HONG KONG INSTITUTE OF VOCATIONAL EDUCATION (TSING YI NEXUS)

CIVIL AND STRUCTURAL ENGINEERING COURSE BOARD

COURSE VALIDATION DOCUMENT

VOLUME 2
MODULE SYLLABUSES

HIGHER DIPLOMA IN CIVIL ENGINEERING (Full-time, 51301F)
HIGHER DIPLOMA IN CIVIL ENGINEERING (Part-time Evening, 55901)
DIPLOMA IN CIVIL ENGINEERING (Part-time Day Release, 53201)
DIPLOMA IN CIVIL ENGINEERING (Part-time Evening, 55201)
CERTIFICATE IN CIVIL ENGINEERING (Part-time Day Release, 53501)
CERTIFICATE IN CIVIL ENGINEERING (Part-time Evening, 55501)
HIGHER DIPLOMA IN CIVIL ENGINEERING (Part-time Day Release, 53301F)
HIGHER DIPLOMA IN CIVIL ENGINEERING (Part-time Evening, 55901F)

June 2006

May 2007 - 1st Revision to incorporate 53301F and 55901F HD courses
Jan 2011 - 2nd Revision after Guided Learning Review for L2, L3 & L4 Modules
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* Bridging Modules for Level 2 (Year 2) entry only
* For students progression from L2 only.
** Bridging Modules for Level 3 (F.7) entry only

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Module Title: Vocational English and Communication Skills

Module Code: LAN6030

Class-Contact Hours:
- Lecture/Tutorial: 120 hours
- Laboratory: 60 hours

Module Value: 12.0

Module Rationale/Aims

a. To improve the communication abilities of students in a vocational context
b. To help students become attuned to the rules of use for communicating in a work place context
c. To help students use appropriate language functions and communication strategies to achieve communication purposes
d. To develop students' abilities in reading, writing, speaking, and listening so that they can carry out various communication tasks effectively at work or in their future study
e. To help students build up confidence when using English
f. To help students become more independent language learners
g. To improve students' basic English language skills and learning strategies so that students can engage in life long learning

Pre-requisite(s): Nil

Co-Requisite(s): Nil

Exemption Criteria: HKVEP Level 2 or above
Teaching and learning Strategies

a. A competency-based approach will be adopted to help students use the language to carry out various tasks in vocational and academic contexts independently or as a member of a group.
b. Simulated tasks and learning activities which are communicative and which allow optimum student interaction will be organised. There will be a variety of activities to arouse interest and motivate learning.
c. Teaching will be learner-centred and students will be encouraged to take initiative in their learning.
d. Authentic materials and simulated workplace situations will be adopted as far as possible.
e. The teaching of communication skills will be contextualised and forms an integral part of students’ regular language learning activities.
f. Grammar revision will be contextualized and the teaching of listening, speaking, reading, and writing skills will be integrated.
g. Self-access facilities / resources / information and communication technologies will be used to enhance students’ language learning.
h. Students’ progress and achievements will be regularly monitored and assessed in a variety of methods such as simulations, skills demonstration, direct and indirect observation, etc.

Assessment Scheme

Continuous Assessment 100 %
### Learning Objectives and Key Content Area

<table>
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<tr>
<th>Competency in Vocational &amp; Academic Contexts</th>
<th>Elements / Text Types</th>
</tr>
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| **1. Can set one's English learning goals & work towards them independently (10 hours)** | a. Can use a number of learning strategies (e.g. goal setting, making action plans, self evaluation, etc.) to improve English skills  
| | b. Can use a variety of learning tools and school facilities to enhance learning (e.g. dictionaries, library & independent language learning centre, etc.) |
| **2. Can communicate in ways that are appropriate to the workplace (10 hours)** | a. Can use polite language in a workplace context  
| | b. Can use appropriate language strategies to share information, seek clarification, and to avoid misunderstanding  
| | c. Can show basic understanding of tone, style and register |
| **3. Can use a range of basic communication strategies to achieve different purposes (160 hours)** | a. Can read short procedural texts  
| | Instructions, manuals, regulations, work procedures  
| | b. Can read a range of short informational texts  
| | Information memos/reports, leaflets, faxes, e-mails, advertisements, notices, extracts from books  
| | c. Can complete formatted texts and can understand short informational presentations  
| | Forms (e.g. application forms, workplace forms, message forms, order forms, etc.), presentations, briefings, lectures  
| | d. Can write routine formal correspondence  
| | Simple routine letters (e.g. request letters and replies, job application letters, etc.), resumes, and memos  
| | e. Can write/complete short informational texts  
| | Simple informational reports (e.g. short project reports, incident reports, etc.)  
| | f. Can engage in simple social conversations and can make and deal with routine telephone calls (making and receiving calls, leaving & taking messages, transferring calls)  
| | Conversations (Greetings, introduction, saying goodbye), telephone calls (making and receiving calls, leaving & taking messages, transferring calls) |
telephone calls

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<tr>
<td><strong>g.</strong></td>
<td>Can make simple requests, can understand and give spoken instructions and directions</td>
</tr>
<tr>
<td></td>
<td>Procedures, instructions and directions</td>
</tr>
<tr>
<td><strong>h.</strong></td>
<td>Can give and ask for routine information orally in familiar situations</td>
</tr>
<tr>
<td></td>
<td>Conversations (including requesting, clarifying and repeating information, making arrangements, etc.)</td>
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**Reference Materials**

2. Teaching and Learning Package
3. Work in Progress by Andy Hopkins and Jocelyn Potter (Longman 1997), Course Book and Workbook
4. Early Business Contacts (Longman 2001)
5. Handshake by Peter Viney and Karen Viney (OUP 1996)
6. Basic Grammar by Dave Willis and Jon Wright (Collins Cobuild 1995)
7. English Dictionary (Collins Cobuild 1995)

**Date**

May 2005 (Revised)
Module Syllabus

Module Title
ELEMENTARY LAND SURVEYING

Module Code
CBE6003

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 1 / 2
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 1
51310F Higher Diploma in Architectural Design and Technology /Level 1

Part-time Mode
53501/55501 Certificate in Civil Engineering/Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes
To achieve this module a student shall be able to:

- Understand the surveying profession in construction industry
- Provide an introduction to the principles and procedures used in land surveying
- Develop various surveying skills used in construction sites

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Full-time & Part-time Modes
The module consists of 10 hours of formal lecture, 5 hours of tutorial lessons and 15 hours of survey practical in small groups. There will be assignments and class quizzes at suitable intervals throughout the year to monitor the progress of the students.
Higher Diploma in Civil Engineering

Survey practical will be held normally in Saturday afternoons.

**Assessment Scheme**

| Coursework | 100% |
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<td><strong>1</strong> Understand the basic engineering surveying terms used in current practice. (2 hours)</td>
<td>● General principles and different types branches of surveying, ● Different types of survey errors, ● Precision and accuracy.</td>
</tr>
<tr>
<td><strong>2</strong> Understand the methods of angular, distance measurements; and levelling in land surveying. (15 hours)</td>
<td>● Use of total station instrument to measure and reduce angular and distance measurement, ● Use of chain surveying in small map/plan revision work, ● Use of leveling equipment to carry out simple leveling works.</td>
</tr>
<tr>
<td><strong>3</strong> Develop the basic skill in interpretation of maps and plans. (3 hours)</td>
<td>● Survey reference systems of Hong Kong: Universal Transverse Mercator (UTM) projection, Hong Kong Grid System and leveling datum, ● Hong Kong maps and plans series and use of maps, ● Interpretation of contour map, symbols and legends, ● Calculation of area and volume.</td>
</tr>
<tr>
<td><strong>4</strong> Allow students to practice and apply the techniques in surveying production. (10 hours)</td>
<td>● Basic skills for detail surveying, ● Generation of detail surveying plan.</td>
</tr>
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</table>
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ✔
Information Management □
Use of Numbers ✔
Creative Thinking ✔
Analytical & Problem Solving ✔

Personal Management Skills
Attitudes & behaviour □
Responsibility & Autonomy ✔
Adaptation ✔
Continuous Learning ✔
Work Safety ✔

Teamwork Skills
Working with others ✔
Participation in Projects & Tasks ✔

Reference
Module Syllabus

Module Title
CONSTRUCTION DRAWING A

Module Code
CBE6013

Class Contact Hours
90 hours

Module Value
6.0

Course Code/Level
Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 1

Learning Outcomes
To achieve this module a student shall be able to:

- Use basic hand drawing tools to produce geometric and engineering drawing.
- Understand geometric drawing and methods of construction.
- Construct and understand the properties of conic.
- Interpret, present and construct basic engineering drawing.
- Convert three dimensional shapes into two dimensional drawings in multi-views and single-view.
- Develop basic freehand sketching skill

Pre-requisite(s):
Nil

Teaching & Learning Strategies
Full-time Mode
The module consists of 90 hours of practical/tutorial lessons.

At initial stage, student will learn to solve plane geometry problems. After establishing and accruing certain basic drawing concept and techniques, students will perceive spatial orientation of point, line and plan from Descriptive Geometry.
Students are then further trained to handle objects presented in multi-views and single-view drawings. Exercises and assignments will be practical in nature to develop students’ confidence in their ability to solve problems and communicate their solutions graphically. To monitor the progress, assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals throughout the semester.

**Assessment Scheme**

Coursework 100%
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<th>Learning Outcome</th>
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| **1  Accustom to Engineering Drawing** (15 hours) | • Understand the basic standards and techniques in drafting.  
• Understand drawing layout and presentation.  
• Understand geometric terms and geometric shapes.  
• Geometric construction including division of lines and angles, polygons, circles, tangents, curves, ellipses, conic sections.  
• Get the techniques in the use of line types, abbreviations, symbols, size and scale of drawings. |
| **2  Acquire basic concepts in Descriptive Geometry** (30 hours) | • Understand the technique in graphical presentation and visualize three dimensional orientation:  
• Spatial representation of points, lines, planes and solids.  
• Spatial intersection of lines and planes.  
• Determination of true lengths, true angles and true shapes and other properties of objects.  
• Multi-views and auxiliary views. |
| **3  Understand and apply orthographic projection for various shapes of object** (20 hours) | • Approach to depict the missing views for various given conditions.  
• Approach to reveal the missing lines and curves from drawings of orthographic projections.  
• Determine the nature of missing elements.  
• Acquire the basic concept of section.  
• Know various presentation and practice of sectional drawings.  
• Understand, apply and draw sections for engineering drawings  
• Integrate sectional concept and orthographic projection.  
• Draw section from contour lines of land survey map. |
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<td>Convert between 2-D and 3-D drawings (5 hours)</td>
<td>● Acquire concept and skill in producing isometric and oblique projection.  ● Conversion between pictorial and orthographic projections.  ● Use of labels, allocate and demonstrate of dimensions.</td>
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<td>Free-hand Sketches and Perspective Projection (20 hours)</td>
<td>● Spaces and objects as visualized by human perception.  ● Skills in free hand sketches in isometric and oblique projection.  ● Sketches with 1-point, 2-point and 3-point vanishing points</td>
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</table>
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy
Information Management
Use of Numbers
Creative Thinking
Analytical & Problem Solving

Personal Management Skills
Attitudes & behaviour
Responsibility & Autonomy
Adaptation
Continuous Learning
Work Safety

Teamwork Skills
Working with others
Participation in Projects & Tasks

Reference
Module Syllabus

Module Title
LIFE SKILLS

Module Code
FDC 6402

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Year

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 1
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 1
51310F Higher Diploma in Architectural Design and Technology /Level 1

Module Aims
To introduce students with a set of life skills that develop their competencies in managing themselves, dealing with decisions and problems, improving human relations, and keeping abreast of the ever-changing environment.

Teaching & Learning Strategies
Activity-based approach through such activities as games, assessment tests, group discussions / presentation, reflective writing, case studies, role-play, organization / exhibition visits, or talks from guest speakers to arouse learning interest and encourage active participation.

Assessment Scheme
Coursework 100%
**Learning Objectives**

Through interactive process of teaching and learning, to enable students to:
(a) understand how to maintain personal health and balanced development;
(b) acquire good interpersonal skills and understand how to manage their anger/emotion;
(c) develop critical thinking and decision-making skills;
(d) understand the money management concept; and
(e) enhance their employability.

**Key Content Area**

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<td>Lesson 13:</td>
<td>Conflict Management</td>
</tr>
<tr>
<td>Lesson 14:</td>
<td>Safety and Health in the Workplace</td>
</tr>
<tr>
<td>Lesson 15:</td>
<td>Presentation Techniques</td>
</tr>
</tbody>
</table>

**Reference**

Module Syllabus

Module Title
INTEGRATED WORKSHOP AND SAFETY PRACTICE

Module Code
CSE6942

Class Contact Hours
60 hours

Module Value
0

Course Code/Level
Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 1
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 1
51310F Higher Diploma in Architectural Design and Technology /Level 1

Learning Outcomes

To achieve this module a student shall be able to:
• Acquire the personal safety and health practices in construction works;
• Learn and experience fundamental craft skills of various trades in construction industries;
• Experience the basic craft operations in construction works; and
• Obtain an insight of building forms via the building up physical models.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

The module consists of 60 training hours.

Key skills training should also be provided such that students will be self-motivated to acquire new skills. Wide range of demonstrations, workshop/fieldwork, case studies and model making are designed to optimize students’ learning experience and outcomes.
Assessment Scheme

Coursework 100%

Individual student’s performance will be assessed by the project supervisor and moderator throughout the prescribed project activities. Assessment will be based on the following:
1. Engineering concept and technical content
2. Organisation and management
3. Quality of the work, including the written report and oral presentation
4. Individual initiative and effort
5. Response to questions from an evaluation panel
### Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1. Acquire the personal safety and health practices in construction works. (9 hours) | ● Demonstrate the use of PPE: safety helmets, safety boots, goggles and spectacles, ear muffs and ear plugs, masks or respirators, safety harness for working at height, reflective waistcoats, gloves,  
● Study case on potential hazards and application of safety measures in construction sites. |
| 2. Learn and experience fundamental craft skills in woodwork. (9 hours) | ● Produce different products of polished woodwork with basic knowledge and safe use of hand tools including Saw, cutter, plane, sand paper, etc,  
● Safety in woodworks. |
| 3. Learn and experience fundamental craft skills in electrical work. (9 hours) | ● Use basic wiring skills to carry out some simple circuit connections with the knowledge of electricity including relationship between voltage, current and resistance (Ohm’s law) for circuit in series and in parallel, single-phased and three-phased electricity. |
| 4. Learn and experience fundamental craft skills in painting. (9 hours) | ● Produce different products of painted woodwork and metalwork with basic knowledge and safe use of painting tools including pen, brush, bucket, fine sand paper, etc.,  
● Demonstrate the behaviour and applications of different painting materials and proper use of various painting solvents. |
| 5. Learn and experience fundamental craft skills in plumbing. (9 hours) | ● Demonstrate the proper and safe use of plumbing tools and equipments,  
● Demonstrate different pipes & fittings and basic pipe jointing techniques. |
6. Learn and experience fundamental craft skills in architectural model making.

| (15 hours) | • Demonstrate woodwork, painting, wiring skills and jointing techniques,  
|           | • Appreciate the design essences of different forms of building. |
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

**Fundamental Skills**
- Communication, IT and Numeracy ✓
- Information Management ✓
- Use of Numbers □
- Creative Thinking ✓
- Analytical & Problem Solving ✓

**Personal Management Skills**
- Attitudes & behaviour ✓
- Responsibility & Autonomy ✓
- Adaptation ✓
- Continuous Learning ✓
- Work Safety □

**Teamwork Skills**
- Working with others □
- Participation in Projects & Tasks ✓

**Reference**
1. *Factories and Industrial Undertakings Ordinance and its Regulations*
2. *Construction Sites (Safety) Regulations*
3. Hong Kong Housing Society: “*Quality Field Practices*” Video
   [香港房屋委員會之優質工序系列]
Module Syllabus

Module Title
CHINESE

Module Code
LAN6493

Class Contact Hours
45 hours Lecture, 15 hours Laboratory

Module Value
4.0

Course Code/Year
Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 1
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 1
51310F Higher Diploma in Architectural Design and Technology /Level 1

Module Rationale/Aims
● To develop students’ listening, reading, speaking and writing skills, and to improve their communication skills in Chinese.
● To help students consolidate and enhance their basic knowledge of Chinese language and enable them to carry out various language tasks more effectively for future work or further study.
● To develop students’ confidence and basic skills in using Putonghua.
● To help students become more independent in their learning.

Teaching and learning Strategies
● A communicative and student centred approach will be encouraged.
● A wide range of activities, such as pair work, group discussion, and role-play will be arranged, primarily in laboratory and tutorial sessions, to make the module more interesting for students.
● Authentic materials will be adapted for use.
● The teaching of the four skills, e.g. listening, speaking, reading and writing, will be integrated.
● Self-access and information technology will be used to enhance teaching and learning.
### Assessment Scheme

<table>
<thead>
<tr>
<th>Coursework</th>
<th>60%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>40%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topic Area</th>
<th>Principal Objectives plus Indicative Contents</th>
</tr>
</thead>
</table>
| 1. Putonghua (15 hours)             | **Upon completion of the unit, students will be able:**  
To make effective use of independent study skills for work and study purposes.  
To be familiar with Putonghua Pinyin system.  
To develop Putonghua listening skills and strategies for listening for meaning in a wide range of different contexts and situations, listening for different purposes, and produce an appropriate response.  
To develop Putonghua speaking skills and strategies in conducting basic conversations on familiar topics. |
| 2. Speaking and Presentation Skills (15 hours) | **Upon completion of the unit, students will be able:**  
To acquire speaking management skills and strategies.  
To speak properly in different situations, e.g. speaking for an audience, presentation of report, and attending an interview. |
| 3. Syntax, Vocabulary and Simplified Chinese Characters (15 hours) | **Upon completion of the unit, students will be able:**  
To use their reading skills effectively.  
To be aware of simplified Chinese characters used in the Mainland.  
To consolidate and enhance their basic knowledge of Chinese language through the study of syntactic error analysis, lexical and syntactic differences between Cantonese and standard Chinese. |
| 4. Practical Writing (15 hours)      | **Upon completion of the unit, students will be able:**  
To be familiar with the most commonly used business/technical correspondence.  
To be able to write simple business letters or technical reports. |
Reference

1. Teaching and Learning Package
   中國社會科學院語言研究所詞典編輯室 (1996) 《現代漢語詞典》，北京：商務印書館。
   何萬貫編 (1995) 《說話能力訓練》，香港：牛津大學出版社中國有限公司。
4. S. P. Ho, “Confusing Chinese Characters in Hong Kong” (Book 1 & 2), Ming Pao Publications, 2000
   何成邦 (2000) 《香港別字追蹤》1、2 冊，香港：明報出版社。
5. Y. T. Tam, S. L. Chow, “Practical Chinese Writing”, Hong Kong Educational Publishing Company, 1999
   談彥廷、鄒兆玲編著 (1999) 《活學活用應用文》，香港：香港教育圖書公司。
   卞君 (1980) 《漢語基本知識》，香港：商務印書館香港分館。
Module Syllabus

Module Title
BASIC CAD

Module Code
CBE5024

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Level
Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 1

Learning Outcomes
To achieve this module a student shall be able to:
- Acquire basic skill to manoeuvre AutoCAD.
- Understand the CAD concept versus conventional manual practice.
- Set up basic CAD environment before further development.
- Edit or amend CAD drawing file.
- Use built-in functions of CAD for measurement and calculation.
- Organize and present of engineering drawing in CAD.
- Product drawing according to paper size and printing scale.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Full-time & Part-time Modes
The module consists of 30 hours of formal workshop sessions.

Workshop sessions include formal delivery of instructions, practice, and manoeuvring techniques. Working examples will be demonstrated and students have to do exercise during the sessions such that those errors encountered can be resolved immediately or malpractice can be rectified with conceptual explanation. To monitor the progress and evaluate the achievement of students, assignments and/or quizzes are to be held at suitable intervals throughout the semester.
Assessment Scheme

Coursework 100%
### Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| **1** Introduce AutoCAD and its major functions and applications | - Acquire the basic features of CAD.  
- Understand basic input methods: icon, pull down menu, key in command.  
- Understand the CAD co-ordinates system: absolute, relative, polar.  
- Use basic commands: draw line, circle, arc and text; erase, offset, trim, and extend.  
- Set basic environment: drawing limits, grid, snap, and ortho. |
| **2** Explore basic CAD settings and commands | - Set the print environment: paper size, orientation, print area, print offset, and pen style.  
- Set the layering system: create, on/off, current, colour, print, and line type.  
- Understand and use of more commands: view, zoom, copy, explore, move, rotate, mirror, chamfer, and fillet.  
- Understand and use of settings: line type, line weight, and line type scale. |
| **3** Explore further CAD settings and commands | - Understand the text settings: text style, height, inclination, and width factor  
- Format the Dimension settings: dimension style, arrow size, leader, symbols, text location, and scale factor.  
- Use of commands: hatch, array, list, pedit and polyline. |
| **4** Apply CAD to Construction Drawings | - Understand and draw typical floor plan and section drawings.  
- Understand and draw typical reinforced concrete footing.  
- Acquire basic knowledge of structural steel sections and its properties.  
- Search and figure out geometric sections from structural steel tables. |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy
Information Management
Use of Numbers
Creative Thinking
Analytical & Problem Solving

Personal Management Skills
Attitudes & behaviour
Responsibility & Autonomy
Adaptation
Continuous Learning
Work Safety

Teamwork Skills
Working with others
Participation in Projects & Tasks

Reference
Module Syllabus

Module Title
INFORMATION TECHNOLOGY APPLICATIONS FOR CONSTRUCTION

Module Code
CBE6006

Class Contact Hours
60 hours

Module Value
4.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 1
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 1
51310F Higher Diploma in Architectural Design and Technology /Level 1

Learning Outcomes
To achieve this module a student shall be able to:

• Acquire a basic knowledge of computer technology: PCs, CPUs, memory, data storage and retrieval, input and output devices.
• Understand the use and development of the Internet and its applications and the World Wide Web (WWW).
• Acquire the techniques in handing the word processing in a professional manner.
• Demonstrate the creation of a spreadsheet, graphical presentations and statistical analysis. Be able to process and analyse the data in a clear and easy way.
• Organize the data in a database, which is managed by a database management system. Be able to sort and retrieve the data accurately and conveniently from the data management system.
• Demonstrate the use of presentation software to report the important findings and produce the professional-looking presentations.

