unit, learners are guided to understand and analyze the environmental protection issues, as well as the important issues in Hong Kong and their causes and effects. This unit gives an overview on legislation and regulations relating environmental protection, assessment and planning.

Learning Outcomes

After successful completion of this unit, the learners should be able to:
LO-1 Identify the environmental protection issues
LO-2 Apply the basic principles of environmental engineering to construction projects
LO-3 Understand the environmental legislation and regulations
LO-4 Perform environmental assessment and planning

Reference Readings

- Blewitt, J. (2014) Understanding Sustainable Development, 2nd edition, Routledge.
- Kibert, C.J. (2016) Sustainable Construction: Green Building Design and Delivery, 4th edition, Wiley.
- Vesilind, P.A., Morgan, S.M. and Heine, L.G. (2010) Introduction to Environmental Engineering, 3rd edition, Cengage Learning.
- Environmental Protection Department, HKSAR Government.

MCE06-3 Sustainable Construction
可持續發展建築

Unit Aim

To provide knowledge in the urban influence on the environment and climate and the importance of using sustainable construction. This unit introduces the study of environmental issues and problems.

Unit Introduction

In this unit, learners are guided to understand causes and consequences of the pollution generated from construction and the built environment. Techniques in design, project management and sustainable construction are introduced to stimulate learners to have a basic awareness of the energy options, green building and sustainable development and construction.

Learning Outcomes

After successful completion of this unit, the learners should be able to:

LO-1 Identify the causes and consequences of the problems generated from the built environment
LO-2 Propose mitigation measures to the major environmental issues
LO-3 Understand worldwide trend in sustainable development
LO-4 Apply the green materials and sustainable construction techniques and technologies

Reference Readings

- Technical Circular (TCW No.19/2005), Development Bureau, HKSAR Government.
- Blewitt, J. (2014) Understanding Sustainable Development, 2nd edition, Routledge.
- Kibert, C.J. (2016) Sustainable Construction: Green Building Design and Delivery, 4th edition, Wiley.
- Vesilind, P.A., Morgan, S.M. and Heine, L.G. (2010) Introduction to Environmental Engineering, 3rd edition, Cengage Learning.

MCE07-3 Engineering Mathematics I
工程數學 I

Unit Aim

To introduce the basic theories and some applications of engineering mathematics and to develop learners' ability in applying mathematical knowledge to solve engineering and practical construction problems.

Unit Introduction

In this unit, learners are guided to understand and apply mathematics theories to basic engineering and practical construction problems. Worked examples will be used to explain the mathematical methods and theories for the fundamentals of more advanced studies and this develops learners' ability for logical thinking.

Learning Outcomes

After successful completion of this unit, the learners should be able to:

LO-1 Acquire fundamental knowledge in engineering mathematics
LO-2 Use graphical and numerical methods to solve engineering and practical construction problems
LO-3 Use algebra to solve engineering and practical construction problems
LO-4 Use trigonometry and geometry to solve engineering and practical construction problems

Reference Readings

- Kreyszig, E. (2011). Advanced Engineering Mathematics, 10th edition, John Wiley & Sons.
- Bird, J. (2014) Basic Engineering Mathematics, Routledge.
- Walpole, R.E., Myers, S.L. and Ye, K.E. (2011) Probability and Statistics for Engineers and Scientists, 9th edition, Prentice Hall.
- Young, H.D. and Freedman, R.A. (2016) University Physics with Modern Physics, 14th edition, Pearson.

MCE08-3 Engineering Mathematics II
工程數學 II

Unit Aim

To introduce the basic theories and some applications of engineering mathematics and to develop learners' ability in applying mathematical knowledge to more advanced topics in solving engineering and practical construction problems.

Unit Introduction

In this unit, learners are guided to understand and apply mathematics theories to basic engineering and practical construction problems. Worked examples will be used to explain the mathematical methods and theories for the fundamentals of more advanced studies and this develops learners' ability for logical thinking.

Learning Outcomes

After successful completion of this unit, the learners should be able to:

LO-1 Apply arithmetical techniques to solve engineering and practical construction problems
LO-2 Use calculus to solve engineering and practical construction problems
LO-3 Use statistics to solve engineering and practical construction problems
LO-4 Apply the mathematical skills to solve more complex engineering problems

Reference Readings

- Kreyszig, E. (2011). Advanced Engineering Mathematics, 10th edition, John Wiley & Sons.
- Bird, J. (2014) Basic Engineering Mathematics, Routledge.
- Walpole, R.E., Myers, S.L. and Ye, K.E. (2011) Probability and Statistics for Engineers and Scientists, 9th edition, Prentice Hall.
- Young, H.D. and Freedman, R.A. (2016) University Physics with Modern Physics, 14th edition, Pearson.

