



Subject	Fundamentals of Engineering Drawings
Subject Code	CE401

Summary

Year	1
Unit	CE401
Status	core
Learning Hours	100 hrs including Lectures and Group Exercises
Credits	20
Period of Study	2 months

Summary of Learning Outcomes

Learning outcomes are results of learning that students will have achieved on successfully completing a course. The following reference points were used in designing the learning outcomes;

- QAA Subject Benchmark Statements to ensure: that appropriate and effective teaching, support, assessment and learning resources are provided for students; that the learning opportunities provided are monitored; and that the provider considers how to improve them; and
- The professional competencies required by ICES and CIOB.

Learning outcomes are expressed under three broad headings of achievement in both threshold and typical standards:

U: Understanding (a general awareness of the activity)

K: Knowledge (a more detailed level of understanding of the activity)

S: Skills (to be able, without supervision, to perform relevant functions)



Learning outcomes: The learner will:	Assessment criteria: The Learner can:
1. Have a sound understanding in engineering language and fundamental drawings and design principle [K, U].	1.1 Understand the types of sectional views, Cutting plane or sectional plane. 1.2 Understand the layout of drawing sheet, margin, border lines, title block, list of parts, scales, uses of scale, sizes of scale, dimensioning.
2. Understand various civil engineering design options and able to apply dimensions on engineering drawings [S].	2.1 Understand the purpose of construction drawing, drawing lines and shapes, views and dimensions. 2.2 Understand the representation of materials, doors, windows, and first and third angle projection.
3. Be able to apply the features and functions of typical CAD systems for producing CAD drawings [S].	3.1 Understand the plans, elevations, structural elements, elevations, component drawings and engineering drawings. 3.2 Able to read symbols indicating materials and drawings for trade information. 3.3 Able to prepare detailed structural and service drawings. 3.4 Able to create 2D drawings using Auto CAD.
4. Understanding BIM Tools [K, U].	4.1 Introduction of BIM Tools. 4.2 Understand Quantification using the BIM Process.
Additional information about the unit	
Units aim(s)	

Recommended Reading

1. Keith Styles and Andrew Bichard, *Working Drawings Handbook*, 4th edition
2. Mark W. Huth, *Understanding Construction Drawings*, 5th edition
3. W. Otie Kilmer, Rosemary Kilmer, *Construction Drawings and Details for Interiors: Basic Skills*, 2003



Unit Title	Construction and Civil Engineering Technology
Unit Code	CE402

Summary

Year	1
Unit	2
Status	core
Learning Hours	100hrs including Lectures and Group Exercises
Credits Value	20
Period of Study	2 months

Summary of Learning Outcomes

Learning outcomes are results of learning that students will have achieved on successfully completing a course. The following reference points were used in designing the learning outcomes;

- QAA Subject Benchmark Statements to ensure: that appropriate and effective teaching, support, assessment and learning resources are provided for students; that the learning opportunities provided are monitored; and that the provider considers how to improve them; and
- The professional competencies required by the ICES and the CIOB.

Learning outcomes are expressed under three broad headings of achievement in both threshold and typical standards:

U: Understanding (a general awareness of the activity)

K: Knowledge (a more detailed level of understanding of the activity)

S: Skills (to be able, without supervision, to perform relevant functions)