Pre-requisite(s):
Nil
Teaching & Learning Strategies

Full-time Mode
The module consists of 60 hours of practical lessons.

During practical lessons, a group project including conducting a survey, report as well as a formal presentation is to be done to inspire learners of this module. Learners will be able to write a proposal, project brief and report based on real situations. Finally, the learners can adopt what they learn from the module to create a formal slide show and to do the presentations. Practical type assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals throughout the semester to monitor the progress of the students.

Assessment Scheme

Coursework 100%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Demonstrate an understanding of the available technology: PCs, CPUs, memory,</td>
<td>● Learn various types of hardware; the constituent parts of a PC and the importance</td>
</tr>
<tr>
<td>data storage and retrieval, input and output devices.</td>
<td>of the specification versus performance issue. Processors, memory, hard disks,</td>
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<tr>
<td></td>
<td>floppy disks, CD Rom, multimedia, screens (including appropriate resolution).</td>
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<tr>
<td></td>
<td>Input and output devices including voice, scanners, printers and plotters.</td>
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<tr>
<td>(2 hours)</td>
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<tr>
<td>2. Understand the use and development of the Internet and its applications and</td>
<td>● Understand the concepts underlying the development of the internet and the WWW.</td>
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<tr>
<td>the World Wide Web (WWW).</td>
<td>● Be able to participate in internet activities, including searching for information</td>
</tr>
<tr>
<td></td>
<td>using search engines, browsing information, sending and receiving e-mails,</td>
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<tr>
<td></td>
<td>uploading and downloading files</td>
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<td></td>
<td>● Be aware of the kinds of personal, social or commercial activities that are</td>
</tr>
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<td></td>
<td>available on the internet, including e-commerce.</td>
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<tr>
<td>(2 hours)</td>
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<tr>
<td>3. Demonstrate the use of advanced functions of word processor.</td>
<td>● Be able to create, edit and save a document in word processing.</td>
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<td></td>
<td>● Use the customized command to create icon in the window.</td>
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<tr>
<td></td>
<td>● Be able to use the basic command to create and edit a simple research paper,</td>
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<tr>
<td></td>
<td>proposal and report, including the text formatting, paragraph alignment and</td>
</tr>
<tr>
<td></td>
<td>formatting and graphical insertion and table insertion.</td>
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<td></td>
<td>● Be able to adopt more advanced functions such as creating header and footer,</td>
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<tr>
<td></td>
<td>footnote, office clipboard as well as equation editor.</td>
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<tr>
<td>(8 hours)</td>
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<tr>
<td><strong>4</strong></td>
<td>Demonstrate the creation spreadsheet, graphical presentations and statistical analysis. (16 hours)</td>
</tr>
</tbody>
</table>
|   | ● Understand the elementary command to create a spreadsheet such as entering the text and number as well as the modifying and formatting the styles.  
|   | ● Be able to create a table with different style and format by using the merging and paragraph alignment as well as orientation.  
|   | ● Understand the purpose of the cell and concept of creating a formula as well as the mathematical functions such as summation, average, maximum and minimum.  
|   | ● Understand the importance of copy and paste command to handle all the data and calculations.  
|   | ● Use the spreadsheets to perform more advanced engineering calculations, algorithm, graphical presentations and basic programming concept.  
|   | ● Be able to create an embedded chart and three dimensional graphs and charts.  
|   | ● Understand the relationship between absolute and relative cell which are helpful for calculations. This all relates to the independent and dependant variables in Mathematics.  
|   | ● Understand the use of simple function to perform logical test.  
|   | ● Be able to use the statistical analysis and correlation, regression tool, different kinds of polynomial curve fittings for the data processing. This involves the process of data import and export. |
| **5** | Organize the data in a database, managed by a database management system. (16 hours) |
|   | ● Understand the background and functions of database.  
|   | ● Be able to input items in sequence into the database management systems.  
|   | ● Be able to create a simple database, table and records accurately for large amount of data.  
|   | ● Be able to analyze the data for trends and produce a variety of useful report.  
|   | ● Understand the use of sorting, retrieving data in the database.  
|   | ● Be able to create different kind of forms or report automatically by choosing the items and criteria value.  
|   | ● Be able to plot the graph from the database. |
| 6. **Show the important findings and produce them into the professional-looking presentations.** (16 hours) | ● Learn the creation of the template to suit the format of presentation.  
● Be able to create a slide with different background, title and content.  
● Be able to edit the colour and style of the background on different slide.  
● Be able to create a single-level bullet on the slide.  
● Understand the function of milt-level bullet and clip art in the presentation.  
● Be able to add an animation scheme to slide show.  
● Produce the slide into the view of outline.  
● Be able to add a more advanced animation program to the slide show with video and audio effect. |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
- Communication, IT and Numeracy ✓
- Information Management ✓
- Use of Numbers □
- Creative Thinking ✓
- Analytical & Problem Solving ✓

Personal Management Skills
- Attitudes & behaviour □
- Responsibility & Autonomy ✓
- Adaptation ✓
- Continuous Learning ✓
- Work Safety □

Teamwork Skills
- Working with others ✓
- Participation in Projects & Tasks ✓

Reference
Module Title

FOUNDATION MATHEMATICS FOR CONSTRUCTION

Module Code

CBE6111

Class Contact Hours

60 hours

Module Value

4.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 1
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 1
51310F Higher Diploma in Architectural Design and Technology /Level 1

Learning Outcomes

To achieve this module a student shall be able to:
• Understand and apply the knowledge of algebra by manipulate numbers, algebraic symbols and other mathematical objects such as equations, inequalities, functions, ratio, arithmetic sequences and geometric sequences in solving everyday and construction problems;
• Understand the basic properties of angles and tangents in circles and use a deductive approach to study geometric and related problems;
• Understand and use trigonometric ratios and rules for simple 2-D figures and mensuration of 3-D solid objects;
• Understand the basic laws of probability and knowledge of statistical measures to analyze and interpret data;
• Understand and apply knowledge of coordinate geometry to solve problems involving points and straight lines.

Pre-requisite(s):

Nil

Exemption Criteria

Exemption can be granted if a student has obtained a pass in Mathematics in HKCEE
or equivalent.

**Teaching & Learning Strategies**

**Full-time Mode**
The module consists of 45 hours of formal lecture, 15 hours of tutorial.

The teaching and learning is conducted through a mixture of lectures and class practices. Emphasis is placed upon the practicing of skills and application of basic concepts. Applications in real-life situations will be stressed on consolidating students’ knowledge and skills. Appropriate use will be made of calculators, software and other IT media, when appropriate, to enhance the effectiveness of teaching and learning.

**Assessment Scheme**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>50%</td>
</tr>
<tr>
<td>Examination</td>
<td>50%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Understand and apply the knowledge of algebra by manipulate numbers,</td>
<td>• Indices and logarithm,</td>
</tr>
<tr>
<td>algebraic symbols and other mathematical objects such as equations,</td>
<td>• Basic techniques of solving problems,</td>
</tr>
<tr>
<td>inequalities, functions, ratio, arithmetic sequences and geometric sequences in</td>
<td>• Factorization of simple expressions; factor theorem,</td>
</tr>
<tr>
<td>solving everyday and construction problems.</td>
<td>• Quadratic equations in one unknown,</td>
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<td></td>
<td>• Linear and quadratic inequalities in one variable,</td>
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<td></td>
<td>• Simultaneous equations in two unknowns,</td>
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<tr>
<td></td>
<td>• Solving equations by graphical methods,</td>
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<tr>
<td></td>
<td>• Ratio, proportion and variation and their applications (e.g. mixtures, sharing of profit in partnership),</td>
</tr>
<tr>
<td></td>
<td>• Arithmetic sequences and geometric sequences and their applications (e.g. growth, depreciation and mortgages).</td>
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<tr>
<td>(28 hours)</td>
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</tr>
<tr>
<td>2. Understand the basic properties of angles and tangents in circles and use a</td>
<td>• Various parts of a circle,</td>
</tr>
<tr>
<td>deductive approach to study geometric and related problems.</td>
<td>• Angle properties under different conditions in circles,</td>
</tr>
<tr>
<td></td>
<td>• Tangent properties in circles.</td>
</tr>
<tr>
<td>(3 hours)</td>
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<tr>
<td>3. Understand and use trigonometric ratios and rules for simple 2-D figures and</td>
<td>• Trigonometric ratios and their graphs; degrees and radians,</td>
</tr>
<tr>
<td>mensuration of 3-D solid objects.</td>
<td>• Reduction principle,</td>
</tr>
<tr>
<td></td>
<td>• Simple trigonometric equations,</td>
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<td></td>
<td>• Sine and cosine formulae,</td>
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<td></td>
<td>• Problems in 2-dimensions,</td>
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<td></td>
<td>• Mensuration of common plane figures and solids.</td>
</tr>
<tr>
<td>(13 hours)</td>
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</tr>
<tr>
<td>Learning Outcome</td>
<td>Indicative Contents</td>
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<tr>
<td>4. Understand the basic laws of probability and knowledge of statistical measures to analyze and interpret data.</td>
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</tbody>
</table>
| (13 hours) | • Definition of probability,  
• The addition law and the multiplication law,  
• Organization of numerical data: frequency and cumulative frequency tables,  
• Graphical representations of numerical data,  
• Measures of central tendency,  
• Measures of dispersion,  
• Applications of standard deviation: standard scores and the use of normal curves. |
| 5. Understand and apply knowledge of coordinate geometry to solve problems involving points and straight lines. |
| (3 hours) | • Plane rectangular coordinates, distance formula and section formula,  
• Slope of a straight line,  
• Equation of a straight line in different forms,  
• Condition for 2 lines to be parallel or perpendicular. |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ☑
Information Management ☐
Use of Numbers ☑
Creative Thinking ☑
Analytical & Problem Solving ☑

Personal Management Skills
Attitudes & behaviour ☐
Responsibility & Autonomy ☑
Adaptation ☑
Continuous Learning ☑
Work Safety ☐

Teamwork Skills
Working with others ☐
Participation in Projects & Tasks ☐

Reference
1. Foundation Mathematics, (2004), TLP.
Module Syllabus

Module Title
ENGLISH AND COMMUNICATION FOR CONSTRUCTION 1A

Module Code
LAN1501

Class Contact Hours
10 hours Laboratory, 20 hours Tutorial

Module Value
2.0

Course Code/Year

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 2
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 2
51310F Higher Diploma in Architectural Design and Technology /Level 2

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Module Rationale/Aims:
The module aims to develop students’ English and communication skills for construction work-related and tertiary learning purposes. Students’ language proficiency will be enhanced with the focus on oral interactions in the workplace, understanding of trade-related texts and documents, and accurate use of the language. They will also be trained to become more independent and reflective language learners. The ultimate aim is to improve students’ language skills so that their English language competency can be benchmarked with HKVEP/LCCI.

Pre-requisite(s):
LAN6030 – VOCATIONAL ENGLISH AND COMMUNICATION SKILLS

Teaching & Learning Strategies
This module uses a task-based approach to arouse interest and motivate learning. It will involve an integrated student-centred, collaborative approach to language learning. The modes of learning will include tutorials, workshops, e-learning,
independent learning, and supervised project work. Students will also be encouraged to continue language learning beyond the classroom.

**Assessment Scheme**

Coursework 100%

**Learning Objectives**

By the end of the module, it is expected that students:
(a) can understand and handle oral interactions in the workplace involving socializing, making and answering telephone calls, and discussions.
(b) can understand trade-related texts and extract information to complete communication tasks in the workplace.
(c) can understand the use of basic language forms and achieve a reasonable level of accuracy in writing.
(d) can develop and consolidate learning strategies for independent language learning.

**Key Content Area**

(a) **Handling oral interactions in the workplace by:**
- starting, extending and ending social conversations using expressions of appropriate formality
- making and receiving calls, taking and leaving detailed messages, fixing and changing appointments using appropriate telephone language
- asking for and giving opinions, showing understanding, agreement and disagreement, giving explanations and making suggestions in informal discussions.

(b) **Extracting information from a variety of sources such as manuals, instructions, articles on technical applications, procedural texts, technical reports, graphs and figures, and other trade-related documents to complete communication tasks in the workplace by:**
- reading effectively using contextual clues
- Identifying and extracting specific details
- Summarizing main ideas
- Interpreting, processing and transferring information

(c) **Using the language accurately by:**
- understanding the structures of simple and complex sentences
- identifying the parts of speech and using them appropriately
- understanding the use of passive voice and reported speech
- editing one’s own writing

(d) **Carrying out independent language learning by:**
- developing a realistic self-learning plan
- searching for learning materials independently
practising critical self-reflection of learning styles and strategies

Materials

TLP materials will support the module.

Reference Books

Module Syllabus

Module Title
ENGINEERING SCIENCE

Module Code
CBE5009

Class Contact Hours
60 hours

Module Value
4.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 2
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 1
51310F Higher Diploma in Architectural Design and Technology /Level 1

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes
To achieve this module a student shall be able to:
• Acquire the fundamental concepts of kinematics and mechanics;
• Understand the different forms of energy and its transformation;
• Understand the nature of sound and electromagnetic waves their daily life and engineering applications;
• Understand the basic concepts and principles of electricity and its daily life and engineering applications;
• Acquire the concepts of the atomic structure of matters and the related knowledge in material science.

Pre-requisite(s):
Nil

Exemption Criteria
Exemption from this module will be granted to students with a Grade E or above in
Hong Kong Institute of Vocational Education
Department of Construction
HKCEE Physics or Engineering Science, or equivalent

**Teaching & Learning Strategies**

Formal lectures will focus on concepts of fundamental physics, and tutorial will be held for applications of the scientific principles in solving basic civil and other engineering problems. Simple experiments such as beam equilibrium, sound level measurement, metal relocator, electric circuits, and tensile test will be carried out in laboratories to demonstrate and/or verify the engineering science theory. Assignments and quizzes on specific concepts and knowledge under this module will be held at suitable intervals throughout the semester to monitor the progress of the students.

**Full-time and Part-time Mode**

The module consists of 30 hours of formal lecture, 24 hours of tutorial lessons, and 6 hours of laboratory work.

**Assessment Scheme**

- Coursework: 40%
- Examination: 60%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acquire the fundamental concepts of kinematics and mechanics. (20 hours)</td>
<td>● Establish the basic linear motion equation; ● Apply principle of vectors in resultant force, its resolution and conditions for force equilibrium; ● Use friction law for objects under motion and force equilibrium; ● Understand and apply Archimedes Principle in hydrostatic applications; ● Define pressure for fluids and apply hydraulic principles in machineries.</td>
</tr>
<tr>
<td>2. Understand the different forms of energy and their transformation. (9 hours)</td>
<td>● Establish the concepts of energy, work and power; ● Understand mechanical energy and other forms of energy, their transformation and principle of conservation of energy; ● Establish the scarcity of energy sources, strategies and means of energy saving; ● Outline the features of modern energy infrastructure projects.</td>
</tr>
<tr>
<td>3. Understand the nature of sound and electromagnetic waves, their daily life and engineering applications. (6 hours)</td>
<td>● Distinguish between longitudinal and transverse wave; ● Define amplitude, period and frequency for wave motion and the related wave equation; ● Understand the law of reflection and refraction; ● Explore the nature of sound wave, its frequency, intensity and loudness measurement and applications; ● Explore the nature of electromagnetic wave, its frequency/wavelength spectrum; ● Demonstrate the engineering applications of electromagnetic waves of different wavelengths.</td>
</tr>
</tbody>
</table>
4. Understand the basic concepts and principles of electricity and its daily life and engineering applications.

   (14 hours)

   ● Define voltage, potential difference and current;
   ● Apply Ohm’s Law for electric circuits in series and parallel configurations;
   ● Use ammeter, voltmeter, and multi-tester for electrical measurements;
   ● Study the thermal and electric effects of an electric current;
   ● Understand the principle of electromagnetic induction;
   ● Distinguish between AC and DC motors and generators in terms of working principle and internal structures;
   ● Acquire the working principle and construction details of an AC transformer and demonstrate its application in power transmission and distribution;
   ● Apply safety precautions in the use of electricity.

5. Acquire the concepts of the atomic structure of matters and the related knowledge in material science.

   (11 hours)

   ● Establish the concepts of an atomic structure and chemical and metallic bonding in materials;
   ● Differentiate between metals and non-metals, inorganic and organic compounds;
   ● Understand the relationship between stress and strain and define Young’s modulus and Hooke’s Law;
   ● Define ductility, toughness, elasticity, electrical and thermal conductivity, durability for engineering materials.
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
- Communication, IT and Numeracy ☑
- Information Management ☐
- Use of Numbers ☑
- Creative Thinking ☐
- Analytical & Problem Solving ☑

Personal Management Skills
- Attitudes & behaviour ☐
- Responsibility & Autonomy ☐
- Adaptation ☑
- Continuous Learning ☑
- Work Safety ☑

Teamwork Skills
- Working with others ☑
- Participation in Projects & Tasks ☐

Reference
Module Title
MATHEMATICS FOR CONSTRUCTION

Module Code
CBE5021

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 2

Part-time Mode
53501/53501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes
To achieve this module a student shall be able to:
• Acquire a firm mathematical groundwork by reviewing relevant Secondary Five Mathematical topics;
• Understand the basic operations of complex numbers;
• Understand and apply basic concepts of vectors in manipulating some physical quantities in engineering;
• Understand the basic concept of differential calculus and apply the technique to solve for motions of bodies, approximations, maximum and minimum values for engineering problems;
• Understand the basic concept of integral calculus and apply knowledge to solve engineering problems involving areas and volume between curves and mean values of functions

Pre-requisite(s):
CBE6111 – FOUNDATION MATHEMATICS FOR CONSTRUCTION
Teaching & Learning Strategies

Formal lectures will focus on basic theories and relevant techniques of higher mathematics such as advanced calculus.

In tutorials, students will work on exercises based on basic principles learned in lectures. Students will be encouraged to participate in open discussions. An informal approach will be adopted and mathematical processes will be explained using simple language. Mathematical ideas will be illustrated by examples and rigorous derivations are kept to the minimum. Emphasis is placed upon basic concepts, techniques and applications, rather than abstract treatments. Ample practical exercises will be given in tutorial classes.

Software packages such as Derive or Matlab may be used to enhance teaching and learning at appropriate occasions. Students are also encouraged to access internet web sites on relevant mathematics topics to supplement their learning.

Full-time and Part-time Mode
The module consists of 30 hours of formal lecture and 15 hours of tutorial hours.

Assessment Scheme

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>40%</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acquire a firm mathematical groundwork by reviewing relevant Secondary Five Mathematical topics.</td>
<td></td>
</tr>
</tbody>
</table>
(5 hours)  
- Review of relevant Secondary Five Mathematical topics  
- Trigonometric functions  
- Trigonometry formulae  
- Logarithmic and exponential functions |
| 2. Understand the basic operations of complex numbers. |  
(6 hours)  
- Arithmetic of complex numbers  
- Argand diagrams  
- Rectangular and polar forms  
- Euler's formula  
- De Moivre’s theorem |
| 3. Understand and apply basic concepts of vectors in manipulating some physical quantities in engineering. |  
(10 hours)  
- Vectors and scalars  
- Basic operation of 2-D and 3-D vectors  
- Scalar and vector products  
Applications:  
- Moment and Force Equilibrium |
| 4. Understand the basic concept of differential calculus and apply the technique to solve for motions of bodies, approximations, maximum and minimum values for engineering problems. |  
(12 hours)  
- Concepts of limits and continuity  
- Derivatives of functions  
- Differentiation rules  
Applications:  
- Moment of Inertia, Centre of Gravity, Bending Moment and Shear Force Diagram Sketching and Critical Values |
<table>
<thead>
<tr>
<th>Learning Outcome</th>
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</tr>
</thead>
</table>
| 5. • Understand the basic concept of integral calculus and apply knowledge to solve engineering problems involving areas and volume between curves and mean values of functions (12 hours) | • Indefinite integrals  
• Standard integrals  
• Integration by substitution  
• Integration by parts  
• Integration by partial fractions  
• Definite Integral as the limit of a sum  
Applications: Deflected Shape for Beams, Groundwater Flow and Dewatering, Water Hammer Analysis |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ✅
Information Management ☐
Use of Numbers ✅
Creative Thinking ✅
Analytical & Problem Solving ✅

Personal Management Skills
Attitudes & behaviour ☐
Responsibility & Autonomy ✅
Adaptation ✅
Continuous Learning ✅
Work Safety ☐

Teamwork Skills
Working with others ☐
Participation in Projects & Tasks ☐

Reference
Module Syllabus

Module Title
CIVIL ENGINEERING IN SOCIETY

Module Code
CBE5026

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 2

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes
To achieve this module a student shall be able to:
• Establish the importance and the historical development of civil engineering in human activities;
• Appreciate the role of civil engineering and in a developing modern society;
• Understand basic credentials, duties and ethics of professional engineers and the civil engineering profession;
• Develop a state-of-art in basic engineering practices;

Pre-requisite(s):
Nil

Exemption Criteria
One year of working experience in the relevant field with proven document

Teaching & Learning Strategies

Full-time Mode
The module consists of 10 hours of formal lecture and 20 hours of tutorial lessons.
Formal lectures will introduce to students the need and historical development of civil engineering ever since ancient times. Important achievement of civil engineering projects in human history as well as locally will be demonstrated through video shows, web resources to inspire students the contribution made by civil engineering which they are and will be studying. The role played by the civil engineering profession and its subdivisions will be briefed for students to have a concise picture of the construction industry as a whole. Tour of local important infrastructure project sites are encouraged apart from audio visual aids delivery. The students should also be given opportunities to have an overview of current important civil engineering project development in Mainland China in the form of tutorial and case study discussion sessions. External industrial or professional expert speakers will be invited to deliver talks or to hold seminars for the student audience so as to maintain the latter an updated and close link with local and the Mainland industry. Cases and practices will also be conducted to students to ensure them possess the pre-requisite concepts, the due care and accuracy in engineering calculations and other practices expected by the engineering profession. Assignments and quizzes in this regard will be held at suitable intervals throughout the semester to monitor the level of competence made by the students.