MCE09-3 Construction Safety & Health I
建築安全及健康 I

Unit Aim

To introduce the major occupational safety and health legislation and regulations and their applications in building and construction industry.

Unit Introduction

In this unit, learners are guided to understand the health and safety legislation and associated regulations. The roles and duties in different positions in complying with their related legal obligations will be discussed. Basic knowledge and principles on occupational health and safety management are also introduced.

Learning Outcomes

After successful completion of this unit, the learners should be able to:

LO-1 Understand the health and safety legislation and regulations and identify safety related offences in their workplaces.
LO-2 Know the responsibilities of employers and employees under current health, safety and welfare legislation
LO-3 Apply the knowledge on occupational health to construction and the built environment
LO-4 Apply the principles of safety management to construction and the built environment

Reference Readings

- Construction Site Safety Handbook, 2000 edition, Development Bureau, HKSAR Government.
- Construction Site Safety Manual, 2008 edition, Development Bureau, HKSAR Government.
- Holt, A.S.J. and Allen, J. (2009) Principles of Health and Safety at Work: 8th edition, The Institution of Occupational Safety and Health.
- Dhillon, B.S. (2003) Engineering Safety: Fundamentals, Techniques, Applications, World Scientific.
- Alan, G. and Tim, H. (2001) Construction Health and Safety Management, Longman.

MCE11-3 Civil Engineering Surveying
土木工程測量

Unit Aim

To enable learners to develop skills in linear surveys, levelling surveys, traverse surveys and setting out processes.

Unit Introduction

In this unit, learners are guided to understand basic surveying techniques, be able to carry out simple surveying tasks and present the data, and understand the roles of surveying and setting out in the construction process.

Learning Outcomes

After successful completion of this unit, the learners should be able to:

LO-1 Understand the fundamental principles in civil engineering survey
LO-2 Perform linear survey, levelling survey and traverse survey to produce results from calculations
LO-3 Perform linear survey, levelling survey and traverse survey to produce drawings
LO-4 Perform the setting out processes.

Reference Readings

- Bannister, A., Raymond, S. and Baker, R. (1998) Surveying, 7th edition Prentice Hall.
- Kavanagh, B. (2013) Surveying: Principles and Applications, 9th edition, Pearson.
- Holley, P.W. (2005) Surveying and Layout Fundamentals for Construction, John Wiley & Sons, Inc.

MCE12-3 Civil Engineering Construction
土木工程建築

Unit Aim

To provide the knowledge in different types of construction methods and contemporary technologies in civil engineering construction. This unit provides knowledge and practical professional skills required to work in civil engineering projects.

Unit Introduction

In this unit, learners are guided to understand the construction processes of civil engineering infrastructures. Emphasis is given on the understanding of the construction methods, technologies and techniques of different infrastructure elements, as well as the use of materials, plant and equipment. Constrains in construction will be discussed to develop learners' abilities in problem solving.

Learning Outcomes

After successful completion of this unit, the learners should be able to:

LO-1 Illustrate the construction methods of various types of civil engineering infrastructures and elements
LO-2 Apply advanced and innovative techniques and technologies to construction of infrastructure
LO-3 Select and specify proper materials, plant and equipment for civil engineering construction projects
LO-4 Discuss the constrains in civil engineering infrastructures construction

Reference Readings

- Nunnally, S.W. (2011) Construction Methods and Management, 8th edition, Prentice Hall, Pearson Education.
- Blankenbaker, E.K. (2013) Construction and Building Technology, Goodheart-Willcox Publisher.
- Spence, W.P. (2017) Construction Materials, Methods and Techniques, 4th edition, Cengage Learning.
- Standards and Drawing, HKSAR Government

MCE14-3 Construction Project Management
建築項目管理

Unit Aim

To develop learner's skills in planning and implementation of a project relating to construction.

Unit Introduction

In this unit, learners are guided to understand different aspects in project management and administration. This unit intends to enable learners to complete a realistic project relating to construction. Different construction techniques and technologies will be also discussed to develop their skills to carry out a project in planning and implementation.

Learning Outcomes

After successful completion of this unit, the learners should be able to:

LO-1 Understand the principles and practice of project management and administration in construction project
LO-2 Plan a construction project
LO-3 Implement a construction project
LO-4 Evaluate the outcomes of the construction project.

Reference Readings

- Baldwin, A. and Bordoli, D. (2014) A Handbook for Construction Planning and Scheduling, Wiley.
- Chan, C.T.W. and Sin, H.C. (2009) Construction Project Management, Prentice Hall.
- Nunnally, S.W. (2011) Construction Methods and Management, 8th edition, Prentice Hall.