Learning outcomes: The learner will:	Assessment criteria: The Learner can:
1. Able to manage and mitigate health, safety and environmental (HSE) risks [K, S]	1.1 Risk assessment. 1.2 Management plan for safe working practices 1.3 Manage and mitigate HSE risks at pre-and post contract stages. 1.4 Quantitative and qualitative risk techniques.
2. Understanding health, safety and environmental law and obligations in construction and the application of current Construction Design and Management (CDM) regulations [K, S]	2.1 HSE hazards in construction. 2.2 Emergency management procedures in accident preventions and investigations. 2.3 Identify and apply the legislation, standards and best practice to prevent accidents. 2.4 Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). 2.5 Obligations of all parties involved in construction according to the HSE law.
3. Understanding foundations and substructure and able to design and operate with suitable technology [K, S]	3.1 Types of foundation (e.g. reinforced strip, piles, raft foundations). 3.2 Basement construction. 3.3 Excavations and ground works.
4. Understanding the superstructure in building construction and able to design and operate with suitable technology [S]	4.1 Type of frames in multi storey buildings construction. 4.2 Sustainable technologies in multi storey buildings construction. 4.3 Exterior envelope of multi storey buildings 4.4 Building materials and selection.
5. Understanding the technology in design process of the built environment [K, U]	5.1 Architectural innovations. 5.2 Environmental legislations. 5.3 Planning and Building Regulations. 5.4 Other impacts in construction design.
6. Able to select and operate building services and systems in a multi stories building [K, S]	6.1 Heating and ventilation. 6.2 Fire safety and building security requirements. 6.3 Energy efficient buildings and select suitable technology in installation of services such power, gas, telecommunications, water, drainage, wastewater, etc.
Additional information about the unit	
Units aim(s)	



Text Book

1. Mike Riley & Alison Cotgrave, *Construction Technology 2 - Industrial and Commercial Building*, 3rd Edition

Recommended Reading

1. Hughes, P. (2015) *Introduction to Health and Safety in Construction*, 5th edition; Abingdon: Taylor and Francis



Unit Title	Construction Materials and Scope of Works
Unit Code	QS403

Summary

Year	1
Unit	3
Status	core
Learning Hours	100hrs including Lectures and Group Exercises
Credits Value	10
Period of Study	2 months

Summary of Learning Outcomes

Learning outcomes are the results which students will have achieved on successfully completing a course. The following reference points were used in designing the learning outcomes;

- QAA Subject Benchmark Statements to ensure that appropriate and effective teaching, support, assessment and learning resources are provided for students; that the learning opportunities provided are monitored; provider considers how to improve them; and
- The professional competencies required by the ICES, the RICS and the CIOB.

Learning outcomes are expressed under three broad headings of achievement in both threshold and typical standards:

K: Knowledge (a more detailed level of understanding of the activity)

U: Understanding (a general awareness of the activity)

S: Skills (to be able, without supervision, to perform relevant functions)



Learning outcomes: The learner will:	Assessment criteria: The Learner can:
1. Understand regulations, standards and properties of materials on construction works [U, K].	1.1 Understand construction regulations and standards. 1.2 Evaluate the properties of materials in each component of construction. 1.3 Explain the factors to be considered when selecting the materials for retrofitting low carbon technologies.
2. Understand how the selection and use of materials and products can contribute to sustainable construction [K, S].	2.1 Evaluate the use of sustainable materials and products for a given construction project. 2.2 Evaluate the lifecycle costs of materials and products for a given project. 2.3 Produce a sustainable procurement strategy for a given construction works. 2.4 Explain how the process of installing building services may affect the energy performance of the completed project. 2.5 Explain to the end user how to sustain the optimum performance of a construction project.
3. Knowledge in consideration factors during the development of specifications [U, K].	3.1 Understand specification language, clarity, consistency, vocabulary, sentence structure, grammar, abbreviations, symbols and inappropriate terms. 3.2 Understand philosophy, technical requirements and computerised specification systems. 3.3 Evaluate the issues in bidding phase of a project and specifications revisions before contract awards.
4. Be able to develop scope of works related to building and civil engineering components, systems and services for low rise buildings. [K, S].	4.1 Evaluate the scope of works related to demolition, shoring and underpinning, excavation and ground works, formwork, concrete and steel structures and finishing. 4.2 Evaluate the scope of works related to masonry, roofing, finishing, fittings, gladding and flooring. 4.3 Evaluate the scope of works related to plumbing, mechanical and electrical installations, site utilities and landscaping. 4.4 Evaluate the scope of works related to civil engineering projects.
Additional information about the unit	
Units aim(s)	