**Assessment Scheme**

Coursework 100%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1. Establish the importance and the historical development of civil engineering in human activities. | - Appreciate the nature and history of civil engineering in human activities and its role in urbanization;  
  - Demonstrate important achievements of civil engineering projects in the past and modern times;  
  - Demonstrate local infrastructure projects currently under construction and planned for future. |
| (5 hours)                                                                        |                                                                                                                                                                                                                        |
| 2. Appreciate the role of civil engineering and in a developing modern society.   | - Define civil engineering and other engineering disciplines;  
  - Describe common infrastructure projects for developing countries in different needs during various stages of development;  
  - Discuss the challenges and problems of implementing civil engineering projects from planning, financing, construction and maintenance. |
| (5 hours)                                                                        |                                                                                                                                                                                                                        |
| 3. Understand basic credentials, duties and ethics of civil engineering personnel. | - Describe entry qualifications and job specifications of a civil engineer and other work force personnel;  
  - Describe the ethics of civil engineering personnel required by the industry;  
  - Describe the structure and different levels of responsibility assumed by each level of personnel under the hierarchy of the civil engineering profession. |
| (5 hours)                                                                        |                                                                                                                                                                                                                        |
| 4. Develop a state-of-art in basic engineering practices.                        | - Define common physical quantities, and their respective units;  
  - Use mathematical techniques for the manipulation of data in physical relationships;  
  - Distinguish between Imperial and SI units;  
  - Use electronic calculator to perform multi-stages engineering calculations to the acceptable engineering accuracy;  
  - Explain the engineering approach to problem solving: use of mathematics and scientific laws, materials and technology, graphical communication, and Code of Practices and Industrial Standards in the civil engineering profession. |
| (15 hours)                                                                       |                                                                                                                                                                                                                        |
**Key Skills**
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

**Fundamental Skills**
- Communication, IT and Numeracy ✓
- Information Management □
- Use of Numbers ✓
- Creative Thinking □
- Analytical & Problem Solving ✓

**Personal Management Skills**
- Attitudes & behaviour ✓
- Responsibility & Autonomy □
- Adaptation ✓
- Continuous Learning ✓
- Work Safety □

**Teamwork Skills**
- Working with others ✓
- Participation in Projects & Tasks ✓

**Reference**

Module Syllabus

Module Title
BUILDING MATERIALS AND BUILDING TECHNOLOGY I

Module Code
CBE6012

Class Contact Hours
60 Hours

Module Value
4.0

Course Code/Year

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 2
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 2
51310F Higher Diploma in Architectural Design and Technology /Level 2

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes

The aim of this module is to equip students with basic knowledge of construction materials, their functions and performance; with the basic technology of infrastructure’s construction. On completion of this module, students should:

- Understand the basic concept of the mechanical properties of materials.
- Develop an understanding of the characteristics, usage and application of commonly used building materials.
- Understand the different types of infrastructures
- Demonstrate knowledge and understand the application of various infrastructures.
- Select appropriate methods and resources to solve problems arising from construction activities having proper regard to safety, environmental, quality, technical and economic considerations.
Pre-requisite(s):
Nil

Teaching & Learning Strategies
The module consists of 40 hours of formal lecture, 10 hours of tutorial and 10 hours of practical in small groups with real or simulated case studies at suitable intervals to consolidate their knowledge for full-time mode. For part-time mode, students got knowledge on job and therefore the module consists of 20 hours with tutorial, 30 hours of guided study hours and 10 hours practical in small groups with real or simulated studies at suitable intervals to consolidate their knowledge. There will be assignments and class quizzes sat suitable intervals throughout the year to monitor the progress of the students.

Full-time and Part-time Mode
The module consists of 40 hours of formal lecture, 10 hours of tutorial lessons, and 10 hours of laboratory work.

Assessment Scheme
Coursework 40%
Examination 60%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1. Acquire the basic concept in materials science                               | ● Overview the related engineering properties of materials  
  ● Define ductility, brittleness, creep, fatigue, hardness, wear resistance, impact strength and toughness for engineering properties  
  ● Apply concepts of stress and strain, Young’s modulus and Factor of safety for use of materials.                                                                                                                                                                                                                           |
| (9 hours)                                                                        |                                                                                                                                                                                                                                                                                                                                                      |
| 2. Acquire the knowledge on different types of construction materials and their general use under the general headings of:                                                                 | ● Understand the different types of materials used in construction works which are the following: Concrete, metal, non-metal, plastics, masonry, timber, bricks and bituminous materials.                                                                                                                                                  |
| (9 hours)                                                                        |                                                                                                                                                                                                                                                                                                                                                      |
| 3. Explore the performance characteristics of the materials and apply the materials in various environments.                                                                   | ● Realize the following elements affecting the materials properties:  
  Physical stability, weathering, durability, thermal movement, heat and sound insulation: effects of moisture content – fungal attack, frost damage, sulphate attack.  
  ● Understand the physical movement, fire resistance, impact resistance, surface treatment; strength as structural materials – suitability for use in a variety of situations, strength: weight ratio affect the properties of materials.                                                                 |
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>Acquire the knowledge on different type of substructure construction.</td>
<td>(12 hours)</td>
</tr>
<tr>
<td>5.</td>
<td>Acquire the knowledge on different forms of superstructure.</td>
<td>(6 hours)</td>
</tr>
<tr>
<td>6.</td>
<td>Acquire the knowledge on the construction of superstructures.</td>
<td>(6 Hours)</td>
</tr>
<tr>
<td>7.</td>
<td>Explore and apply the different types of infrastructures in the environment.</td>
<td>(9 hours)</td>
</tr>
</tbody>
</table>
**Key Skills**
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

<table>
<thead>
<tr>
<th>Fundamental Skills</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication, IT and Numeracy</td>
<td>☐</td>
</tr>
<tr>
<td>Information Management</td>
<td>☑</td>
</tr>
<tr>
<td>Use of Numbers</td>
<td>☐</td>
</tr>
<tr>
<td>Creating Thinking</td>
<td>☑</td>
</tr>
<tr>
<td>Analytical &amp; Problem Solving</td>
<td>☑</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personal Management Skills</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes &amp; Behaviour</td>
<td>☐</td>
</tr>
<tr>
<td>Responsibility &amp; Autonomy</td>
<td>☑</td>
</tr>
<tr>
<td>Adaptation</td>
<td>☑</td>
</tr>
<tr>
<td>Continuous Learning</td>
<td>☑</td>
</tr>
<tr>
<td>Work Safety</td>
<td>☑</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teamwork Skills</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Working with others</td>
<td>☑</td>
</tr>
<tr>
<td>Participation in Projects &amp; Tasks</td>
<td>☑</td>
</tr>
</tbody>
</table>

**Reference**

Module Syllabus

Module Title
BASIC INDUSTRIAL TRAINING A

Module Code
CBE5028

Formal Tuition Hours
60 hours

Module Value
0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 2

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes
To achieve this module a student shall be able to:

- appreciate basic craft skills in handling electrical equipment found in the construction industry;
- appreciate basic craft skills in woodwork; and
- appreciate basic craft skills in painting.

Pre-requisite(s)
Nil

Exemption Criteria
One year of working experience in the relevant field with proven document, subject to assessment

Teaching and Learning Strategies
In this module, students are required to spend 20 hours on electrical equipment in VTC Industrial Training Centres, and 40 hours on practicing general construction works in workshops of the Construction Department. Teaching strategy shall be student-oriented and emphasis shall be put on correct operation procedures, safety at work and quality of output.

Assessment Scheme
Continuous Assessment 100%

Hong Kong Institute of Vocational Education
Department of Construction
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Appreciate the Basic Electrical Workshop Practice.</strong></td>
<td>● Introduction to basic workshop tools and equipment.</td>
</tr>
<tr>
<td>(20 hours)</td>
<td>● Appreciate the safety in the use of electricity.</td>
</tr>
<tr>
<td></td>
<td>● Appreciate the practice in cable jointing and termination.</td>
</tr>
<tr>
<td></td>
<td>● Appreciate the practice in wiring in building and installation of conduits.</td>
</tr>
<tr>
<td></td>
<td>● Installation of electric appliances.</td>
</tr>
</tbody>
</table>

| **2 Appreciate the Basic Woodwork.**                      | ● Appreciate the safety in woodwork.                                               |
| (20 hours)                                                | ● Appreciate the proper use of common hand tools                                   |
|                                                           | ● Appreciate the skill and technique in construction of simple woodworks           |
|                                                           | ● Appreciate the common powered tools and safety                                   |
|                                                           | ● Appreciate the practice in making and fixing simple cabinet                      |
|                                                           | ● Appreciate the practice in fixing drawer locks and ironmongeries                 |
|                                                           | ● Appreciate the practice in laying floor boards                                   |

| **3 Appreciate the Basic Painting.**                      | ● Appreciate the Proper and safe use of tools and equipment                         |
| (20 hours)                                                | ● Appreciate the storage and handling of dangerous materials                        |
|                                                           | ● Appreciate the practice in removal of paints from wood, metal and plastered surfaces |
|                                                           | ● Appreciate the preparation of backgrounds                                         |
|                                                           | ● Appreciate the application of paints on woodwork                                 |
|                                                           | ● Appreciate the practice in painting on metal surface                              |
Module Syllabus

Module Title
ENGLISH AND COMMUNICATION FOR CONSTRUCTION 1B

Module Code
LAN1502

Class Contact Hours
10 hours Laboratory, 20 hours Tutorial

Module Value
2.0

Course Code/Year

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 2
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 2
51310F Higher Diploma in Architectural Design and Technology /Level 2

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Module Rationale/Aims:
The module aims to develop students’ English and communication skills for construction work-related purposes. Students will learn how to handle complex workplace interactions involving requests and enquiries, and technical reports with the focus on good organization of ideas, accuracy and clarity of expression in written and spoken modes. They will also be trained to become more independent and reflective language learners. The ultimate aim is to improve students’ language skills so that their English language competency can be benchmarked with HKVEP/LCCI.

Pre-requisite(s):
LAN6030 – VOCATIONAL ENGLISH AND COMMUNICATION SKILLS

Teaching & Learning Strategies
This module uses a task-based approach to arouse interest and motivate learning. It will involve an integrated student-centred, collaborative approach to language learning. The modes of learning will include tutorials, workshops, e-learning, and
independent learning. Students will also be encouraged to continue language learning beyond the classroom.

**Assessment Scheme**

Coursework 100%

**Learning Objectives**

By the end of this module, it is expected that students:

(a) can understand and handle complex workplace interactions on the telephone, face-to-face and in writing involving requests and enquiries that require detailed explanations
(b) can demonstrate linguistic competence in handling the complex interactions
(c) can report on accidents that have happened in the workplace
(d) can report on maintenance jobs that have been done in the workplace
(e) can develop and consolidate learning strategies for independent language learning

**Key Content Area**

(a) **Dealing with complex requests and enquiries in written and oral modes by:**
   - asking for and giving detailed information including describing products/services appropriately
   - making suggestions and giving advice
   - apologizing, refusing requests/enquiries
   - offering help
   - explaining procedures and processes to colleagues and clients
   - extracting specific details from a variety of sources including written documents and spoken discourse
   - expressing the above in letters or memos in their appropriate formats

(b) **Reporting on accidents that have happened in the workplace**
   - describing accidents in detail
   - analyzing the cause(s) of the accidents
   - giving an account of action(s) taken
   - recommending a course(s) of action in cases where similar accidents occur again
   - recommending preventive measures

(c) **Reporting on construction activities on site by**
   - giving accounts of the maintenance jobs by completing forms
   - giving accounts of the maintenance jobs by writing reports in an appropriate format
   - recommending further follow-up actions where appropriate
(d) **Carrying out Independent language learning**
- developing a realistic self-learning plan
- searching for learning materials independently
- practising critical self-reflection of learning styles and strategies

**Materials**

TLP materials will support the module.

**Reference Books**

科目名稱：職業普通話
科目編號：LAN 3591
教學時數：30
科目數值：2.0

課程宗旨：
➢ 培養學生以普通話進行職場溝通的能力。
➢ 提供模擬情境訓練，使學生能將建造工程專業相關的知識融會貫通，得
體地運用普通話傳達意思。
➢ 訓練學生掌握聆聽技巧，達到有效溝通的能力。
➢ 訓練學生掌握漢語拼音規範，以利正音。

先修科目：無
免修條件：無

教學策略：
本課程設計適合於三十人為一班的學生修讀。課程以學生為中心，強調普通話聆
聽及口語訓練。課程中會採取的訓練方式包括：情境對話、角色扮演、朗讀、口頭報
告等，使學生能活用建造工程相關的普通話詞彙。有為了提高學生的正音能力，亦
會強調自學能力的培養，包括利用工具書、互聯網等。學生參加該課程，須完成有
關作業並通過學程中各項評估測試。

評估方式：持續性評核 100%

學習目標：學生在完成課程後，
◆ 能聽出普通話情景中說話人的信息及意圖。
◆ 能用適當的語調及恰當的普通話辭彙進行有效的溝通。
◆ 能用普通話清楚、得體地傳遞信息。
◆ 能擁有自學及初步的自我正音能力，配合專業需要。

教學內容
聆聽：專業或職場中的常用語句、情景對話、短講、宣布及討論。
說話：專業或職場中的常用語句、情景對話、角色扮演、電話對話及短講。
正音：漢語拼音方案及拼讀方法

參考材料
1. 高然等(1998)，《對粵港澳普通話教程》，北京大學出版社。
2. 張黎、張靜賢、聶學慧(1999)，《商務口語課程》，北京語言文化大學出版社。
3. 潘蜀健(2000)，《物業管理手冊》(精)，中國建築工業出版社。
4. 沈正超、黃建華(2002)，《住宅與房地產詞典》(精)，學林出版社。

教學材料 由語文中心統籌開發

初擬日期 2006年4月
Module Syllabus

Module Title
BUILDING SYSTEM I

Module Code
CBE5004

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 2
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 2
51310F Higher Diploma in Architectural Design and Technology /Level 2

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes
To achieve this module a student shall be able to:

• Acquire a sound knowledge and understand the main functions of electrical and mechanical services systems in buildings.
• Explore and apply the design principles plumbing and drainage systems in residential and simple commercial building
• Acquire the knowledge and physical phenomena of fire formation and fire protection in buildings. Explore different approaches of fire protection and fire detection systems in different kinds of fire hazard of buildings.
• Understand the basic technology in electrical works and acquaint with the electrical safety and installations in buildings.
• Demonstrate knowledge and understanding of the lighting distributions on working plane and carry out preliminary design of layout of luminaire.
• Acquire the physical phenomena of natural and mechanical ventilation systems. Demonstrate the appropriate design of mechanical ventilation for different orientation and configuration of working area in a building.
• Understand the basic concept of air conditioning systems and different cooling approaches.

Hong Kong Institute of Vocational Education
Department of Construction
Pre-requisite(s):
Nil

Teaching & Learning Strategies
During tutorial lessons, real or simulated case study discussion will be employed to inspire learners of this module to develop both practices and design solutions in meeting general design criteria level, human comfort and appropriate air quality level. Design and analytical type assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals throughout the semester to monitor the progress of the students.

Full-time and Part-time Mode
The module consists of 30 hours of formal lecture and 15 hours of tutorial lessons.

Assessment Scheme
Coursework  40%
Examination  60%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1 Acquire the basic concept and important roles of electrical and mechanical services in a building. Explore the importance of human comfort and air quality inside the building. (4 hours) | ● Understand the main functions and purposes of building services system in buildings.  
● Learn the basic idea of building services system such as air conditioning, fire, plumbing and drainage system, electrical systems.  
● Understand and identify what physical parameters affecting the environment and sensation of human beings within a building.  
● Explore the healthy and hygiene problem inside a building. |
| 2 Explore the basic principles of plumbing and drainage system. Learn the basic concept and application of hydraulic calculation in engineering. (11 hours) | ● Understand the functions and type of common sanitary fitments  
● Recognize the definitions and meanings of the terms of portable and flushing water supply systems.  
● Learn the basic design criteria and concept of water supply main pipe and distributing pipes from the government main to sanitary fitments.  
● Recognize the definitions of the terms in the soil and waste appliances and pipes.  
● Learn the objective and importance of a proper drainage system, the basic concept of different kinds of design and their advantages. |
| 3 Acquire basic knowledge of fire and theory of the occurrence of fire and protection of fire in a building. (11 hours) | ● Acquire knowledge of the cause of fire and fire growth inside a building  
● Learn the definition of the fire hazard of different kinds of buildings.  
● Acquire the basic concept of fire protection approaches such as sprinkler system and fire hydrant and hose reel systems.  
● Understand the basic principle of different kinds of fire detection systems and their usage practically. |
| 4 | Study the basic knowledge and principles of electrical circuits and installations in building. | ● Review the basic concept of electrical circuits.  
● Understand the principle of alternative current, generation of single phase and three phase currents.  
● Understand the fundamental requirement for safety in electrical installation such as protection against electric shock, overcurrent.  
● Obtain the general idea of Hong Kong electricity supply condition, power generation and distribution.  
● Acquire the basic concept on the electricity supply and distribution to buildings. |
|---|---|---|
| 5 | Understand the characteristic and functions of lighting in a building, design concept of lighting, the lighting distribution on a working plane inside a building. | ● Recognize the definitions and meanings for terms used in lighting.  
● Calculate lighting values by Lumen method.  
● Design the layout of luminaries for an application. |
| 6 | Explore the phenomena of natural and mechanical ventilation in building and study the basic idea of air conditioning system. | ● Understand the physical phenomena of natural ventilation of the buildings.  
● Acquire the knowledge of pressure balancing and importance of mechanical ventilation of a building.  
● Understand the basic concept of cooling load which is attributed to the sensible, latent heat and ventilations.  
● Recognize the different kinds of air conditioning system such as all air sides, all water side, air-water system as well as the package unitary system and their applications for different activities in working area. |
**Key Skills**
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

**Fundamental Skills**
- Communication, IT and Numeracy ☑
- Information Management ☑
- Use of Numbers ☐
- Creative Thinking ☑
- Analytical & Problem Solving ☑

**Personal Management Skills**
- Attitudes & behaviour ☐
- Responsibility & Autonomy ☑
- Adaptation ☑
- Continuous Learning ☑
- Work Safety ☑

**Teamwork Skills**
- Working with others ☑
- Participation in Projects & Tasks ☑

**Reference**
Module Syllabus

Module Title
STRUCTURAL MECHANICS

Module Code
CBE5029

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 2

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes
To achieve this module a student shall be able to:
• Understand the fundamental principles of structural mechanics;
• Acquire the methods to determine the properties of arbitrary cross sections;
• Acquire the methods of analysis of statically determinate plane trusses;
• Acquire the methods of analysis of statically determinate beams;
• Appreciate the concepts of stress and strain;
• Demonstrate the knowledge of stress distribution in beams.

Pre-requisite(s):
Nil

Teaching & Learning Strategies
There will be class quizzes at suitable intervals throughout the year to monitor the progress of students.

Full-time and Part-time Mode
This module consists of 30 hours of formal lectures, 12 hours of tutorials and 3 hours
of laboratory sessions.

**Assessment Scheme**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>40%</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| **1.** Understand the fundamental principles of structural mechanics *(3 hours)* | ● Appreciate the equilibrium of forces in static condition.  
● Carry out the resolution of force components.  
● Understand the concepts of free body diagrams.  
● Construct the force polygons.  
● Calculate the support reactions of determinate structures. |
| **2.** Acquire the methods to determine the properties of arbitrary cross sections *(6 hours)* | ● Determine the centroid, moment of inertia, radius of gyration and polar moment of inertia of a section.  
● Apply the Parallel-axes Theorem to calculate the moment of inertia in any arbitrary axis. |
| **3.** Acquire the methods of analysis of statically determinate plane trusses *(9 hours)* | ● Determine the member forces by the method of joint.  
● Calculate the member forces by the method of section.  
● Identity the zero force members by the method of inspection. |
| **4.** Acquire the methods of analysis of statically determinate beams *(12 hours)* | ● Construct the bending moment and shear force diagrams for beams.  
● Appreciate the relationship between bending moment, shear force and load.  
● Draw the deflected shapes.  
● Determine the points of inflection.  
● Calculate the beam deflection by means of deflection tables. |
| **5.** Appreciate the concepts of stress and strain *(6 hours)* | ● Determine the normal stress and shear stress.  
● Understand the elastic constants, Hooke’s Law from the stress-strain curves.  
● Define the Poisson’s ratio.  
● Appreciate the application of Factor of Safety and the allowable stresses.  
● Understand the Saint-Venant’s principle. |
6. Demonstrate the knowledge of stress distribution in beams (9 hours)

- Understand the general concept in axial, shear and bending stresses.
- Determine the bending stress distribution in beams subject to bending moment.
- Acquire the shear stress distribution in beams subject to shear force.
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ☑
Information Management ☐
Use of Numbers ☑
Creative Thinking ☑
Analytical & Problem Solving ☑

Personal Management Skills
Attitudes & behaviour ☑
Responsibility & Autonomy ☑
Adaptation ☑
Continuous Learning ☑
Work Safety ☑

Teamwork Skills
Working with others ☑
Participation in Projects & Tasks ☐

Reference
Module Syllabus

Module Title
ENGINEERING SURVEYING

Module Code
CBE5030

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 2

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes
To achieve this module a student shall be able to:

- Demonstrate the ability to use a range of instruments pertinent to the surveying and setting out process
- Demonstrate a detailed understanding of the principles of surveying and setting out
- Calculate from raw data the information required for cartographic detailing and setting out of construction works
- Describe the use of electronic and laser instruments in the construction industry
- Apply and evaluate computer software to calculate and produce surveying solutions.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Full-time & Part-time Modes
The module consists of 10 hours of formal lecture, 5 hours of tutorial lessons and 15 hours of survey practical in small groups. There will be assignments and class quizzes.
at suitable intervals throughout the year to monitor the progress of the students.
Survey practical will be held normally in Saturday afternoons.

**Assessment Scheme**

| Coursework | 100%  |

## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
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</tr>
</thead>
</table>
| 1 Demonstrate a detailed understanding of the principles of surveying.           | ● Overview the general principles and survey errors of land surveying,,  
                                                                                       ● Classification, Standards of Accuracy, and General specifications for Horizontal and Vertical Controls,  
                                                                                       ● Planning and operation of survey field work.                                                                                     |
| (3 hours)                                                                        |                                                                                                                                                  |
| 2 Demonstrate the ability to use a range of instruments pertinent to the surveying.| ● Select the appropriate instrument for a particular job,  
                                                                                       ● Distance Measurement – Steel tapes and Electromagnetic Distance Measuring (EDM) instrument, Base line measurement, Methods of standardization and corrections,  
                                                                                       ● Angular Measurement – Optical and digital theodolites, Measurement and reduction of vertical and horizontal angles. Temporary adjustment of theodolites. Trigonometric leveling,  
                                                                                       ● Levelling – automatic level, digital and laser levels, Ordinary levelling booking and reduction of observations, Bench Marks, Two peg test, Inverted staff reading, Reciprocal levelling, Effects of Earth curvature and refraction, Precise leveling. |
| (12 hours)                                                                       |                                                                                                                                                  |
| 3 Acquire a knowledge of cartographic detailing and generation of survey plans and engineering drawings. | ● Plot contours and ground sections,  
                                                                                       ● Calculate areas and/or volumes of cut and fill,  
                                                                                       ● Spot heights, Direct and indirect method of contouring, Interpolation of contours,  
                                                                                       ● Hong Kong Survey Grid Systems, Projection and Datum, Grid, magnetic and true bearings.  
                                                                                       ● Digital Terrain Modelling, Geographic Information System,  
                                                                                       ● Basic skill of plotting plans and engineering drawings, Generation of Ground model. |
| (6 hours)                                                                        |                                                                                                                                                  |
4 Describe the use of modern survey methods and instruments in the construction industry.

(3 hours)

- Use of a variety of modern electronic surveying instruments (Total Station, Laser instruments) and their application to construction and civil engineering work,
- Satellite Navigation systems – principles, advantages, errors and operation of the system.

5 Application of computer software to calculate and produce surveying solutions to setting out.

(6 hours)

- Traverse computation – Open and closed traverses, Bowditch method of adjustment,
- Data analysis using survey information from digital mapping database,
- Computation of deflection angles and tabulate setting out data for co-ordinated points and for horizontal circular curves.
**Key Skills**
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

**Fundamental Skills**

- Communication, IT and Numeracy ✔
- Information Management
- Use of Numbers ✔
- Creative Thinking ✔
- Analytical & Problem Solving ✔

**Personal Management Skills**

- Attitudes & behaviour
- Responsibility & Autonomy ✔
- Adaptation ✔
- Continuous Learning ✔
- Work Safety ✔

**Teamwork Skills**

- Working with others ✔
- Participation in Projects & Tasks ✔

**Reference**

Module Syllabus

Module Title
CIVIL ENGINEERING CONSTRUCTION I

Module Code
CBE5031

Class Contact Hours
30 Hours

Module Value
2.0

Course Code/Year
Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 2

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes
On completion of the module, students shall be able to:

- Acquire the knowledge of construction technology in major civil engineering works;
- Understand the principles and applicability of various construction techniques in civil engineering.
- Select and evaluate appropriate methods to solve problems arising from construction activities involving earthworks, deep excavation, foundations and prestressed & precast concrete construction having proper regard to safety, environmental, quality, technical and economic considerations.

Pre-requisite(s)
Nil

Teaching & Learning Strategies

Full-time & Part-time Modes
The module consists of 20 hours of formal lecture and 10 hours of tutorial lessons.
For full-time mode, formal lecture and tutorial lessons are essential and for part-time mode, students with experience shall have lesser formal lectures and rely on guided study period through e-learning and webCT. There will be class quizzes/tests at suitable intervals throughout the year to monitor the progress of students.

**Assessment Scheme**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>40%</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Explore and apply the earthwork in related excavation to suit the permanent works.</td>
<td>● Understand different excavation methods applied on various construction works: Trench, bulk and rock excavation techniques and precaution works. Impact of public utilities and adjacent buildings. Preventing Damage to Underground Utility Services</td>
</tr>
</tbody>
</table>
|                                                                                  | ● Realize the cut & fill slope, methods of slope stabilization, slope protection.  
● Identify evidences of dangerous slope, inspection list for inspection of a slope.                                                                                                                                |
| 2. Acquire the knowledge of types of shallow and deep foundation associated with tests. | ● Identify the construction of various types of shallow and deep foundations.  
● Understand the control works on the depth of piles and apply piles integrity by various means of test and site investigation. |
| 3. Acquire the knowledge of deep excavation.                                      | ● Understand various deep excavation methods for substructure construction with related works.  
● Identify basement construction methods: top-down and bottom-up approaches, temporary and permanent lateral supporting systems, surveillance systems for monitoring the settlement of surrounding area during excavation  
● Understand types of cofferdams: sheet piles and slurry diaphragm wall construction.  
● Realise water control systems in deep excavation. |
4. Explore and apply the prestressed and precast concrete construction in various infrastructures. (6 hours)

- Understand the construction and application of prestressed concrete structures in building and civil engineering works:
- Understand Pretensioning and post-tensioning, prestressing methods, and production.
- Realize precast concrete construction: advantages and disadvantages, manufacturing, transportation and erection.
- Understand application of precast and prestressed structures.
**Key Skills**
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

**Fundamental Skills**
- Communication, IT and Numeracy  
- Information Management  
- Use of Numbers  
- Creating Thinking  
- Analytical & Problem Solving

**Personal Management Skills**
- Attitudes & Behaviour  
- Responsibility & Autonomy  
- Adaptation  
- Continuous Learning  
- Work Safety

**Teamwork Skills**
- Working with others  
- Participation in Projects & Tasks

**Reference**
Module Syllabus

Module Title

MEASUREMENT AND DOCUMENTATION A

Module Code

CBE5032

Class Contact Hours

30 hours

Module Value

2.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 2

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes

To achieve this module a student shall be able to:

• Acquire a knowledge of the use of Standard Method of Measurement and Bills of Quantities in the measurement and tendering process;
• Able to identify the clauses in the Standard Method of Measurement and apply the measurement principles for simple civil engineering works;
• Demonstration knowledge of specification and its function in civil engineering works.

Pre-requisite(s):

Nil

Teaching & Learning Strategies

During tutorial lessons, real or simulated case study discussion will be employed to inspire learners of this module to develop both standard practices and measurement solutions in meeting general and specific site constraints in calculating bills of quantities. Mathematical and analytical type assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals.
throughout the semester to monitor the progress of the students.

**Full-time Mode**
The module consists of 20 hours of formal lectures and 10 hours of tutorials.

**Part-time Mode**
The module consists of 9 hours of formal lectures, 6 hours of tutorials and 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

**Assessment Scheme**

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>40%</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acquire a knowledge of the use of Standard Method of Measurement and Bills of</td>
<td>● Understand the Standard Method of Measurement for measuring civil engineering works</td>
</tr>
<tr>
<td>Quantities in the measurement and tendering process.</td>
<td>● Appreciate the use of Bills of Quantities and its continents in the tendering process</td>
</tr>
<tr>
<td></td>
<td>● Differentiate the various types and formats of bills of quantities.</td>
</tr>
<tr>
<td>(7 hours)</td>
<td></td>
</tr>
<tr>
<td>2. Able to identify the clauses in the Standard Method of Measurement and apply</td>
<td>● Familiar with the basic skills of measurement for civil engineering.</td>
</tr>
<tr>
<td>the measurement principles for simple civil engineering works.</td>
<td>● Understanding the use of relevant clauses in measurement of civil engineering.</td>
</tr>
<tr>
<td></td>
<td>● Carry out the measurement process for simple civil engineering work such as earthworks, foundations, retaining walls and superstructures.</td>
</tr>
<tr>
<td></td>
<td>● Prepare the abstract and billing procedures for preparation of bills of quantities.</td>
</tr>
<tr>
<td>(16 hours)</td>
<td></td>
</tr>
<tr>
<td>3. Demonstration knowledge of specification and its function in civil engineering</td>
<td>● Appreciate the basic principles of specification.</td>
</tr>
<tr>
<td>works.</td>
<td>● Realise the purpose and principles of specification writing.</td>
</tr>
<tr>
<td></td>
<td>● Understanding the function, source and format of specification.</td>
</tr>
<tr>
<td></td>
<td>● Differentiate various types and typical clauses of specification.</td>
</tr>
<tr>
<td>(7 hours)</td>
<td></td>
</tr>
</tbody>
</table>
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ☑
Information Management ☑
Use of Numbers ☐
Creative Thinking ☑
Analytical & Problem Solving ☑

Personal Management Skills
Attitudes & behaviour ☐
Responsibility & Autonomy ☑
Adaptation ☑
Continuous Learning ☑
Work Safety ☐

Teamwork Skills
Working with others ☑
Participation in Projects & Tasks ☑

Reference
Key Skills Module  
2005-2006

Module Code: KSM-1-001  Duration: 15 Hours

Key Skills Module is a mandatory module that all full-time diploma, higher diploma (2-year & 3-year) year-1 students and higher diploma (4-year) year-2 students have to complete and pass before graduation.

Aims of the Key Skills Module:
The 15-hour Key Skills Module aims to help students become self-directed and lifelong learners by providing them with a framework and general approach to identify, acquire and apply Key Skills to meet the VTC’s graduate outcomes.

Teaching Schedule:
One hour for each meeting

<table>
<thead>
<tr>
<th>Teaching Week</th>
<th>Lesson</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Introduction to Key Skills and Key Skills Career Portfolio</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Importance of Key Skills</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>How to build a Key Skills Career Portfolio</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Key Skills Inventory</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Effective Presentation of Key Skills Career Portfolio</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Creating Effective Artifacts</td>
</tr>
<tr>
<td>7-11</td>
<td>7-11</td>
<td>Key Skills in Practice (Outside Classroom Activities)</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>Presentation of Key Skills Career Portfolio</td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>Presentation of Key Skills Career Portfolio</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>Presentation of Key Skills Career Portfolio</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>Presentation of Key Skills Career Portfolio</td>
</tr>
</tbody>
</table>
**Assessment Method:**

1. **Attendance Rate: 80% or above**
   Must attend at least 80% of this 15-hour module i.e.12 hours (must join at least 5-hour activities + at least 7-hour lessons)

2. **Participate in at least 3 activities accumulated to 5 hours or above**
   The 3 activities should be of different types and each activity should last for at least 1 hour.

3. **A PASS grade gained from the Presentation of Key Skills Career Portfolio.**

**Grade Awarded:** Pass / Fail (to be recorded in the Transcript of Studies)

*A Pass in this module is a graduation requirement for all full-time HD students.*
Module Syllabus

Module Title
BASIC INDUSTRIAL TRAINING B

Module Code
CBE5034

Formal Tuition Hours
60 hours

Module Value
0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 2

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes
To achieve this module a student shall be able to:

- appreciate basic craft skills in mechanical hydraulic system found in the construction industry;
- appreciate basic craft skills in brickwork; and
- appreciate basic craft skills in plumbing.

Pre-requisite(s)
Nil

Exemption Criteria
One year of working experience in the relevant field with proven document, subject to assessment

Teaching and Learning Strategies
In this module, students are required to spend 20 hours on hydraulic work in VTC Industrial Training Centres, and 40 hours on practicing general construction works in workshops of the Construction Department. Teaching strategy shall be student-oriented and emphasis shall be put on correct operation procedures, safety at work and quality of output.

Assessment Scheme
Continuous Assessment 100%
### Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| **1** Appreciate basic craft skills in mechanical hydraulic system found in the construction industry. (20 hours) | ● Appreciate the safety in the handling of hydraulic equipment  
● Appreciate the basic hydraulic principles and circuit diagram  
● Appreciate the various types of hydraulic equipment, their basic setting up, operation, fault diagnosis and maintenance |
| **2** Appreciate the basic craft skills in brickwork. (20 hours)                | ● Appreciate the proper and safe use of tools and equipment  
● Appreciate the safety in brickworks  
● Appreciate the basic bricklaying practice  
● Appreciate the practice in laying blocks  
● Appreciate the practice in plastering on wall surface |
| **3** Appreciate the Basic Plumbing. (20 hours)                                | ● Appreciate the proper and safe use of tools and equipment  
● Appreciate the safety in plumbing work  
● Appreciate various types of pipes, fittings and valves  
● Appreciate the use of powered tools and safety  
● Appreciate the practices in cutting, jointing, bending and fixing G.I., copper and PVC pipes.  
● Appreciate the practice in basic pipe work installation  
● Appreciate the practice in pipe work testing for leakage |
Module Syllabus

Module Title
CONSTRUCTION DRAWING B

Module Code
CBE5023

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 2

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 2
53301F/55901F Higher Diploma in Civil Engineering /Level 2

Learning Outcomes
To achieve this module a student shall be able to:

• Interpret engineering drawings and visualize three dimensional shapes.
• Convert three dimensional shapes into two dimensional drawings in multi-views and single-view.
• Acquire basic skill to manoeuvre CAD.
• Set up basic CAD environment.
• Organize and present engineering drawing in CAD.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

At initial stage, student will learn to solve plane geometry problems. After establishing and accruing basic drawing concept and techniques, students will perceive spatial orientation of point, line and plan from Descriptive Geometry.

Hong Kong Institute of Vocational Education
Department of Construction
Students are then further trained to handle objects presented in multi-views and single-view drawings. Students do not merely adhere to the production of hand drawing, but also to the conversion of their concept into the CAD presentation and production. Exercises and assignments will be practical in nature to develop students’ confidence in their ability to solve problems and communicate their solutions graphically. To monitor the progress, assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals throughout the semester.

**Full-time Mode**
The module consists of 45 hours of practical/tutorial lessons.

**Part-time Mode**
The module consists of 27 hours of practical/tutorial lessons and 18 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

**Assessment Scheme**

Coursework 100%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Accustom to Engineering Drawing (10 hours)</td>
<td>• Understand the basic standards and techniques in drafting.</td>
</tr>
<tr>
<td></td>
<td>• Understand drawing layout and presentation.</td>
</tr>
<tr>
<td></td>
<td>• Understand geometric terms and geometric shapes.</td>
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<tr>
<td></td>
<td>• Geometric construction including division of lines and angles, polygons, circles, tangents, curves, ellipses, conic sections.</td>
</tr>
<tr>
<td>2 Acquire basic concepts in Descriptive Geometry (10 hours)</td>
<td>• Understand the technique and presentation of engineering drawing.</td>
</tr>
<tr>
<td></td>
<td>• Spatial representation of points, lines, planes and solids.</td>
</tr>
<tr>
<td></td>
<td>• Spatial intersection of lines and planes.</td>
</tr>
<tr>
<td></td>
<td>• Determination of true lengths, true angles and true shapes and other properties of objects.</td>
</tr>
<tr>
<td>3 Understand and apply orthographic projection for various shapes of object (10 hours)</td>
<td>• Approach to depict the missing views for various given conditions.</td>
</tr>
<tr>
<td></td>
<td>• Approach to reveal the missing lines and curves from drawings of orthographic projections.</td>
</tr>
<tr>
<td></td>
<td>• Know various presentation and practice of sectional drawings.</td>
</tr>
<tr>
<td></td>
<td>• Understand, apply and draw sections for engineering drawings</td>
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<td></td>
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</tr>
</tbody>
</table>
| **4** | Introduce AutoCAD and its major functions and applications. | - Acquire the basic features of CAD.  
- Understand the CAD co-ordinates system: absolute, relative, polar.  
- Use of commands: draw line, circle, arc and text; erase, offset, trim, extend, view, zoom, copy, explore, move, rotate, mirror, chamfer, and fillet.  
- Set basic environment: drawing limits, grid, snap, ortho, layer, print, dimension, line type, and line weight. |
| **(10 hours)** |   |   |
| **5** | Explore further CAD settings and commands. | - Format the Dimension settings: dimension style, arrow size, leader, symbols, text location, and scale factor.  
- Use of commands: hatch, array, list, pedit and polyline. |
| **(5 hours)** |   |   |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F / 55901 / 53201 / 55201 / 53501 / 55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy
Information Management ✓
Use of Numbers
Creative Thinking ✓
Analytical & Problem Solving ✓

Personal Management Skills
Attitudes & behaviour
Responsibility & Autonomy ✓
Adaptation ✓
Continuous Learning ✓
Work Safety

Teamwork Skills
Working with others
Participation in Projects & Tasks

Reference
2. Pare, E.G. et al. (1997), Descriptive Geometry, Collier Macmillan.
Module Syllabus

Module Title
ENGLISH AND COMMUNICATION FOR CONSTRUCTION 2A

Module Code
LAN2501

Class Contact Hours
10 hours Laboratory, 20 hours Tutorial

Module Value
2.0

Course Code/Year

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 3
51310F Higher Diploma in Architectural Design and Technology /Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3
53301F/55901F Higher Diploma in Civil Engineering /Level 3

Module Rationale/Aims:
The module aims to develop students’ English and communication skills for construction work-related and tertiary learning purposes. Students will learn how to read and write about construction-related matters. They will also learn how to make a presentation on a construction-related matter. The focus of this module will be on good organization of ideas, accuracy and clarity of expression in written and spoken modes. They will also be trained to become more independent and reflective language learners. The ultimate aim is to improve students’ language skills so that their English language competency can be benchmarked with HKVEP/LCCI.

Pre-requisite(s):
LAN1501 – ENGLISH & COMMUNICATION FOR CONSTRUCTION 1A and LAN1502 – ENGLISH & COMMUNICATION FOR CONSTRUCTION 1B.

Teaching & Learning Strategies
This module uses a task-based approach to arouse interest and motivate learning. It
will involve an integrated student-centred, collaborative approach to language learning. The modes of learning will include tutorials, workshops, e-learning, and independent learning. Students will also be encouraged to continue language learning beyond the classroom.

**Assessment Scheme**

Coursework 100%

**Learning Objectives**

By the end of the module, it is expected that students:

a. can read and write construction-related documents involving explanations, justifications and persuasion
b. can write a report on progress of work carried out
c. can make a persuasive presentation of a construction-related matter
d. can develop and consolidate learning strategies for independent language learning.

**Key Content Area**

(a) **Preparing and writing technical documents by:**
- correctly interpreting statutory regulations, code of practice and contract documents
- extracting specific details from a variety of sources (e.g. promotional material, manuals, journal articles)
- understanding and giving technical instructions
- describing dimensions, shape, size, location, parts, materials and operation of a product
- writing a technical specification
- comparing and contrasting features using appropriate expressions

(b) **Giving a written report on the progress of work including**
- the background of the work
- the method used to accomplish the work
- the schedule of work
- accomplishment of work
- difficulties encountered and solutions

(c) **Making a persuasive presentation of a product/service by:**
- organizing information from a written text into spoken discourse for a particular audience and purpose
- structuring a presentation and organizing information logically and coherently to suit the audience and purpose
- highlighting advantages, special features and benefits of a product/service with persuasive language
- using visual aids effectively
- handling questions from the audience
(d) **Carrying out independent language learning by:**
- developing a realistic self-learning plan
- searching for learning materials independently
- practising critical self-reflection of learning styles and strategies

**Materials**

TLP materials will support the module.