References and Further Readings

1. *Smith, Jason G. Construction management: subcontractor scopes of work / Jason G. Smith, Jimmie Hinze. Pg. 3-73, 143-177, 209-239, 381-391*
2. *Mehta, Madan. Building construction: principles, materials, and systems / Madan Mehta, Walter Scarborough, Diane Armpriest.—2nd ed. Pg. 21-65.*
3. *R. Chudley and R. Greeno, Building Construction Handbook, 6th ed, Pg. 296-536*
4. *The CSI specifications practice guide / Construction Specifications Institute. Pg. 131-142*
5. *Sidney M. Levy, Construction Data Book, 2nd ed, Pg. 457-536*
6. *Spon's Building, Civil Engineering, External Works and Landscape Price Book 2013*
7. *McEvoy, M., External Components, Mitchell's Building Series, Longman Scientific & Technical, Harlow, 1994*
8. *Marshall, D., Worthing D., The Construction of Houses, The Estates Gazette Ltd, London 1995*
9. *Weinand, N., Materials, Specification and Detailing: Foundations of Building Design, Taylor and Francis, London 2007 pg. 24-48*



Unit Title	Construction Project Scheduling
Unit Code	QS404

Summary

Status	core
Learning Hours	200 GLH including Lectures and Group Exercises
Credits Value	20
Period of Study	2 months

Summary of Learning Outcomes

Learning outcomes are the results which students will have achieved on successfully completing a course. The following reference points were used in designing the learning outcomes;

- QAA Subject Benchmark Statements to ensure: that appropriate and effective teaching, support, assessment and learning resources are provided for students; that the learning opportunities provided are monitored; and that the provider considers how to improve them; and
- The professional competencies required by the ICES, the RICS and the CIOB.

Learning outcomes are expressed under three broad headings of achievement in both threshold and typical standards:

U: Understanding (a general awareness of the activity)

K: Knowledge (a more detailed level of understanding of the activity)

S: Skills (to be able, without supervision, to perform relevant functions)



Learning outcomes: The learner will:	Assessment criteria: The Learner can:
1. Understand the types of documents that are used for project planning [U].	1.1 Evaluate the types of documents used for project planning to ascertain their importance to the planning work. 1.2 Explain the processes for dealing with inaccurate and missing information.
2. Be able to produce a method statement for the works [K, S].	2.1 Produce a method statement with reference to drawings, specifications and other documents relating to proposed construction.
3. Be able to produce a coherent and complete programme for the works [K, S].	3.1 Produce a programme for the works. 3.2 Demonstrate knowledge and understanding of the principles of design and construction 3.3 Understand the process of constructing the works
4. Understand how site inspection findings influence the execution of construction works [U, K]	4.1 Explain how site inspection findings affect the feasibility of the proposed plans.
5. Be able to determine resource requirements for construction works [S].	5.1 Assess the quantities and qualities of materials needed for the work. 5.2 Assess the plant and equipment needed for the work. 5.3 Assess the labour needed for the work, including sub-contractors.
6. Be able to produce projects in Primavera P6 [K, S].	6.1 Overview and navigation 6.2 Creating new projects; 6.3 Importing and exporting projects; 6.4 Creating WBS (Work Breakdown Structure); 6.5 Adding and managing activities to the WBS, creating relationships, CPM (Critical Path Method), total float, assigning constraints and scheduling; 6.6 Defining resources and roles, analysing resource performance, and adding resources and costs to the schedule;
Additional information about the unit	
Units aim(s)	



Recommended Reading

1. Baldwin, A. and Bordoli, D. (2014) *A Handbook for Project Planning and Scheduling*; Chichester: Wiley Blackwell
2. Cooke, B and Williams, P. (2009) *Construction Planning, Programming and Control*, 3rd edition; Oxford: Blackwell
3. Paul E Harris, *Project Planning and Scheduling using Primavera P6*, 2008
4. Oracle Primavera Project Management P6, Reference Manual, version 7.0
5. Jerry Brown Governor, *Project Scheduling with Primavera P6 Training Manual*, December 2011, Ver 1



Unit Title	Construction and Civil Engineering Technology
Unit Code	CE402

Summary

Year	1
Unit	2
Status	core
Learning Hours	100hrs including Lectures and Group Exercises
Credits Value	20
Period of Study	2 months