**Reference Books**

Module Syllabus

Module Title
COMPUTING FOR CIVIL ENGINEERING

Module Code
CBE2020

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Level
Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3
53301F/55901F Higher Diploma in Civil Engineering /Level 3

Learning Outcomes
To achieve this module a student shall be able to:
• Acquire the knowledge of basic programming concepts, programming logic and flowcharting and to understand structured programs;
• Familiarize with Visual Basic (VB) environments, VB objects and VB events and the controls of various properties of the objects in VB;
• Understand the basic Input / Output methods in VB, syntax of an expression and use of some Built-in Functions;
• Demonstrate knowledge and understanding of the decision control and repetition in VB;
• Demonstrate knowledge and understanding of the collection of simple variables by using Array and introduction to sorting techniques;
• Understand and familiarize with some further input objects for selection control.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Full-time & Part-time Modes
Hong Kong Institute of Vocational Education
Department of Construction
The module consists of 30 hours of laboratory lessons. Laboratory classes will take place in a computer laboratory for practice and demonstration. Exercises will be focused on concepts of fundamental computer organization, programming design and language syntax. Students will be required to work on practical exercises. Commercial and engineering applications will be emphasized. There will be design assignments and class quizzes at suitable intervals throughout the course to monitor the progress of the students.

**Assessment Scheme**

Coursework 100%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acquire the knowledge of basic programming concepts, programming logic and</td>
<td>• Program Development Cycle</td>
</tr>
<tr>
<td>flowcharting and to understand structured programs</td>
<td>• Programming Tools</td>
</tr>
<tr>
<td></td>
<td>• Logical Program Organization</td>
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<tr>
<td>(2 hours)</td>
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<tr>
<td>2. Familiarize with Visual Basic environments, VB objects and VB events and the</td>
<td>• Background in VB</td>
</tr>
<tr>
<td>controls of various properties of the objects in VB</td>
<td>• Events and Event Procedures</td>
</tr>
<tr>
<td></td>
<td>• Object-Related Concepts</td>
</tr>
<tr>
<td></td>
<td>• VB Program Components</td>
</tr>
<tr>
<td></td>
<td>• VB Environment</td>
</tr>
<tr>
<td>(4 hours)</td>
<td></td>
</tr>
<tr>
<td>3. Understand the basic Input / Output methods in VB, syntax of an expression</td>
<td>• Numeric and String Constants</td>
</tr>
<tr>
<td>and use of some Built-in Functions</td>
<td>• Variables</td>
</tr>
<tr>
<td></td>
<td>• Data Types and Data Declarations</td>
</tr>
<tr>
<td></td>
<td>• Operators and Expressions</td>
</tr>
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<td></td>
<td>• Hierarchy of Operations</td>
</tr>
<tr>
<td></td>
<td>• String Expressions</td>
</tr>
<tr>
<td>(8 hours)</td>
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<tr>
<td></td>
<td>Demonstrate knowledge and understanding of the decision control and repetition in VB</td>
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<td>---------------------------------</td>
</tr>
</tbody>
</table>
| 4 | (6 hours) | ● Relational Operators and Logical Expressions  
|   |                         | ● Logical Operators  
|   |                         | ● Branching with the If-Then Block; and If-Then-Else Blocks  
|   |                         | ● Selection: Select Case  
|   |                         | ● Looping with For-Next; Do-Loop; While-Wend  
|   |                         | ● The Stop Statement |

<table>
<thead>
<tr>
<th></th>
<th>Demonstrate knowledge and understanding of the collection of simple variables by using Array and introduction to sorting techniques</th>
<th></th>
</tr>
</thead>
</table>
| 5 | (6 hours) | ● Array Characteristics and Declarations  
|   |                         | ● Processing Array Elements  
|   |                         | ● Passing Arrays to Procedures  
|   |                         | ● Dynamic Arrays  
|   |                         | ● Array-Related Functions  
|   |                         | ● Control Arrays  
|   |                         | ● Looping with For Each-Next  
|   |                         | ● Sorting Techniques – Bubble Sort; Shell Sort |

<table>
<thead>
<tr>
<th></th>
<th>Understand and familiarize with some further input objects for selection control</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>(4 hours)</td>
<td>● More control Fundamentals – Check Boxes; Option Buttons and Frames; List Boxes and Combo Boxes; The Timer Control; Scroll Bars</td>
</tr>
</tbody>
</table>
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ✓
Information Management ✓
Use of Numbers ✓
Thinking & Problem Solving ✓

Personal Management Skills
Attitudes & behaviour ✓
Responsibility & Autonomy ✓
Adaptation
Continuous Learning ✓
Work Safety

Teamwork Skills
Working with others
Participation in Projects & Tasks ✓

Reference
Module Syllabus

Module Title
SOIL MECHANICS AND GEOLOGY

Module Code
CBE2021

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3
53301F/55901F Higher Diploma in Civil Engineering /Level 3

Learning Outcomes
To achieve this module a student shall be able to:

- Carry out the processes of soil description and classification, and the determination of index soil properties.
- Demonstrate the knowledge and understanding of the importance of underground water in soil engineering.
- Demonstrate the knowledge and understanding of basic geotechnical engineering concept.
- Describe and identify common rock forming minerals, common rock types and their mode of formation.
- Recognize basic land forms, carry out mapping, and use descriptive geometry techniques to analyze planar rock structures.
- Perform soil index tests and analyze the test results to draw engineering conclusion.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Hong Kong Institute of Vocational Education
Department of Construction
Full-time & Part-time Modes
The module consists of 30 hours of formal lecture, 9 hours of tutorial lessons and 6 hours of laboratory work.

During tutorial lessons, review questions will be employed to inspire learners to develop the understanding and application of the subject matters. Course works including laboratory reports, problem solving and analytical type assignments, and quizzes on specific concepts and knowledge at suitable intervals throughout the semester will be used to monitor the progress of the students.

Assessment Scheme

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>40%</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1 Carry out the processes of soil description and classification, and the       | • origin, composition and definition of engineering soil  
| determination of basic soil properties.                                         | • soil as a 3-phase model: mass-volume relationship, void ratio, porosity, moisture content, specific gravity, density, unit weight, degree of saturation  
|                                                                                  | • particle size distribution  
|                                                                                  | • soil consistency and Atterberg Limits  
|                                                                                  | • soil description and classification  
|                                                                                  | • compaction: dry density-moisture content relationship, maximum dry density, optimum moisture content, relative density and in-situ density            |
| (10 hours)                                                                       |                                                                                                                                                     |
| 2 Demonstrate the knowledge and understanding of importance of underground water| • hydrological cycle, surface and ground water flow  
| in soil engineering.                                                            | • underground water conditions  
|                                                                                  | • permeability of soils and its measurement in the laboratory  
|                                                                                  | • seepage, hydraulic gradient, hydraulic instability  
|                                                                                  | • pore water pressure and effective stress concept                                                                                                 |
| (6 hours)                                                                        |                                                                                                                                                     |
| 3 Demonstrate the knowledge and understanding of the basic geotechnical          | • concepts of shear strength  
| engineering concept.                                                             | • consolidation process and one-dimensional consolidation and settlement  
|                                                                                  | • earth pressures: at-rest, active and passive                                                                                                     |
| (5 hours)                                                                        |                                                                                                                                                     |
|   | Describe and identify common rock minerals, common rock types and their mode of formation. | • physical properties of minerals and their identification  
• formation, characteristics and identification of rocks  
• geology of Hong Kong |
<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>(9 hours)</td>
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</tbody>
</table>

|   | Recognize basic land forms, carry out mapping, and use descriptive geometry techniques to analyze planar rock structures. | • geological forces in rock formations  
• characteristics and features of folds, faults, joints and bedding plane  
• dip, strike and structure contour of rock bedding  
• mapping of geological features and interpretation of geological maps |
<table>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>(9 hours)</td>
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</tbody>
</table>

|   | Perform basic soil tests and analyze the test results to draw engineering conclusion. Minerals and rocks identification. | • moisture content  
• particle density  
• particle size distribution  
• laboratory permeability test  
• Atterberg limits  
• dry density/moisture content relationship  
• in-situ density and relative compaction  
• identification of minerals and rocks |
<table>
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<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>(6 Hours)</td>
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</tbody>
</table>
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ☑
Information Management ☑
Use of Numbers ☑
Creative Thinking ☐
Analytical & Problem Solving ☑

Personal Management Skills
Attitudes & behaviour ☐
Responsibility & Autonomy ☑
Adaptation ☐
Continuous Learning ☑
Work Safety ☑

Teamwork Skills
Working with others ☑
Participation in Projects & Tasks ☐

Reference
Module Syllabus

Module Title
R C DESIGN & CONSTRUCTION

Module Code
CBE2022

Class Contact Hours
60 hours

Module Value
4.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3
53301F/55901F Higher Diploma in Civil Engineering /Level 3

Learning Outcomes

The aim of this module is to introduce the theories of concrete technology and the limit states design of reinforced concrete structures. To achieve this module a student shall be able to:

• Develop a sound knowledge of concrete technology in civil engineering applications;
• Understand the basic philosophy of limit state design;
• Design simple reinforced concrete structural elements;
• Aware of the basic requirements of the relevant codes of practices.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

During tutorial lessons, real or simulated case study discussion will be employed to inspire learners of this module to develop both standard practices and design solutions in meeting general and specific site constraints in designing concrete mix or R.C. structures. Design and analytical type assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals.
throughout the semester to monitor the progress of the students. Integrated R.C. structure design project is recommended. The students should also be given opportunities to have an overview of current RC design practices in Mainland China in the form of tutorial and case study discussion sessions. Expert professionals could be invited to deliver talks to the students in this development.

**Full-time and Part-time Mode**
This module consists of 40 hours of formal lecture, 14 hours of tutorials and 6 hours of laboratory sessions.

**Assessment Scheme**

Coursework 100%
### Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1 Properties of Concrete | Acquire a knowledge of concrete properties:  
- Hydration of cement. Types of cement and their applications.  
- Types and properties of aggregate. Fresh and hardened properties of concrete.  
- Basic concreting operation.  
- Strength in compression and tension. Elastic properties. Creep under load.  
- Drying and carbonation shrinkage, plastic shrinkage. Moisture and thermal movements.  
- Durability problems. |
| 2 Concrete Mix Design and concreting operations | Understand the principles of concrete mix design and the concreting operations:  
- Principles of concrete mix design. Various methods of mix design.  
- Applications of admixtures and PFA.  
- Introduction to very-high strength concrete.  
- Mixing, handling, placing, compaction, and curing of concrete.  
- Use of ready-mixed concrete. |
| 3 Concrete Testing and Quality Assurance | Acquire knowledge of concrete testing and quality assurance in concrete production:  
- Testing of concrete and its constituents, flexural test, compression test, split cylinder test, non-destructive tests.  
- Statistical methods of control: CUSUM method.  
- Quality assurance in concrete production. |
<table>
<thead>
<tr>
<th>Table</th>
<th>Course Description</th>
<th>Details</th>
</tr>
</thead>
</table>
| 4     | Introductory to Limit State Design | **Appreciate the concept of limit state design:**
|       |                    | • Limit state: Ultimate limit state. Serviceability limit state.  
|       |                    | • Material properties for design: Concrete and Reinforcement.  
|       |                    | • Partial safety factors: for Loading and Materials.  
|       |                    | • Design forces envelopes: Loading combination, loading pattern, bending moment and shear force envelopes.  |
| 5     | Reinforced Concrete Beams Design | **Acquire the basic skills of designing reinforced concrete beams:**
|       |                    | • R.C. beams: Rectangular and flanged section. Simply supported and continuous beams with moment and shear coefficients.  
|       |                    | • Bending: Singly reinforced and doubly reinforced section.  
|       |                    | • Shear: Shear link and nominal link design.  
|       |                    | • Bond: anchorage bond length, tension and compression lap.  
|       |                    | • Serviceability: deflection check by span-effective ratio and code’s requirement.  |
| 6     | Reinforced Concrete Slabs Design | **Acquire the basic skills of designing reinforced concrete slabs:**
|       |                    | • R.C. slabs: single span and continuous one-way spanning slabs.  
|       |                    | • Bending and shear reinforcement design, deflection check by span-effective ratio.  
|       |                    | • Design of staircases.  |
| 7     | Reinforced Concrete Columns and Walls Design | **Acquire the basic skills of designing reinforced concrete columns and walls:**
|       |                    | • Definition: Braced and unbraced columns; short and slender columns  
|       |                    | • Determination of effective column length by simplified approach.  
|       |                    | • Design of short R.C. column: design formulae for axially loaded column. Design charts. Uniaxial bending design.  
|       |                    | • Design of wall.  |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/5501/53201/55201/55501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ☑
Information Management ☑
Use of Numbers ☐
Creative Thinking ☑
Analytical & Problem Solving ☑

Personal Management Skills
Attitudes & behaviour ☐
Responsibility & Autonomy ☑
Adaptation ☑
Continuous Learning ☑
Work Safety ☑

Teamwork Skills
Working with others ☑
Participation in Projects & Tasks ☑

Reference
6. Concrete and Aggregates, (1992), ASTM
9. Libby J.R. & Associate, (1990), Modern Prestressed Concrete : Design
Module Syllabus

Module Title
FLUID MECHANICS

Module Code
CBE2023

Class Contact Hours
60 hours

Module Value
4.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3
53301F/55901F Higher Diploma in Civil Engineering /Level 3

Learning Outcomes
To achieve this module a student shall be able to:
• Acquire the knowledge of basic principals of hydrostatics and apply to the measurement of pressure and the evaluation of hydrostatic forces on vertical and inclined plane surfaces;
• Understand the knowledge of flow kinematics in the forms of continuity and energy equations and its application to the flow measurements;
• Understand the knowledge of momentum equation and simple applications;
• Demonstrate knowledge and understanding of the head losses in pipe flow under laminar and turbulent flow conditions and application to pipeline systems;
• Demonstrate knowledge and understanding of open channel flow for uniform and non-uniform flow conditions, critical flow condition and simple hydraulic applications.

Pre-requisite(s):
Nil

Teaching & Learning Strategies
There will be design assignments and class quizzes and at suitable intervals
throughout the course to monitor the progress of the students.

Full-time and Part-time Mode
This module consists of 37.5 hours of formal lecture, 14.5 hours of tutorials and 8 hours of laboratory sessions.

**Assessment Scheme**

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>40%</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acquire the knowledge of basic principals of hydrostatics and apply to the</td>
<td>- Identify the basic fluid properties and their units of measurement.</td>
</tr>
<tr>
<td>measurement of pressure and the evaluation of hydrostatic forces on vertical and</td>
<td>- Understand the distribution and variation of fluid pressure.</td>
</tr>
<tr>
<td>inclined plane surfaces</td>
<td>- Identify and calculate the hydrostatic force as a result of the fluid pressure on</td>
</tr>
<tr>
<td></td>
<td>- Apply the piezometers, manometers and other devices for the measurement of fluid</td>
</tr>
<tr>
<td></td>
<td>pressures.</td>
</tr>
<tr>
<td>(8 hours)</td>
<td><strong>(8 hours)</strong></td>
</tr>
<tr>
<td>2. Understand the knowledge of flow kinematics in the forms of continuity and</td>
<td>- Acquire the knowledge on the classification of different types of fluid flow.</td>
</tr>
<tr>
<td>energy equations and its application to the flow measurements</td>
<td>- Understand the concept of conservation of mass in the form of Continuity</td>
</tr>
<tr>
<td></td>
<td>- Understand the concept of conservation of energy in the form of Bernoulli’s</td>
</tr>
<tr>
<td></td>
<td>- Application of continuity and energy equations in flow measurements.</td>
</tr>
<tr>
<td>(10 hours)</td>
<td><strong>(10 hours)</strong></td>
</tr>
<tr>
<td>3. Understand the knowledge of momentum equation and simple applications</td>
<td>- Understand the concept of conservation of linear momentum of fluid flow in the</td>
</tr>
<tr>
<td></td>
<td>- Simple applications of momentum equation in one and two dimensional flows such</td>
</tr>
<tr>
<td></td>
<td>as jet forces on plane and curved surfaces, pipe bends and open channel flow.</td>
</tr>
<tr>
<td>(6 hours)</td>
<td><strong>(6 hours)</strong></td>
</tr>
</tbody>
</table>
4. Demonstrate knowledge and understanding of the head losses in pipe flow under laminar and turbulent flow conditions and application to pipeline systems (16 hours)

- Understand the importance of viscosity in fluid flow, Reynolds number and its effect in the classification of laminar and turbulent flows in pipes.
- Evaluation of head loss in pipe flow under laminar flow condition and the flow by using the Hagen - Poiseuille equation.
- Evaluation of frictional and minor head losses in pipe flow under turbulent flow condition by Darcy – Weisbach or graphically by Moody diagram.
- Modify the energy equation to incorporate the head loss and the application to simple pipe flow condition.
- Analyse the pipe discharges in simple pipe systems including pipes connected in series, parallel, branches and in simple pipe networks.

5. Demonstrate knowledge and understanding of open channel flow for uniform and non-uniform flow conditions, critical flow condition and simple hydraulic applications (20 hours)

- Acquire the knowledge on the classification of different types of open channel flow.
- Discharge of open channel flow under uniform flow condition by Manning equation.
- Optimum flow sections in uniform open channel flow.
- Understand the concept of specific energy and the critical flow condition in non-uniform open channel flow.
- Application of energy equation to non – uniform open channel flow in various hydraulic structures.
- Rapid varied flow in open channel flow and its energy loss.
- Evaluation of water surface profile in gradually varied flow and the classifications of the surface profiles.
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ✓
Information Management ✓
Use of Numbers ✓
Thinking & Problem Solving ✓

Personal Management Skills
Attitudes & behaviour ✓
Responsibility & Autonomy ✓
Adaptation □
Continuous Learning ✓
Work Safety □

Teamwork Skills
Working with others ✓
Participation in Projects & Tasks □

Reference
Module Syllabus

Module Title
CIVIL ENGINEERING CONSTRUCTION II

Module Code
CBE2024

Class Contact Hours
30 Hours

Module Value
2.0

Course Code/Year

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3
53301F/55901F Higher Diploma in Civil Engineering /Level 3

Learning Outcomes

On completion of the module, students shall be able to:
- Acquire the knowledge of construction technology in major civil engineering works;
- Understand the principles and applicability of various construction techniques in civil engineering.
- Select and evaluate appropriate methods to solve problems arising from construction activities involving marine works, bridge construction, tunneling, structural steel construction having proper regard to safety, environmental, quality, technical and economic considerations.

Pre-requisites

Nil

Teaching & Learning Strategies

For full-time mode, formal lecture and tutorial lessons are essential and for part-time mode, students with experience shall have lesser formal lectures and rely on guided study

Hong Kong Institute of Vocational Education
Department of Construction
period through e-learning and webCT. There will be class quizzes/tests at suitable intervals throughout the year to monitor the progress of students.

**Full-time and Part-time Mode**
The module consists of 22 hours of formal lecture and 8 hours of tutorial lessons

**Assessment Scheme**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
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<tr>
<td>Examination</td>
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</table>
## Content

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<thead>
<tr>
<th>Learning Outcome</th>
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</tr>
</thead>
</table>
| 1. Acquire the knowledge of various marine works and be able to supervise the quality works. (7 hours) | - Understand the construction processes in marine works.  
- Realize Reclamation works, construction of piers & jetties, and dolphins, construction of fender systems, breakwaters, shore protection works, construction of submarine outfalls and pipelines and apply on different infrastructures.  
- Identify problems arising from the reclamation works and realize the solutions to the problems. |
| 2. Acquire the knowledge of bridge construction methods and various choice of materials applied on different environment. (7 hours) | - Understand the construction processes of bridges and materials for bridge construction.  
- Realize the different structural forms of bridges in relation to various requirements.  
- Understand construction methods for various types of bridges; Cast in situ, precast and composite section in bridge construction; installation of ancillary items; bridge bearing and expansion joints; precautionary measures in bridge construction; falsework and scaffolding work |
| 3. Acquire the knowledge of construction processes in tunneling. (7 hours) | - Understand the various techniques and application in tunnel construction for different ground condition.  
- Realize the various construction procedures of pipe jacking method; cut and cover method; shield tunneling in soft ground; tunnel boring machine method; New Austrian Tunneling Method (NATM) in soft rock and soft ground; submerged tunnel construction and construction of horizontal and vertical shafts. |
4. Acquire the knowledge of structural steel construction and be able to supervise the quality works. (5 hours)

- Understand the structural forms and construction procedures of structural steel construction
- Realize fabrication and assembly of structural steelworks; welding and bolting; erection of steel structures; safety measures in structural steel section; corrosion and fire resistance; steel-concrete composite construction.

5. Explore and apply the safety and health in construction. (4 hours)

- Understand the legislative provisions and execution of safety measures on construction sites:
  - Overview of legislative provisions; potential hazards on construction sites; causes of accidents and principles of accident prevention strategies; purpose, correct selection and proper use of personal protective equipment.
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy □
Information Management ☑
Use of Numbers □
Creating Thinking ☑
Analytical & Problem Solving ☑

Personal Management Skills
Attitudes & Behaviour □
Responsibility & Autonomy ☑
Adaptation ☑
Continuous Learning ☑
Work Safety ☑

Teamwork Skills
Working with others ☑
Participation in Projects & Tasks ☑

Reference
7. Guide to the Factories and Industrial Undertakings (Safety Officers and safety Supervisors) Regulations, Labour Department, Hong Kong.
8. The Factories & Industrial Understakings (Safety Officers & safety Supervisors) Regulations, (1986), Labour Department, Hong Kong.
Module Syllabus

Module Title
SAFETY & INDUSTRIAL TRAINING

Module Code
CBE2025

Formal Tuition Hours
81 hours

Module Value
0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3
53301F/55901F Higher Diploma in Civil Engineering /Level 3

Learning Outcomes
To achieve this module a student shall be able to:

- acquire hands-on experience of the skills and techniques relevant to falsework construction;
- acquire hands-on experience of the skills and techniques relevant to formwork, reinforcing bars fixing, and concreting;
- acquire hands-on experience of the skills and techniques relevant to drain-laying;
- acquire hands-on experience of the skills and techniques relevant to scaffolding; and
- understand the potential hazards and safety measures on construction sites and eligible of awarding the ‘Construction Industry Safety Training Certificate’.

Pre-requisite(s)
Nil

Exemption Criteria
One year of working experience in the relevant field with proven document, subject to assessment plus a valid Safety Green Card

Teaching and Learning Strategies
In this module, students are required to spend a total of 81 hours on a variety of skill areas including falsework erection, formwork construction, reinforced concrete construction, drain laying, scaffolding and site safety training. Students are required to complete a number of practical assignments under the guidance of and with demonstration given by Instructors. Students’ progress and performance are monitored.
Higher Diploma in Civil Engineering

by continuous assessments.

**Assessment Scheme**

Continuous Assessment 100%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
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</tr>
</thead>
</table>
| **1** Acquire hands-on experience of the skills and techniques relevant to falsework construction (10 hours) | ● Recognize various types of falsework and their usage.  
● Practice in the construction of falsework.  
● Appreciate the quality control and safety inspection of falsework. |
| **2** Acquire hands-on experience of the skills and techniques relevant to formwork, reinforcing bars fixing, and concreting (30 hours) | ● Recognize the proper and safe use of various tools and equipment.  
● Recognize various components of timber formwork and their functions.  
● Practice in the construction, erection and removal of formwork.  
● Overview various types of formwork.  
● Recognize and practice in scheduling, cutting, bending and fixing of reinforcing bars.  
● Recognize and practice in batching, mixing, placing and curing of concrete.  
● Appreciate in quality control and safety inspection. |
| **3** Acquire hands-on experience of the skills and techniques relevant to drain-laying (20 hours) | ● Recognize and practice in setting out and leveling.  
● Recognize and practice in laying of drains including bedding, jointing, haunching and connection to manholes.  
● Appreciate drain tests, quality control and safety inspection. |
| **4** Acquire hands-on experience of the skills and techniques relevant to scaffolding (14 hours) | ● Recognize various forms of bamboo scaffolding (work platform, catchfan, safety net, etc.).  
● Experience the process of erection and removal of scaffold.  
● Appreciate the quality control and safety inspection of scaffolding. |
<table>
<thead>
<tr>
<th>5</th>
<th>Understand the potential hazards and safety measures on construction site and eligible of awarding a ‘Green Card’ (7 hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>● Attend a one-day site safety training course at the Construction Industry Training Authority which satisfies the mandatory safety requirement stipulated in Section 6BA(4), Cap. 59 for personnel working in construction sites.</td>
</tr>
</tbody>
</table>
Module Syllabus

Module Title
ENGLISH AND COMMUNICATION FOR CONSTRUCTION 2B

Module Code
LAN2502

Class Contact Hours
10 hours Laboratory, 20 hours Tutorial

Module Value
2.0

Course Code/Year

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 3
51310F Higher Diploma in Architectural Design and Technology /Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3
53301F/55901F Higher Diploma in Civil Engineering /Level 3

Module Rationale/Aims:
The module aims to develop students’ English and communication skills for construction work-related and tertiary learning purposes. Students will carry out secondary data research using the Internet and critically evaluate secondary sources, participate in problem-solving meetings and handle written documents related to meetings. They will also learn job search skills. The focus of this module will be on good organization of ideas, accuracy and clarity. They will also be trained to become more independent and reflective language learners. The ultimate aim is to improve students’ language skills so that their English language competency can be benchmarked with HKVEP/LCCI.

Pre-requisite(s):
LAN1501 – ENGLISH & COMMUNICATION FOR CONSTRUCTION 1A and LAN1502 – ENGLISH & COMMUNICATION FOR CONSTRUCTION 1B.

Teaching & Learning Strategies

Hong Kong Institute of Vocational Education
Department of Construction
This module uses a task-based approach to arouse interest and motivate learning. It will involve an integrated student-centred, collaborative approach to language learning. The modes of learning will include tutorials, workshops, e-learning, independent learning, and supervised project work. Students will also be encouraged to continue language learning beyond the classroom.

**Assessment Scheme**

Coursework 100%

**Learning Objectives**

After successful completion of this module, it is expected that students:
(a) can carry out secondary data research
(b) can write a research report based on secondary sources
(c) can participate in meetings
(d) can write a resume and application letter
(e) can demonstrate effective job interview skills
(f) can develop and consolidate learning strategies for independent language learning

**Key Content Area**

(a) Using information retrieval skills to carry out investigative research report by
- retrieving information using Internet search engines and/or library databases
- selecting and processing information for a report from a variety of sources (the Internet, magazines, professional journals, newspapers) related to a problem within students’ own field
- producing a research report presenting the background, methodology, solutions and recommendations to solve the problem

(b) Participating in problem-solving meetings by
- exchanging and explaining information accurately and appropriately
- understanding and discussing work-related concepts accurately and appropriately
- using the language and techniques of discussions accurately and appropriately
- managing agendas and minutes
- listening, understanding and taking notes of a workplace discussion

(c) Developing job application skills by
- identifying job requirements from the advertisement relevant to their study
- writing a clear resume and job application letter highlighting individual strengths with reference to the requirements of the job
- demonstrating effective job interview skills by asking and answering questions related to their personal profile, the job advertisement, and general knowledge of the company; showing general social/trade awareness by answering questions on current social and trade events locally and overseas
(d) **Carrying out independent language learning by**
- developing a realistic self-learning plan
- searching for materials independently
- practising critical self-reflection of learning styles and strategies

**Materials**

TLP materials will support the module.

**Reference Books**

Module Syllabus

Module Title
ADVANCED CIVIL ENGINEERING MATHEMATICS

Module Code
CBE2026

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes
To achieve this module a student shall be able to:
• Understand and apply knowledge of matrix algebra by deriving and solving algebraic equations pertaining to engineering problem in construction industry;
• Understand and apply techniques of finding eigenvalues and eigenvetors in solving algebraic equations;
• Define engineering problems with multiple variables using partial derivative and apply the technique to find total differentials and maximum/minimum;
• Demonstrate knowledge and understanding of double integrals by applying techniques of evaluate double integrals over simple regions to calculate areas, volumes, masses and mean values;
• Define engineering problems using differential equations and apply techniques for solving ordinary differential equations;
• Understand and apply knowledge of probability and statistics to analyze problems
• Demonstrate and apply knowledge of numerical method in solving equations, integrations and curve fitting

Pre-requisite(s):
CBE5021 – MATHEMATICS FOR CONSTRUCTION
Teaching & Learning Strategies

Formal lectures will focus on basic theories and relevant mathematical techniques such as matrix algebra and advanced calculus.

In tutorials, students will work on exercises based on basic principles learned in lectures. Students will be encouraged to participate in open discussions. An informal approach will be adopted and mathematical processes will be explained using simple language. Mathematical ideas will be illustrated by examples and rigorous derivations are kept to the minimum. Emphasis is placed on basic concepts, techniques and applications, rather than abstract treatments. Ample practical exercises will be given in tutorial classes.

Software packages such as Derive or Matlab may be used to enhance teaching and learning at appropriate occasions. Students are also encouraged to access internet web sites on relevant mathematics topics to supplement their learning.

Full-time and Part-time Mode
The module consists of 30 hours of formal lecture and 15 hours of tutorial hours.

Assessment Scheme

<table>
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<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Coursework</td>
<td>40%</td>
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<tr>
<td>Examination</td>
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</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1. Understand and apply knowledge of matrix algebra by deriving and solving algebraic equations pertaining to engineering problem in construction industry. | • Basic operations of matrices (up to 3x3)  
• Properties of determinants  
• Cramer’s rule  
• Gaussian elimination  
• Existence of solution  
  Applications: Stiffness Matrix for beams; Structural member forces |
|                                                                                 | (11 hours)                                                                                                                                              |
| 2. Understand and apply techniques of finding eigenvalues and eigenvectors in solving algebraic equations. | • The characteristic equation  
• Eigenvalues  
• Eigenvectors                                                                                                                                 |
|                                                                                 | (3 hours)                                                                                                                                               |
| 3. Define engineering problems with multiple variables using partial derivative and apply the technique to find total differentials and maximum/minimum. | • Functions of several variables  
• Partial differentiation  
• Chain rule  
• Total differentials  
• Maximum/Minimum  
  Applications: Fluid Flow, Consolidation of soil |
|                                                                                 | (12 hours)                                                                                                                                               |
4. Demonstrate knowledge and understanding of double integrals by applying techniques of evaluate double integrals over simple regions to calculate areas, volumes, masses and mean values.

- Iterated integrals
- Evaluation of double integrals


(2 hours)


- Variable separable
- Integrating factors
- 2nd order homogeneous O.D.E.

Applications: Cable of a Suspension Bridge, Buckling of Columns, Simple Harmonic Motion, Free Oscillation and Forced Vibration, Damping and Resonance.

(6 hours)

6. Understand and apply knowledge of probability and statistics to analyze problems

- Statistical measures: mean and standard deviation
- Elementary probability
- Probability distributions: normal, binomial and Poisson’s distributions

Applications: Characteristic Strength, Compliance Requirement and Quality Control in Civil Engineering Materials.

(5 hours)

7. Demonstrate and apply knowledge of numerical method in solving equations, integrations and curve fitting

- Numerical solution to roots of equations
- Numerical integration: Trapezoidal and Simpson's rules
- Curves fitting: least squares straight line, finite differences and interpolations

Applications: Area and Volume Calculation for Earthwork, Material Test and Experimental Data Plot

(6 hours)
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ☑
Information Management ☐
Use of Numbers ☑
Creative Thinking ☑
Analytical & Problem Solving ☑

Personal Management Skills
Attitudes & behaviour ☐
Responsibility & Autonomy ☑
Adaptation ☑
Continuous Learning ☑
Work Safety ☐

Teamwork Skills
Working with others ☐
Participation in Projects & Tasks ☐

Reference
Module Syllabus

Module Title
STRUCTURAL ANALYSIS I

Module Code
CBE2027

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3
53301F/55901F Higher Diploma in Civil Engineering /Level 3

Learning Outcomes
To achieve this module a student shall be able to:
• Appreciate the idealisation of structures;
• Acquire the method of analysis of statically determinate beams with internal hinge;
• Acquire the method of analysis of statically determinate frames;
• Understand the theory of torsional shear stress of circular sections;
• Acquire the knowledge of stress distribution of short columns;
• Understand the structural behaviour of long columns;
• Appreciate the knowledge of plane stress analysis.

Pre-requisite(s):
CBE5029 – STRUCTURAL MECHANICS

Teaching & Learning Strategies

Full-time & Part-time Modes
This module consists of 30 hours of formal lectures, 12 hours of tutorials and 3 hours of laboratory sessions.

Hong Kong Institute of Vocational Education
Department of Construction
There will be class quizzes at suitable intervals throughout the year to monitor the progress of students.

**Assessment Scheme**

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</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
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</tr>
</thead>
</table>
| 1. Appreciate the idealisation of structures. | ● Appreciate different types of structures and loading.  
| | ● Understand the structural representation and idealization, structural components, supports and connections;  
| | ● Review the equilibrium equations;  
| | ● Determine the static determinacy;  
| | ● Construct the free-body diagram. |
| 2. Acquire the method of analysis of statically determinate beams with internal hinge. | ● Calculate the reactions by taking the advantage of internal hinge;  
| | ● Draw the shear force diagram;  
| | ● Draw the bending moment diagram;  
| | ● Sketch the deflected shape of the beam. |
| 3. Acquire the method of analysis of statically determinate frames. | ● Calculate the reactions by taking the advantage of internal hinge;  
| | ● Determine the internal forces of the frame members by cutting appropriate sections;  
| | ● Draw the axial force diagram;  
| | ● Draw the shear force diagram;  
| | ● Draw the bending moment diagram |
| 4. Understand the theory of torsional shear stress of circular sections | ● Appreciate the fundamental theory of torsional shear stress;  
| | ● Calculate the torsional shear stress and distribution;  
| | ● Determine the torsional rotation;  
| | ● Draw the torsional moment diagram along a circular shaft. |
5. Acquire the knowledge of stress distribution of short columns. (6 hours)
   - Identity the criteria of short column;
   - Calculate the stress distribution on an eccentrically loaded short column;
   - Appreciate the middle third rule and core of the section.

6. Understand the structural behaviour of long columns. (6 hours)
   - Identity the criteria of long column;
   - Understand the concept of effective length in different end restrained conditions;
   - Define the slenderness ratio;
   - Calculate the Euler buckling load and stress.

7. Appreciate the knowledge of plane stress analysis. (4.5 hours)
   - Appreciate the stress element subject to normal and shear stresses.
   - Determine the principal stresses and principal planes.
   - Construct the Mohr’s Circle.
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
- Communication, IT and Numeracy
- Information Management
- Use of Numbers
- Creative Thinking
- Analytical & Problem Solving

Personal Management Skills
- Attitudes & behaviour
- Responsibility & Autonomy
- Adaptation
- Continuous Learning
- Work Safety

Teamwork Skills
- Working with others
- Participation in Projects & Tasks

Reference
Module Syllabus

Module Title
COMPUTER-AIDED DRAFTING

Module Code
CBE2028

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3
53301F/55901F Higher Diploma in Civil Engineering /Level 3

Learning Outcomes

To achieve this module students shall be able to:
• Avail themselves of CAD techniques to delineate civil engineering and building construction drawings.
• Present basic reinforced concrete framing plan and section according to the trade practice.
• Recognize basic rebar detailing of reinforced concrete structures with sound structural concept and requirements as stipulated by various professional institutions.
• Understand structural steel sections and its properties.
• Present the details of structural steel connections in steel frame structures.
• Perceive the requirements for various levels and purposes of steel frame presentation.
• Shrewd the structural, logical, and practical requirements to various levels of details in the preparation of working drawings.

Pre-requisite(s):
CBE5023 – CONSTRUCTION DRAWING B or
CBE5024 – BASIC CAD
Teaching & Learning Strategies

Full-time & Part-time Modes
The module consists of 45 hours of formal workshop sessions.

Workshop sessions include formal teaching and practice of CAD in civil engineering and building construction drawings. Practical and real examples will be demonstrated and students have to do exercise during the sessions such that those problems encountered can be resolved immediately or malpractice can be rectified with conceptual explanation. To monitor the progress and evaluate the achievement of students, assignments and/or quizzes are to be held at suitable intervals throughout the semester.

Assessment Scheme

Coursework 100%
## Content

<table>
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<tr>
<th>Learning Outcome</th>
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</thead>
</table>
| **1** Invigilate CAD for calibre applications in complex and dilemma environment (7 hours)** | ● Set up of CAD drawings and files.  
● Customize and configure the draw environment.  
● Operate advance commands for drawing.  
● Edit and set up of dimension.  
● Set scale and multiple scales.  
● View and plot setting and configuration.  
● Organize and manage of CAD files. |
| **2** Acquire CAD techniques and Structural perception for the presentation of Reinforcement Concrete in Civil and Building Structures (20 hours)** | ● Introduction to plans and details: general arrangement, structural framing, sections and elevations.  
● Reinforcement details: concrete cover, bond-length, anchorage and lap length; links and stirrups, bend and hooks, curtailment and bar spacing.  
● Typical members: cantilever slab, and continuous slabs; cantilever beam, and continuous beams; columns and pad footings. |
| **3** Acquire techniques in the presentation of Structural Steel drawings in Civil and Building Engineering works (18 hours)** | ● Introduction to plans and details: general arrangement, structural framing, sections and elevations.  
● Connection details: bolted connection, fillet and butt weld; welding symbols, continuous and intermittent welds; angle cleats and gusset plates.  
● Typical connections: simple beam to beam connection; simple beam to column connection; column to column connection and stanchion base. |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ☑
Information Management ☑
Use of Numbers ☐
Creative Thinking ☑
Analytical & Problem Solving ☑

Personal Management Skills
Attitudes & behaviour ☐
Responsibility & Autonomy ☑
Adaptation ☑
Continuous Learning ☑
Work Safety ☐

Teamwork Skills
Working with others ☐
Participation in Projects & Tasks ☐

Reference
2. Standard Method of Detailing Structural Concrete, (1989), IStructE,
5. Code of Practice for the Structural Use of Concrete 2004, Buildings Department of HKSAR.
Module Syllabus

Module Title
ENVIRONMENTAL ENGINEERING

Module Code
CBE2029

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3
53301F/55901F Higher Diploma in Civil Engineering /Level 3

Learning Outcomes
To achieve this module a student shall be able to:
• acquire the basic knowledge of the common water quality parameters and understand water and wastewater treatment processes.
• understand the different types of facilities and the methods for solid waste disposal.
• acquire the basic knowledge in the areas of air and noise pollution.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Full-time & Part-time Modes
This module consists of 20 hours of formal lectures, 6 hours of tutorials and 4 hours of laboratory sessions.

There will be design assignments and class quizzes and at suitable intervals throughout the course to monitor the progress of the students.
Assessment Scheme

Coursework  40%
Examination  60%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| **1** Acquire the basic knowledge of the common water quality parameters and understand water and wastewater treatment processes. (10 hours) | ● Obtain the basic knowledge of the common water quality parameters.  
● Understand the functions of unit operations in water and wastewater treatment processes.  
● Introduce the local standards on water and wastewater treatment. |
| **2** Understand the solid waste management. (8 hours) | ● Introduce different categories of solid waste.  
● Illustrate the compositions and evaluate the quantities of municipal and industrial solid waste.  
● Understand the different types of facilities for solid waste disposal.  
● Study the methods of disposal including landfill, incinerations and cost of treatment.  
● Identify the statutory requirements for solid waste disposal.  
● Illustrate of current waste minimization project. |
| **3** Acquire the basic knowledge in the area of air pollution. (6 hours) | ● Understand the composition and structure of atmosphere.  
● Introduce the types and sources of air pollutants and investigate the effects of them on human beings and the environment.  
● Illustrate of current issues including Air pollution Index (API) and local standard.  
● Study the dispersion of air pollutants. |
| **4** Acquire the basic knowledge in the area of noise pollution. (6 hours) | ● Analysis the basic nature of sound and sound intensity, terms and definition of SPL, SWL and SIL.  
● Measurement of noise level by sound level meter and weighting networks.  
● Identify noise sources and local statutory requirement on noise pollution.  
● Study the effects of noise pollution on human beings. |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ✓
Information Management ✓
Use of Numbers □
Creative Thinking ✓
Analytical & Problem Solving ✓

Personal Management Skills
Attitudes & behaviour □
Responsibility & Autonomy ✓
Adaptation ✓
Continuous Learning ✓
Work Safety □

Teamwork Skills
Working with others ✓
Participation in Projects & Tasks ✓

Reference
3. Environment Hong Kong - Environmental Protection Department, Hong Kong Government.
Module Syllabus

Module Title
CONTRACT ADMINISTRATION

Module Code
CBE2030

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level
Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3
53301F/55901F Higher Diploma in Civil Engineering /Level 3

Learning Outcomes
To achieve this module a student shall be able to:
• Demonstrate a knowledge of basic contract law and understand the various roles of participants in construction contract;
• Acquire the knowledge of various types of contractual arrangement and distinguish the usage of each type in construction work;
• Acquire a knowledge of the tendering procedure and the parties in the process;
• Acquire a knowledge and understanding of the contact administration procedures for valuation of interim payment, variation, issuing of certificates, settlement of final account, claims, and other methods in alternative disputes resolution;
• Demonstrate knowledge and understanding of the law of tort and the law of negligence;
• Acquire a knowledge and understanding of the Quality Management System;
• Demonstrate knowledge and understanding of Health and Safety Management in Construction

Pre-requisite(s):
Nil

**Teaching & Learning Strategies**

During tutorial lessons, real or simulated case study discussion will be employed to inspire learners of this module to develop both theoretical and practical concepts in meeting general and specific site constraints in contract and management of a project. The students should also be given opportunities to have an overview of current civil engineering contract procurement and administration practices in Mainland China in the form of tutorial and case study discussion sessions. Expert professionals could be invited to deliver talks to the students in this development. Theoretical and analytical type assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals throughout the semester to monitor the progress of the students.