Summary of Learning Outcomes

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2. Understanding health, safety and environmental law and obligations in construction and the application of current Construction Design and Management (CDM) regulations [K, S]	2.1 HSE hazards in construction. 2.2 Emergency management procedures in accident preventions and investigations. 2.3 Identify and apply the legislation, standards and best practice to prevent accidents. 2.4 Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). 2.5 Obligations of all parties involved in construction according to the HSE law.
3. Understanding foundations and substructure and able to design and operate with suitable technology [K, S]	3.1 Types of foundation (e.g. reinforced strip, piles, raft foundations). 3.2 Basement construction. 3.3 Excavations and ground works.
4. Understanding the superstructure in building construction and able to design and operate with suitable technology [S]	4.1 Type of frames in multi storey buildings construction. 4.2 Sustainable technologies in multi storey buildings construction. 4.3 Exterior envelope of multi storey buildings 4.4 Building materials and selection.
5. Understanding the technology in design process of the built environment [K, U]	5.1 Architectural innovations. 5.2 Environmental legislations. 5.3 Planning and Building Regulations. 5.4 Other impacts in construction design.
6. Able to select and operate building services and systems in a multi stories building [K, S]	6.1 Heating and ventilation. 6.2 Fire safety and building security requirements. 6.3 Energy efficient buildings and select suitable technology in installation of services such power, gas, telecommunications, water, drainage, wastewater, etc.
Additional information about the unit	
Units aim(s)	



Text Book

1. Mike Riley & Alison Cotgrave, *Construction Technology 2 - Industrial and Commercial Building*, 3rd Edition

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Unit Title	Construction Materials and Scope of Works
Unit Code	QS403

Summary

Year	1
Unit	3
Status	core
Learning Hours	100hrs including Lectures and Group Exercises
Credits Value	10
Period of Study	2 months

Summary of Learning Outcomes

Learning outcomes are the results which students will have achieved on successfully completing a course. The following reference points were used in designing the learning outcomes;

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1. Understand regulations, standards and properties of materials on construction works [U, K].	1.1 Understand construction regulations and standards. 1.2 Evaluate the properties of materials in each component of construction. 1.3 Explain the factors to be considered when selecting the materials for retrofitting low carbon technologies.
2. Understand how the selection and use of materials and products can contribute to sustainable construction [K, S].	2.1 Evaluate the use of sustainable materials and products for a given construction project. 2.2 Evaluate the lifecycle costs of materials and products for a given project. 2.3 Produce a sustainable procurement strategy for a given construction works. 2.4 Explain how the process of installing building services may affect the energy performance of the completed project. 2.5 Explain to the end user how to sustain the optimum performance of a construction project.
3. Knowledge in consideration factors during the development of specifications [U, K].	3.1 Understand specification language, clarity, consistency, vocabulary, sentence structure, grammar, abbreviations, symbols and inappropriate terms. 3.2 Understand philosophy, technical requirements and computerised specification systems. 3.3 Evaluate the issues in bidding phase of a project and specifications revisions before contract awards.
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Additional information about the unit	
Units aim(s)	



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1. *Smith, Jason G. Construction management: subcontractor scopes of work / Jason G. Smith, Jimmie Hinze. Pg. 3-73, 143-177, 209-239, 381-391*
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4. *The CSI specifications practice guide / Construction Specifications Institute. Pg. 131-142*
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7. *McEvoy, M., External Components, Mitchell's Building Series, Longman Scientific & Technical, Harlow, 1994*
8. *Marshall, D., Worthing D., The Construction of Houses, The Estates Gazette Ltd, London 1995*
9. *Weinand, N., Materials, Specification and Detailing: Foundations of Building Design, Taylor and Francis, London 2007 pg. 24-48*



Unit Title	Construction Project Scheduling
Unit Code	CE404

Summary

Status	core
Learning Hours	200 hrs including GLH (Lectures and Group Exercises) and Independent Study
Credits Value	20
Period of Study	2 months

Summary of Learning Outcomes

Learning outcomes are the results which students will have achieved on successfully completing a course. The following reference points were used in designing the learning outcomes;