**Full-time and Part-time Mode**
The module consists of 30 hours of formal lecture and 15 hours of tutorial lessons.

**Assessment Scheme**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>40%</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1. Demonstrate a knowledge of basic contract law and understand the various roles of participants in construction contract. | ● Acquire knowledge of basic principles in law of contract.  
● Realise the role, duties and responsibility of each party, such as the client, the engineer, the architect, the quantity surveyor, the main contractor and the subcontractor, in a construction contract. |
|                                                                                  | (7 hours)                                                                                                                                                                                                            |
| 2. Acquire the knowledge of various types of contractual arrangement and distinguish the usage of each type in construction work. | ● Acquire the characteristics, merit and demerit of various types of contractual arrangement, such as Lump Sum Contracts, Measurement Contracts, Cost Reimbursement Contracts, Design and Build Contracts, Management Contract and Build-operate-transfer scheme, in construction works;  
● Understand the usage of each type of these contracts and appreciate their relevant contract documents.  
● Understand the formulation and the administrative procedures of a construction contract |
|                                                                                  | (5 hours)                                                                                                                                                                                                            |
| 3. Acquire a knowledge of the tendering procedure and the parties in the process. | ● Acquire knowledge of various types of tenders.  
● Understand the tendering and negotiation procedures;  
● Realise the right, duties and relationships of different parties, such as the engineer, the client, the contractor, the sub-contractor and supplier, the nominated sub-contractor and the nominated supplier for a project |
|                                                                                  | (5 hours)                                                                                                                                                                                                            |
4. Acquire a knowledge and understanding of the contact administration procedures for valuation of interim payment, variation, issuing of certificates, settlement of final account, claims, and other methods in alternative disputes resolution

<table>
<thead>
<tr>
<th><strong>4.</strong> Acquire a knowledge and understanding of the contact administration procedures for valuation of interim payment, variation, issuing of certificates, settlement of final account, claims, and other methods in alternative disputes resolution</th>
<th><strong>4.</strong> Acquire a knowledge and understanding of the contact administration procedures for valuation of interim payment, variation, issuing of certificates, settlement of final account, claims, and other methods in alternative disputes resolution.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Understand contractual procedures in relation to issuing interim payment and certificates at various stages;</td>
<td>• Understand contractual procedures in relation to issuing interim payment and certificates at various stages;</td>
</tr>
<tr>
<td>• Appreciate the valuation of variations and settlement of final accounts;</td>
<td>• Appreciate the valuation of variations and settlement of final accounts;</td>
</tr>
<tr>
<td>• Realise termination and breach of contract.</td>
<td>• Realise termination and breach of contract.</td>
</tr>
<tr>
<td>• Acquire a knowledge of contractual claims and distinguish the methods in alternative disputes resolution.</td>
<td>• Acquire a knowledge of contractual claims and distinguish the methods in alternative disputes resolution.</td>
</tr>
</tbody>
</table>

(7 hours)

5. Demonstrate knowledge and understanding of the law of tort and the law of negligence

<table>
<thead>
<tr>
<th><strong>5.</strong> Demonstrate knowledge and understanding of the law of tort and the law of negligence</th>
<th><strong>5.</strong> Demonstrate knowledge and understanding of the law of tort and the law of negligence.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Understand the basic knowledge of the law of tort and the law of negligence.</td>
<td>• Understand the basic knowledge of the law of tort and the law of negligence.</td>
</tr>
</tbody>
</table>

(5 hours)


<table>
<thead>
<tr>
<th><strong>6.</strong> Acquire a knowledge and understanding of ISO 9000 Quality Management System.</th>
<th><strong>6.</strong> Acquire a knowledge and understanding of ISO 9000 Quality Management System.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Acquire a basic concepts of quality policy, quality system, quality assurance, quality control and total quality management in construction industry;</td>
<td>• Acquire a basic concepts of quality policy, quality system, quality assurance, quality control and total quality management in construction industry;</td>
</tr>
<tr>
<td>• Understand the objectives and characteristics of quality system and its implementation benefits in construction;</td>
<td>• Understand the objectives and characteristics of quality system and its implementation benefits in construction;</td>
</tr>
<tr>
<td>• Appreciate a basic knowledge of quality cost in a construction project;</td>
<td>• Appreciate a basic knowledge of quality cost in a construction project;</td>
</tr>
<tr>
<td>• Acquire a basic knowledge of ISO 9000 family of quality standards and the Hong Kong Laboratory Accreditation Scheme (HOKLAS);</td>
<td>• Acquire a basic knowledge of ISO 9000 family of quality standards and the Hong Kong Laboratory Accreditation Scheme (HOKLAS);</td>
</tr>
<tr>
<td>• Understand the requirements of ISO 9000 (version 2000) quality management system and it’s applicable to construction: management responsibility, quality system, contract review, design control, training, review and audits, other requirements.</td>
<td>• Understand the requirements of ISO 9000 (version 2000) quality management system and it’s applicable to construction: management responsibility, quality system, contract review, design control, training, review and audits, other requirements.</td>
</tr>
</tbody>
</table>

(8 hours)
### 7 Demonstrate knowledge and understanding of Health and Safety Management in Construction.

(8 hours)

- Understand various safety management systems in construction;
- Explore the requirements of Ordinance and Regulations related to construction safety;
- Overview the common dangerous occurrences and the monetary losses due to accidents on construction site;
- Identify the causes of accidents and the general measures on construction site;
- Realise the duties and Responsibilities of proprietor, contractor, safety officer, safety supervisor and other professional staff regarding health and safety on construction sites;
- Understand the safety management in construction and the requirements of safety supervision plan on private construction sites in Hong Kong;
- Appreciate the duties and responsibilities of relevant parties and their relationship, related to safety supervision plan in construction.
- Understand the minimum qualification requirements of Technical Competent Person of relevant disciplines and the supervision requirements required in the safety supervision plan.
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ✔
Information Management ✔
Use of Numbers ☐
Creative Thinking ✔
Analytical & Problem Solving ✔

Personal Management Skills
Attitudes & behaviour ☐
Responsibility & Autonomy ✔
Adaptation ✔
Continuous Learning ✔
Work Safety ☐

Teamwork Skills
Working with others ✔
Participation in Projects & Tasks ✔

Reference
19. *Construction Sites (Safety) Regulation*, (1994), Labour Department, Hong Kong.
Module Syllabus

Module Title
GROUP PROJECT

Module Code
CBE2031

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Level

Full-time Mode
51301F  Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53201/55201  Diploma in Civil Engineering /Level 3
53301F/55901F  Higher Diploma in Civil Engineering /Level 3

Learning Outcomes
To achieve this module a student shall be able to:
• Select and agree the scope of a construction design scheme and the specifications and procedures as assigned;
• Undertake with a team effort the study according to the defined specifications, procedures and the time frame;
• Develop and apply engineering skills in identifying, analyzing and formulating solutions to design and/or investigation problems.
• Evaluate and present the interim and final findings of the study as a member of a team.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Students are required to work in groups of about 10 each. After organizing the team
with defined roles and responsibilities of individual team member, they are required to coordinate each other while executing his/her agreed share of work and work together to complete the assigned group project conforming to the agreed specifications, working procedures and within the time frame. They will meet and report to their project supervisor regularly their work progress, problems and achievements and self-assessment of the team members. Close monitoring and assessment will be made throughout the project activity period by their supervisor for both team and individual member performance as part of the continuous assessment process.

**Full-time Mode**
The module consists of 30 hours of guided tutorial meetings between student group and the assigned project supervisor.

**Part-time Mode**
The module consists of 15 hours of guided tutorial meetings between student group and the assigned project supervisor, and 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students and/or groups who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

**Assessment Scheme**

Coursework 100%

Group performance as well as the contribution of individual members throughout the project activities will be assessed by the project supervisor and moderator. Assessment will be based on the following:

1. Engineering concept and technical content
2. Teamwork
3. Quality of the work, including the written report and oral presentation
4. Individual initiative and effort
5. Response to questions from an evaluation panel
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1. Select and agree the scope of a construction design scheme and the specifications and procedures as assigned. | - Establish with project supervisor the scope of work, meeting schedules, and the progress and final reports;  
- Agree with the project supervisor the necessary technical and non-technical specifications to be met;  
- Identify potential internal/external constraints and resources requirements of the study; |
| 2. Undertake with a team effort the study according to the defined specifications, procedures and the time frame; | - Organise a team of 10 members with defined role and responsibilities;  
- Provide evidences of team meeting and work record log book;  
- Submit self-assessment report of team work progress and individual performance against the agreed work schedule and assessment criteria; |
| 3. Develop and apply engineering skills in identifying, analyzing and formulating solutions to design and/or investigation problems | - Agree with project supervisor the design brief, approach and methodology for the study undertaken;  
- Formulate alternative solutions and carry out the cost-benefit analysis for the final preliminary design/investigation proposal;  
- Carry out the detail design and/or full investigation of the work scheme |
| 4. Evaluate and present the interim and final findings of the study as a member of a team. | - Submit scope of work and organization chart of the team with defined roles and responsibilities;  
- Submit and present team meeting notes/minutes  
- Submit interim self-assessment and progress reports  
- Submit and present feasibility report and/or preliminary design scheme/investigation report;  
- Submit and present the final report. |
**Key Skills**
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

**Fundamental Skills**
- Communication, IT and Numeracy ✓
- Information Management ✓
- Use of Numbers □
- Creative Thinking ✓
- Analytical & Problem Solving ✓

**Personal Management Skills**
- Attitudes & behaviour ✓
- Responsibility & Autonomy ✓
- Adaptation ✓
- Continuous Learning ✓
- Work Safety ✓

**Teamwork Skills**
- Working with others ✓
- Participation in Projects & Tasks ✓
Module Syllabus

Module Title
STRUCTURAL MECHANICS AND BUILDING TECHNOLOGY

Module Code
CBE2032

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3

Learning Outcomes
This module is a bridging module designed for Form 7 Level 3 intakes. The aim of this module is to equip students with basic knowledge of structural mechanics and appreciation of construction technology for general building and civil works. It would enhance and complement their studies in Level 3 and Level 4. On completion of this module, students should:

- Understand the fundamental principles of structural mechanics;
- Acquire the methods to determine the properties of arbitrary cross sections;
- Acquire the methods of analysis of statically determinate plane trusses;
- Acquire the methods of analysis of statically determinate beams;
- Demonstrate the knowledge of stress distribution in beams.
- Develop an understanding of the characteristics, usage and application of commonly used building materials.
- Understand the different types of infrastructures
- Appreciate the construction of different types of substructures and superstructures.

Pre-requisite(s):
Nil
Teaching & Learning Strategies

Full-time & Part-time Modes
This module consists of 30 hours of formal lectures, 9 hours of tutorials and 6 hours of laboratory sessions.

There will be class quizzes at suitable intervals throughout the year to monitor the progress of students.

Assessment Scheme

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>40%</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>
### Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| **1.** Acquire the methods of analysis of statically determinate beams (7 hours)  | ● Understand the concepts of free body diagrams.  
                                 | ● Calculate the support reactions of determinate structures.  
                                 | ● Construct the bending moment and shear force diagrams for beams.  
                                 | ● Appreciate the relationship between bending moment, shear force and load.      |
| **2.** Acquire the methods of analysis of statically determinate plane trusses   | ● Determine the member forces by the method of joint.  
                                 | (4 hours)                                                                             |
                                 | ● Calculate the member forces by the method of section.  
                                 | ● Identity the zero force members by the method of inspection.                     |
| **3.** Appreciate the concepts of stress and strain (2 hours)                   | ● Overview of normal stress and shear stress.  
<p>| |
|                                                                                     |
|                                                                                     |
| ● Overview of elastic constants, Poisson’s ratio, Hooke’s Law from the stress-strain |
| curves.                                                                             |
| ● Appreciate the application of Factor of Safety and the allowable stresses.       |
| <strong>4.</strong> Determine the moment of inertia of sections and stress distribution in    | ● Apply the Parallel-axes Theorem to calculate the moment of inertia in any          |
| beams (7 hours)                                                                     | arbitrary axis.                                                                     |
|                                                                                     | ● Determine the bending stress distribution in beams subject to bending moment.     |
|                                                                                     | ● Determine the shear stress distribution in beams subject to shear force.           |</p>
<table>
<thead>
<tr>
<th>5</th>
<th>Overview of different types of construction materials</th>
<th>Overview of different types of materials used in construction works: Concrete, metal, non-metal, plastics, masonry, timber, bricks and bituminous materials.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Acquire the knowledge on different type of substructure construction.</td>
<td>Understand the basic principles of substructure construction: Shallow foundations: footings and raft foundations. Piled foundation: classification and construction techniques of various types of piles: caissons, mini piles and barrettes. Define various types of cofferdams, and sheet piling and apply in different site condition. Understand the various basement construction methods, top-down and bottom-up approaches, temporary and permanent lateral supporting systems.</td>
</tr>
<tr>
<td>8</td>
<td>Appreciate different types of infrastructures</td>
<td>Introduce the different forms of infrastructures and its advantages in terms of application: Road, bridge, tunnel, marine structures, reclamation, landfill</td>
</tr>
</tbody>
</table>
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ☑
Information Management ☐
Use of Numbers ☑
Creative Thinking ☑
Analytical & Problem Solving ☑

Personal Management Skills
Attitudes & behaviour ☑
Responsibility & Autonomy ☑
Adaptation ☑
Continuous Learning ☑
Work Safety ☑

Teamwork Skills
Working with others ☑
Participation in Projects & Tasks ☐

Reference
8. Wong, W. S., (2004), Building Materials and Technology in Hong Kong, All Arts.

Hong Kong Institute of Vocational Education
Department of Construction
15. Seeley, (1999), Building Technology I, Macmillan
Module Syllabus

Module Title
ENGINEERING SURVEYING AND CONSTRUCTION DRAWING

Module Code
CBE2033

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53201/55201 Certificate in Civil Engineering /Level 3

Learning Outcomes

This module is a bridging module designed for Form 7 Level 3 intakes. The aim of this module is to equip students with basic knowledge of engineering surveying, acquire basic drawing concept and techniques. It would enhance and complement their studies in Level 3 and Level 4. On completion of this module, students should:

- Demonstrate the ability to use a range of instruments pertinent to the surveying and setting out process
- Demonstrate a detailed understanding of the principles of surveying and setting out
- Calculate from raw data the information required for cartographic detailing and setting out of construction works
- Describe the use of electronic and laser instruments in the construction industry
- Apply and evaluate computer software to calculate and produce surveying solutions.
- Interpret engineering drawings and visualize three dimensional shapes.
- Convert three dimensional shapes into two dimensional drawings in multi-views and single-view.
Pre-requisite(s):
Nil

Teaching & Learning Strategies

Full-time & Part-time Modes
The module consists of 15 hours of formal lecture, 5 hours of tutorial and 25 hours of practical sessions. There will be assignments and class quizzes at suitable intervals throughout the semester to monitor the progress of the students.

Assessment Scheme

Coursework 100%
<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1 Demonstrate a detailed understanding of the principles of surveying. (3 hours) | ● Overview the general principles and survey errors of land surveying.,
● Classification, Standards of Accuracy, and General specifications for Horizontal and Vertical Controls,
● Planning and operation of survey field work. |
| 2 Demonstrate the ability to use a range of instruments pertinent to the surveying. (10 hours) | ● Use of leveling equipment to carry out simple leveling works.
● Use of total station instrument to measure and reduce angular and distance measurement,
● Select the appropriate instrument for a particular job,
● Distance Measurement – Steel tapes and Electromagnetic Distance Measuring (EDM) instrument, Base line measurement, Methods of standardization and corrections,
● Angular Measurement – Optical and digital theodolites, Measurement and reduction of vertical and horizontal angles. Temporary adjustment of theodolites. Trigonometric leveling,
● Levelling – automatic level, digital and laser levels, Ordinary levelling booking and reduction of observations, Bench Marks, Two peg test, Inverted staff reading, Reciprocal levelling, Effects of Earth curvature and refraction, Precise leveling. |
| 3 Acquire a knowledge of cartographic detailing and generation of survey plans and engineering drawings. (4 hours) | ● Plot contours and ground sections,
● Calculate areas and/or volumes of cut and fill,
● Spot heights, Direct and indirect method of contouring, Interpolation of contours,
● Hong Kong Survey Grid Systems, Projection and Datum, Grid, magnetic and true bearings.
● Digital Terrain Modelling, Geographic Information System,
● Basic skill of plotting plans and engineering drawings, Generation of Ground model. |
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4</strong></td>
<td>Describe the use of modern survey methods and instruments in the construction industry.</td>
<td>Use of a variety of modern electronic surveying instruments (Total Station, Laser instruments) and their application to construction and civil engineering work, Satellite Navigation systems – principles, advantages, errors and operation of the system.</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Application of computer software to calculate and produce surveying solutions to setting out.</td>
<td>Traverse computation – Open and closed traverses, Bowditch method of adjustment, Data analysis using survey information from digital mapping database, Computation of deflection angles and tabulate setting out data for co-ordinated points and for horizontal circular curves.</td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Accustom to Engineering Drawing</td>
<td>Understand the basic standards and techniques in drafting, Understand drawing layout and presentation, Understand geometric terms and geometric shapes, Geometric construction including division of lines and angles, polygons, circles, tangents, curves, ellipses, conic sections.</td>
</tr>
<tr>
<td><strong>7</strong></td>
<td>Acquire basic concepts in Descriptive Geometry.</td>
<td>Understand the technique and presentation of engineering drawing, Spatial representation of points, lines, planes and solids, Spatial intersection of lines and planes, Determination of true lengths, true angles and true shapes and other properties of objects.</td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>Understand and apply orthographic projection for various shapes of object.</td>
<td>Approach to depict the missing views for various given conditions, Approach to reveal the missing lines and curves from drawings of orthographic projections, Know various presentation and practice of sectional drawings, Understand, apply and draw sections for engineering drawings.</td>
</tr>
</tbody>
</table>
**Key Skills**
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

**Fundamental Skills**
- Communication, IT and Numeracy  
- Information Management  
- Use of Numbers  
- Creative Thinking  
- Analytical & Problem Solving

**Personal Management Skills**
- Attitudes & behaviour  
- Responsibility & Autonomy  
- Adaptation  
- Continuous Learning  
- Work Safety

**Teamwork Skills**
- Working with others  
- Participation in Projects & Tasks

**Reference**
Module Syllabus

Module Title
CIVIL ENGINEERING CONSTRUCTION & BUILDING SYSTEM

Module Code
CBE2034

Class Contact Hours
45 Hours

Module Value
3.0

Course Code/Year
Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53501/55501 Certificate in Civil Engineering /Level 3

Learning Outcomes
This module is a bridging module designed for Form 7 level 3 intakes. On completion of the module, students shall be able to:

- Acquire the knowledge of construction technology in major civil engineering works;
- Select and evaluate appropriate methods to solve problems arising from construction activities involving earthworks, deep excavation, foundations and prestressed & precast concrete construction having proper regard to safety, environmental, quality, technical and economic considerations.
- Acquire a sound knowledge and understand the main functions of electrical and mechanical services systems in buildings and acquaint with the electrical safety and installations in buildings.
- Explore and apply the design principles plumbing and drainage systems in residential and simple commercial building.
- Acquire the knowledge and physical phenomena of fire formation and fire protection in buildings.
- Demonstrate knowledge and understanding of the lighting distributions.
- Acquire the physical phenomena of natural and mechanical ventilation systems. Understand the basic concept of air conditioning systems and different cooling approaches.
Pre-requisite(s)
Nil

Teaching & Learning Strategies

Full-time & Part-time Modes
The module consists of 30 hours of formal lecture and 15 hours of tutorial lessons.

For full-time mode, formal lecture and tutorial lessons are essential and for part-time mode, students with experience shall have lesser formal lectures and rely on guided study period through e-learning and webCT. There will be class quizzes/tests at suitable intervals throughout the year to monitor the progress of students.