- QAA Subject Benchmark Statements to ensure: that appropriate and effective teaching, support, assessment and learning resources are provided for students; that the learning opportunities provided are monitored; and that the provider considers how to improve them; and
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Learning outcomes: The learner will:	Assessment criteria: The Learner can:
1. Understand the types of documents that are used for project planning [U].	1.1 Evaluate the types of documents used for project planning to ascertain their importance to the planning work. 1.2 Explain the processes for dealing with inaccurate and missing information.
2. Be able to produce a method statement for the works [K, S].	2.1 Produce a method statement with reference to drawings, specifications and other documents relating to proposed construction.
3. Be able to produce a coherent and complete programme for the works [K, S].	3.1 Produce a programme for the works. 3.2 Demonstrate knowledge and understanding of the principles of design and construction 3.3 Understand the process of constructing the works
4. Understand how site inspection findings influence the execution of construction works [U, K]	4.1 Explain how site inspection findings affect the feasibility of the proposed plans.
5. Be able to determine resource requirements for construction works [S].	5.1 Assess the quantities and qualities of materials needed for the work. 5.2 Assess the plant and equipment needed for the work. 5.3 Assess the labour needed for the work, including sub-contractors.
6. Be able to produce projects in Primavera P6 [K, S].	6.1 Overview and navigation 6.2 Creating new projects; 6.3 Importing and exporting projects; 6.4 Creating WBS (Work Breakdown Structure); 6.5 Adding and managing activities to the WBS, creating relationships, CPM (Critical Path Method), total float, assigning constraints and scheduling; 6.6 Defining resources and roles, analysing resource performance, and adding resources and costs to the schedule;
Additional information about the unit	
Units aim(s)	



Recommended Reading

1. Baldwin, A. and Bordoli, D. (2014) *A Handbook for Project Planning and Scheduling*; Chichester: Wiley Blackwell
2. Cooke, B and Williams, P. (2009) *Construction Planning, Programming and Control*, 3rd edition; Oxford: Blackwell
3. Paul E Harris, *Project Planning and Scheduling using Primavera P6*, 2008
4. Oracle Primavera Project Management P6, Reference Manual, version 7.0
5. Jerry Brown Governor, *Project Scheduling with Primavera P6 Training Manual*, December 2011, Ver 1



Unit Title	Method of Measurement and Estimating
Unit Code	CE405

Summary

Status	core
Learning Hours	200 hrs including GLH (Lectures and Group Exercises) and Independent Study
Credits Value	20
Period of Study	2 months

Summary of Learning Outcomes

Learning outcomes are the results which students will have achieved on successfully completing a course. The following reference points were used in designing the learning outcomes;

- QAA Subject Benchmark Statements to ensure: that appropriate and effective teaching, support, assessment and learning resources are provided for students; that the learning opportunities provided are monitored; and that the provider considers how to improve them; and
- The professional competencies required by the ICES, the RICS and the CIOB.

Learning outcomes are expressed under three broad headings of achievement in both threshold and typical standards:

U: Understanding (a general awareness of the activity)

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S: Skills (to be able, without supervision, to perform relevant functions)



Learning outcomes: The learner will:	Assessment criteria: The Learner can:
1. Understand the estimation processes for a construction tender [K, U].	1.1 Organisation of the estimating function. 1.2 Procurement path. 1.3 Forms of contract. 1.4 Tender documentation. 1.5 Estimating methods.
2. Understand the importance of measurement in construction and able to use the method of measurement for the estimating process [K, S].	2.1 Quantity surveying techniques and the quantification of construction works. 2.2 The Civil Engineering Standard Method of Measurement (CESMM4). 2.3 The Method of Measurement for Highway Works (MMHW). 2.4 RICS New Rules of Measurement (NRM) 2.5 Specifications.
3. Able to produce an estimate for a construction tender and for a given construction project in a standard industry format [K, S].	3.1 Carry out the costing of construction works by resource Costs – Labour, Plant & Material. 3.2 Prime costs, provisional sums and day works. 3.3 Preliminaries. 3.4 Building up rates from first principles. 3.5 Unit rate pricing. 3.6 Risks, opportunities and fluctuations. 3.7 Completing the estimate and final tender Review. 3.8 Cashflow forecasts
4. Understand the estimation processes for a construction tender [K, S].	4.1 Purpose of key contract documents in producing an estimate for a construction tender. 4.2 Use of the standard method of measurement used for the tendering process. 4.3 Produce an estimate for a given construction project in a standard industry format.
Additional information about the unit	
Units aim(s)	



Text Book

1. Martin Brook's *Estimating and Tendering for Construction Work* by Elsevier Butterworth-Heinemann 3rd Edition.

Recommended Reading

1. Thomas Telford Publishing for permission to quote for the ICE Conditions of Contract 7th Edition.
2. Measurement using the New Rules of Measurement by Sean D C Ostrowski.
3. Managing with the MMHW by Hamish Mitchell.
4. Building Measurement by A D Packer which covers SMM7, superseded by NRM2 but of course you are still likely to find it in contracts in progress.



Unit Title	Construction Procurement and Tendering
Unit Code	CE406

Summary

Status	core
Learning Hours	200 hrs including GLH (Lectures and Group Exercises) and Independent Study
Credits Value	20
Period of Study	2 months

Summary of Learning Outcomes

Learning outcomes are the results which students will have achieved on successfully completing a course. The following reference points were used in designing the learning outcomes;

- QAA Subject Benchmark Statements to ensure: that appropriate and effective teaching, support, assessment and learning resources are provided for students; that the learning opportunities provided are monitored; and that the provider considers how to improve them; and
- The professional competencies required by the ICES, the RICS and the CIOB.

Learning outcomes are expressed under three broad headings of achievement in both threshold and typical standards:

U: Understanding (a general awareness of the activity)

K: Knowledge (a more detailed level of understanding of the activity)

S: Skills (to be able, without supervision, to perform relevant functions)



Learning outcomes: The learner will:	Assessment criteria: The Learner can:
<p>1. Understand the procurement of construction materials and plant for the execution of the works [U, K]</p>	<p>1.1 Explain the organisational procurement process for construction materials and plant. 1.2 Describe procurement requirements for public and private sector projects, both nationally and internationally. 1.3 Explain the relationship between effective procurement and cost control. 1.4 Explain codes of practice and procedures commonly used.</p>
<p>2. Understand how construction work is procured [U, K].</p>	<p>2.1 Understand how client needs influence choice of procurement method. 2.2 Discuss how construction work is procured, evaluating the merits of alternative routes. (TN – traditional, design and build, management contracting, construction management, term contracting, partnering, PFI; single-, two-stage, negotiated tenders; sub-contracting, appointing consultants). 2.3 Understand risk allocation and contractual relationship created through different procurement routes. 2.4 Discuss how tendering processes are used to establish contract price.</p>
<p>3 Understand tender documentation and the bid process in construction projects [K, S].</p>	<p>3.1 Explain the tendering process and tender Action. 3.2 Explain the competitive bidding under risk and budgetary control. 3.3 Describe the sequence of successful tender Submissions.</p>
<p>4 Able to evaluate tenders to award successful contractor [K, S].</p>	<p>4.1 Explain the evaluation and comparison of bids process including contractors' queries, late tenders, errors, omissions and adjustment to tenders. 4.2 Explain the negotiation processes such as single and two stage tendering, involved in procurement, the use of codes of practice and e-tendering. 4.3 Explain the preparation of tender evaluation report and award.</p>
<p>Additional information about the unit</p>	
<p>Units aim(s)</p>	



Text Book

1. Ramus, Jack and Birchall, Simon, *Contract Practice for Surveyors*, 3rd edition

Recommended Reading

1. Kwakye A. A, *Understanding Tendering and Estimating*, Ashgate Publishing Limited
2. Hughes, W., Hillebrandt, P., Greenwood, D. and Kwawu, W.(2007) *Procurement in the Construction Industry*, London: Spon
3. *The Aqua Group Guide to Procurement, Tendering and Contract Administration*, 2nd edition Mark Hackett and Gary Statham, Wiley-Blackwell