Assessment Scheme

| Coursework | 40% |
| Examination | 60% |
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1. Explore and apply the earthwork in related excavation to suit the permanent works. (7 hours) | ● Understand different excavation methods applied on various construction works: Trench, bulk and rock excavation techniques and precaution works. Impact of public utilities and adjacent buildings.  
● Realize the cut & fill slope, methods of slope stabilization, slope protection.  
● Identify evidences of dangerous slope, inspection list for inspection of a slope. |
| 2. Acquire the knowledge of types of shallow and deep foundation associated with tests. (7 hours) | ● Identify the construction of various types of shallow and deep foundations.  
● Understand the control works on the depth of piles and apply piles integrity by various means of test and site investigation. |
| 3. Acquire the knowledge of deep excavation. (7 hours) | ● Understand various deep excavation methods for substructure construction with related works.  
● Identify basement construction methods: top-down and bottom-up approaches, temporary and permanent lateral supporting systems, surveillance systems for monitoring the settlement of surrounding area during excavation  
● Understand types of cofferdams: sheet piles and slurry diaphragm wall construction.  
● Realise water control systems in deep excavation. |
| 4. Explore and apply the prestressed and precast concrete construction in various infrastructures. (4 hours) | ● Understand the construction and application of prestressed concrete structures in building and civil engineering works:  
● Understand Pretensioning and post-tensioning, prestressing methods, and production.  
● Realize precast concrete construction: advantages and disadvantages, manufacturing, transportation and erection.  
● Understand application of precast and prestressed structures. |
| 5 | Acquire the basic concept and important roles of electrical and mechanical services in a building. Understand the characteristic and functions of lighting in a building. | ● Understand the main functions and purposes of building services system in buildings.  
● Learn the basic idea of building services system such as air conditioning, fire, plumbing and drainage system, electrical systems.  
● Understand and identify what physical parameters affecting the environment and sensation of human beings within a building.  
● Recognize the definitions and meanings for terms used in lighting. |
|---|---|---|
| 6 | Explore the basic principles of plumbing and drainage system. | ● Understand the main functions and purposes of building services system in buildings.  
● Learn the basic idea of building services system such as air conditioning, fire, plumbing and drainage system, electrical systems.  
● Understand and identify what physical parameters affecting the environment and sensation of human beings within a building.  
● Recognize the definitions and meanings for terms used in lighting. |
| 7 | Acquire basic knowledge of fire and protection of fire in a building. | ● Acquire knowledge of the cause of fire and fire growth inside a building  
● Acquire the basic concept of fire protection approaches such as sprinkler system and fire hydrant and hose reel systems.  
● Understand the basic principle of different kinds of fire detection systems and their usage practically. |
| 8 | Study the basic knowledge and principles of electrical circuits and installations in building. Explore the phenomena of natural and mechanical ventilation in building and study the basic idea of air conditioning system. | ● Understand the principle of alternative current, generation of single phase and three phase currents.  
● Understand the fundamental requirement for safety in electrical installation such as protection against electric shock, overcurrent.  
● Obtain the general idea of Hong Kong electricity supply condition, power generation and distribution.  
● Understand the physical phenomena of natural ventilation of the buildings.  
● Acquire the knowledge of pressure balancing and importance of mechanical ventilation of a building.  
● Understand the basic concept of cooling load which is attributed to the sensible, latent heat and ventilations.  
● Recognize the different kinds of air conditioning system |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ☑
Information Management ☑
Use of Numbers ☐
Creating Thinking ☑
Analytical & Problem Solving ☑

Personal Management Skills
Attitudes & Behaviour ☐
Responsibility & Autonomy ☑
Adaptation ☑
Continuous Learning ☑
Work Safety ☑

Teamwork Skills
Working with others ☑
Participation in Projects & Tasks ☑

Text Books/References
Module Syllabus

Module Title
BASIC INDUSTRIAL TRAINING C

Module Code
CBE2035

Formal Tuition Hours
96 hours

Module Value
0

Course Code/Level
Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3

Learning Outcomes
This module is a bridging module designed for Form 7 level 3 intakes. To achieve this module a student shall be able to:

- appreciate basic craft skills in electrical work found in the construction industry;
- appreciate basic craft skills in woodwork;
- appreciate basic craft skills in painting;
- appreciate basic craft skills in handling hydraulic equipment found in the construction industry;
- appreciate basic craft skills in brickwork; and
- appreciate basic craft skills in plumbing.

Pre-requisite(s)
Nil

Teaching and Learning Strategies
In this module, students are required to spend 16 hours on hydraulic equipment, 16 hours on electrical work in VTC Industrial Training Centres, and 64 hours on practicing general construction works in workshops of the Construction Department in VTC Industrial Training Centres. Teaching strategy shall be student-oriented and emphasis shall be put on correct operation procedures, safety at work and quality of output.

Assessment Scheme
Continuous Assessment 100%

Hong Kong Institute of Vocational Education
Department of Construction
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Appreciate the Basic Electrical Workshop Practice.</td>
<td></td>
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<tr>
<td>(16 hours)</td>
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<tr>
<td>• Introduction to basic workshop tools and equipment.</td>
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<tr>
<td>• Appreciate the safety in the use of electricity.</td>
<td></td>
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<tr>
<td>• Appreciate the practice in cable jointing and termination.</td>
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<tr>
<td>• Appreciate the practice in wiring in building and installation of conduits.</td>
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<tr>
<td>• Installation of electric appliances.</td>
<td></td>
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<tr>
<td><strong>2</strong> Appreciate the Basic Woodwork.</td>
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<tr>
<td>(16 hours)</td>
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<tr>
<td>• Appreciate the safety in woodwork.</td>
<td></td>
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<tr>
<td>• Appreciate the proper use of common hand tools</td>
<td></td>
</tr>
<tr>
<td>• Appreciate the skill and technique in construction of simple woodworks</td>
<td></td>
</tr>
<tr>
<td>• Appreciate the common powered tools and safety</td>
<td></td>
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<tr>
<td>• Appreciate the practice in making and fixing simple cabinet</td>
<td></td>
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<tr>
<td>• Appreciate the practice in fixing drawer locks and ironmongeries</td>
<td></td>
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<tr>
<td>• Appreciate the practice in laying floor boards</td>
<td></td>
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<tr>
<td><strong>3</strong> Appreciate the Basic Painting.</td>
<td></td>
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<tr>
<td>(16 hours)</td>
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<tr>
<td>• Appreciate the Proper and safe use of tools and equipment</td>
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<tr>
<td>• Appreciate the storage and handling of dangerous materials</td>
<td></td>
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<tr>
<td>• Appreciate the practice in removal of paints from wood, metal and plastered surfaces</td>
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<tr>
<td>• Appreciate the preparation of backgrounds</td>
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<tr>
<td>• Appreciate the application of paints on woodwork</td>
<td></td>
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<tr>
<td>• Appreciate the practice in painting on metal surface</td>
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</tbody>
</table>
| 4 | Appreciate basic craft skills in mechanical hydraulic system found in the construction industry.  
(16 hours) |
|   | • Appreciate the safety in the handling of hydraulic equipment  
• Appreciate the basic hydraulic principles and circuit diagram  
• Appreciate the various types of hydraulic equipment, their basic setting up, operation, fault diagnosis and maintenance |
| 5 | Appreciate the basic craft skills in brickwork.  
(16 hours) |
|   | • Appreciate the proper and safe use of tools and equipment  
• Appreciate the safety in brickworks  
• Appreciate the basic bricklaying practice  
• Appreciate the practice in laying blocks  
• Appreciate the practice in plastering on wall surface |
| 6 | Appreciate the Basic Plumbing.  
(16 hours) |
|   | • Appreciate the proper and safe use of tools and equipment  
• Appreciate the safety in plumbing work  
• Appreciate various types of pipes, fittings and valves  
• Appreciate the use of powered tools and safety  
• Appreciate the practices in cutting, jointing, bending and fixing G.I., copper and PVC pipes.  
• Appreciate the practice in basic pipe work installation  
• Appreciate the practice in pipe work testing for leakage |
Module Title
MEASUREMENT AND DOCUMENTATION B

Module Code
CBE2036

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 3

Part-time Mode
53201/55201 Diploma in Civil Engineering /Level 3

Learning Outcomes
This module is a bridging module designed for Form 7 level 3 intakes. To achieve this module a student shall be able to:

- Establish the historical development and the role of civil engineering in human activities and modern society;
- Understand basic credentials, duties and ethics of professional engineers and the civil engineering profession;
- Acquire a knowledge of the use of Standard Method of Measurement and Bills of Quantities in the measurement and tendering process;
- Able to identify the clauses in the Standard Method of Measurement and apply the measurement principles for simple civil engineering works;
- Demonstration knowledge of specification and its function in civil engineering works.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Full-time & Part-time Modes
The module consists of 20 hours of formal lectures and 10 hours of tutorials.
During tutorial lessons, real or simulated case study discussion will be employed to inspire learners of this module to develop both standard practices and measurement solutions in meeting general and specific site constraints in calculating bills of quantities. Mathematical and analytical type assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals throughout the semester to monitor the progress of the students.

**Assessment Scheme**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>40%</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
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</tr>
</thead>
</table>
| 1 Establish the historical development and the role of civil engineering in human activities and modern society (5 hours) | • Appreciate the nature and history of civil engineering in human activities and its role in urbanization;  
• Demonstrate important achievements of civil engineering projects in the past and modern times;  
• Demonstrate local infrastructure projects currently under construction and planned for future;  
• Describe common infrastructure projects for developing countries in different needs during various stages of development;  
• Discuss the challenges and problems of implementing civil engineering projects from planning, financing, construction and maintenance. |
| 2 Understand basic credentials, duties and ethics of civil engineering personnel. (3 hours) | • Describe entry qualifications and job specifications of a civil engineer and other work force personnel;  
• Describe the ethics of civil engineering personnel required by the industry;                                                                 |
| 3 Acquire a knowledge of the use of Standard Method of Measurement and Bills of Quantities in the measurement and tendering process. (5 hours) | • Understand the Standard Method of Measurement for measuring civil engineering works  
• Appreciate the use of Bills of Quantities and its continents in the tendering process  
• Differentiate the various types and formats of bills of quantities. |
<table>
<thead>
<tr>
<th>Course No</th>
<th>Course Title</th>
<th>Objectives</th>
</tr>
</thead>
</table>
| 4 | Able to identify the clauses in the Standard Method of Measurement and apply the measurement principles for simple civil engineering works. | • Familiar with the basic skills of measurement for civil engineering.  
• Understanding the use of relevant clauses in measurement of civil engineering.  
• Carry out the measurement process for simple civil engineering work such as earthworks, foundations, retaining walls and superstructures.  
• Prepare the abstract and billing procedures for preparation of bills of quantities. |
| 5 | Demonstration knowledge of specification and its function in civil engineering works. | • Appreciate the basic principles of specification.  
• Realise the purpose and principles of specification writing.  
• Understanding the function, source and format of specification.  
• Differentiate various types and typical clauses of specification. |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ✓
Information Management ✓
Use of Numbers ☐
Creative Thinking ✓
Analytical & Problem Solving ✓

Personal Management Skills
Attitudes & behaviour ☐
Responsibility & Autonomy ✓
Adaptation ✓
Continuous Learning ✓
Work Safety ☐

Teamwork Skills
Working with others ✓
Participation in Projects & Tasks ✓

Reference
Module Syllabus

Module Title
PROJECT MANAGEMENT

Module Code
CBE3025

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering/Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes

To achieve this module a student shall be able to:
• Acquire the basic knowledge of Management and Organization Principles;
• Demonstration the knowledge and understanding of various phases of a project and structure of Construction Organizations;
• Acquire a knowledge and understanding of Project Scheduling and programming techniques in construction;
• Explore and apply the mathematical tools for construction management;
• Demonstration knowledge and understanding of the fundamental principles of Professional Ethics and Conduct;
• Acquire a knowledge and understanding of the fundamental principles of the prevention of bribery.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Hong Kong Institute of Vocational Education
Department of Construction
During tutorial lessons, real or simulated case study discussion will be employed to inspire learners of this module to develop both theoretical and planning techniques in meeting general and specific constraints in managing construction projects. The students should also be given opportunities to have an overview of current project management practices in Mainland China in the form of tutorial and case study discussion sessions. Expert professionals could be invited to deliver talks to the students in this development. Mathematical and analytical type assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals throughout the semester to monitor the progress of the students.

**Full-time Mode**
The module consists of 30 hours of formal lecture and 15 hours of tutorial lessons.

**Part-time Mode**
The module consists of 26 hours of formal lecture, 4 hours of tutorial lessons and 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

**Assessment Scheme**

<table>
<thead>
<tr>
<th>Component</th>
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</thead>
<tbody>
<tr>
<td>Coursework</td>
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<tr>
<td>Examination</td>
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### Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| **1. Acquire the basic knowledge of Management and Organization Principles.** | ● Acquire basic knowledge of various types of project management theories;  
● Distinguish various organizational structures, such as functional, project and matrix organizations in respect of their characteristics, merit and demerit;  
● Understand span of control;  
● Realise reasons, levels and general principles of delegation of power from leaders;  
● Appreciate quality and characteristics of Leaders;  
● Differentiate various types of leadership styles;  
● Acquire different types of motivation theories;  
● Understand the importance of Teamwork;  
● Distinguish centralization and decentralization of authorities and responsibilities |
| **(10 hours)** | |
| **2. Demonstration the knowledge and understanding of various phases of a project and structure of Construction Organizations.** | ● Understand various phases of a project and the establishment of different parties in construction;  
● Explore organization of different types of construction firms;  
● Realise site staff establishment of contractors and the consulting firms, and their respective roles and responsibilities. |
| **(8 hours)** | |
| **3. Acquire a knowledge and understanding of Project Scheduling and programming techniques in construction.** | ● Acquire various scheduling, programming and planning techniques in construction;  
● Differentiate the function of various types of Programmes and progress charts;  
● Understand the usage of bar chart (Gantt charts);  
● Realise the application of activity and arrow network, precedence network diagrams;  
● Acquire a knowledge of the critical path method and PERT network  
● Apply leveling and smoothing techniques in resource allocation and management;  
● Acquire a knowledge of computer software applications in construction planning of a project. |
<p>| <strong>(10 hours)</strong> | |</p>
<table>
<thead>
<tr>
<th></th>
<th>Explore and apply the mathematical tools for construction management. (6 hours)</th>
<th>Apply various mathematical tools, such as transportation problem and assignment problem, for construction management.</th>
</tr>
</thead>
</table>
| 5 | Demonstration knowledge and understanding of the fundamental principles of Professional Ethics and Conduct. (6 hours) | Introduce the fundamental principles of Professional Ethics and conduct in construction discipline; 
Understand rules of conduct for engineers and technicians and their responsibilities to the profession, colleagues, employers or clients, and to the public. 
Identify conflict of interest of different parties in construction projects; 
Realise common Professional negligence. |
| 6 | Acquire a knowledge and understanding of the fundamental principles of the prevention of bribery. (5 hours) | Introduce the fundamental principles of the Prevention of Bribery Ordinance and its effects in construction industry; 
Understand the concepts of bribery, offer and acceptance of advantage, and corrupt transactions; 
Realise the role of the Independent Commission Against Corruption; 
Appreciate case studies of corruption in construction industry. |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ✓
Information Management ✓
Use of Numbers □
Creative Thinking ✓
Analytical & Problem Solving ✓

Personal Management Skills
Attitudes & behaviour □
Responsibility & Autonomy ✓
Adaptation ✓
Continuous Learning ✓
Work Safety □

Teamwork Skills
Working with others ✓
Participation in Projects & Tasks ✓

Reference
15. Project Scheduling and Management for Construction by David R. Pierce (Hardcover - Feb 2004)
Module Syllabus

Module Title
GEOTECHNICAL ENGINEERING

Module Code
CBE3026

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering/Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes
To achieve this module a student shall be able to:

- Evaluate the compressibility of soils, and calculate consolidation settlement.
- Describe and determine the shear strength of soil under various loading conditions.
- Determine lateral earth pressures under various loading conditions.
- Assess the flow of water through soils.
- Assess slope stability.
- Develop knowledge of rock material and rock mass properties, and rock slope stability.
- Develop skills in advanced soil tests.

Pre-requisite(s):

CBE2021 – SOIL MECHANICS AND GEOLOGY
**Teaching & Learning Strategies**

During tutorial lessons, review questions will be employed to inspire learners to develop the understanding and application of the subject matters. Course works including laboratory reports, problem solving type mini group project assignments, and quizzes on specific concepts and knowledge at suitable intervals throughout the semester will be used to monitor the progress of the students.

**Full-time and Part-time Mode**
The module consists of 30 hours of formal lecture, 9 hours of tutorial lessons, and 6 hours of laboratory work.

**Assessment Scheme**

| Coursework  | 40% |
| Examination | 60% |
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1 Evaluate the compressibility of soils, and calculate consolidation settlement. (8 hours) | • consolidation processes: primary and secondary  
• one-dimensional consolidation  
• normally-consolidated and over-consolidated soils  
• consolidation settlement |
| 2 Describe and determine the shear strength of soil under various loading conditions. (8 hours) | • Mohr circle of stress  
• Mohr-Coulomb failure criterion  
• shear strength of sands and clays  
• field determination of shear strength |
| 3 Determine lateral earth pressure under various loading conditions. (8 hours) | • development of earth pressures: active, at-rest and passive pressures  
• methods of evaluating earth pressures  
• application of computer software |
| 4 Assess the flow of water through soils. (6 hours) | • two dimensional flow  
• flow net and flow through earth structures  
• seepage stress, pore water pressure distribution and uplift force  
• stability of geotechnical system subject to two-dimensional flow |
<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>5</td>
<td>Assess slope stability.</td>
</tr>
<tr>
<td></td>
<td>(9 hours)</td>
</tr>
</tbody>
</table>
|   | • cut and fill soil slopes  
|   | • stability of soil slopes  
|   | • methods of analysis  
|   | • landslip preventive measures; stabilization and maintenance  
|   | • application of computer software to slope stability analysis. |
| 6 | Develop skills in advanced tests for soil. |
|   | (6 hours) |
|   | • compressibility of soil - consolidation test  
|   | • shear strength of soil – direct shear test  
|   | • shear strength of soil – triaxial test |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ✓
Information Management ✓
Use of Numbers ✓
Creative Thinking ✓
Analytical & Problem Solving ✓

Personal Management Skills
Attitudes & behaviour
Responsibility & Autonomy ✓
Adaptation
Continuous Learning ✓
Work Safety ✓

Teamwork Skills
Working with others ✓
Participation in Projects & Tasks ✓

Reference
Region.
Module Syllabus

Module Title
STRUCTURAL ANALYSIS II

Module Code
CBE3027

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering/Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes
To achieve this module a student shall be able to:
• Calculate deflections of simple structures by Energy Methods.
• Demonstrate the knowledge of the underlying principles of the Method of Consistent Deformation and apply Energy Method to analyze indeterminate beams.
• Apply Moment Distribution Method to analyze indeterminate beams.
• Apply Stiffness Method to analyze indeterminate beams and frames.
• Develop the skills in qualitative analysis of beams and frames.
• Apply and understand the limitations of Portal Method and Cantilever Method for laterally loaded frames.
• Develop skills in using computer software to perform structural analysis.

Pre-requisite(s):
CBE5029 – STRUCTURAL MECHANICS
Teaching & Learning Strategies

Full-time & Part-time Modes
The module consists of 28 hours of formal lectures, 14 hours of tutorial lessons and 3 hours of laboratory session.

Analytical type assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals throughout the semester to monitor the progress of the students.

Assessment Scheme

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Coursework</td>
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<td>Examination</td>
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</tr>
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</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| **1. Calculate deflections of simple structures by Energy Methods.** (5 hours) | - Introduce Energy Methods: real and virtual work.  
- Apply Energy Methods to determine deflections of trusses, beams and framed structures under simple loadings. |
| **2. Demonstrate the knowledge of the underlying principles of the Method of Consistent Deformation and apply Energy Method to analyse indeterminate beams.** (8 hours) | - Acquire the knowledge of determining the degree of statical indeterminacy of trusses, beams and frames.  
- Analyse indeterminate beams by the Method of Consistent Deformation.  
- Determine the deflections/deformations at the locations of redundants by Energy Method / deflection tables.  
- Draw free-body diagrams, shear force diagram and bending moment diagram. |
| **3. Apply Moment Distribution Method to analyse indeterminate beams.** (10 hours) | - Acquire the knowledge of determining the degree of kinematic indeterminacy of beams.  
- Analyse indeterminate beams by the Moment Distribution Method.  
- Introduce the advantages of using modified stiffness.  
- Draw free-body diagrams, shear force diagram and bending moment diagram. |
| **4. Apply Stiffness Method to analyse indeterminate beams and plane frames.** (12 hours) | - Acquire the knowledge of determining the degree of kinematic indeterminacy of beams and frames.  
- Understand the properties of stiffness matrix, concept of nodes and elements, and node numbering consideration.  
- Formulate element stiffness matrices, structure stiffness matrix and load vector.  
- Understand the relationship and the transformation of local and global coordinates systems.  
- Analyse indeterminate beams and plane frames by the Stiffness Method.  
- Draw free-body diagrams, shear force diagram and bending moment diagram. |
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| **5** | Develop the skills in qualitative analysis of beams and frames.  
|   |   |
|   |   |
|   |   |
|   |   |
|   |   |
| **6** | Apply and understand the limitations of Portal Method and Cantilever Method for laterally loaded frames.  
|   |   |
|   |   |
|   |   |
|   |   |
| **7** | Develop skills in using computer software to perform structural analysis.  
|   |   |
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</table>
| | Acquire the basic skills of qualitative analysis of beams and frames under simple loading.  
|   |   |
|   | Produce approximately the shear force diagram, bending moment diagram and the deflected shape of beams and frames under simple loading.  
|   |   |
|   |   |
|   |   |
|   |   |
| | Appreciate the assumptions of Portal Method and Cantilever Method.  
|   |   |
|   | Understand the limitations of Portal Method and Cantilever Method.  
|   |   |
|   | Acquire the knowledge and skills to perform approximate analysis for laterally loaded frames.  
|   |   |
|   |   |
|   |   |
| | Introduce the commonly used computer software for structural analysis.  
|   |   |
|   | Appreciate the required input data.  
|   |   |
|   | Interpret the output results from computer software.  
|   |   |
**Key Skills**
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

**Fundamental Skills**
- Communication, IT and Numeracy ✓
- Information Management ✓
- Use of Numbers ✓
- Creative Thinking □
- Analytical & Problem Solving ✓

**Personal Management Skills**
- Attitudes & behaviour □
- Responsibility & Autonomy ✓
- Adaptation ✓
- Continuous Learning ✓
- Work Safety □

**Teamwork Skills**
- Working with others ✓
- Participation in Projects & Tasks ✓

**Reference**
Module Syllabus

Module Title
STEELWORK DESIGN

Module Code
CBE3028

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering/Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes
To achieve this module a student shall be able to:
• Appreciate limit state design philosophy for structural steelwork design;
• Examine design methods for simple structural steelwork connections;
• Examine design methods for simply supported structural steel beams;
• Examine design methods for structural steel columns in both simple and continuous construction;
• Develop skills in using computer software to do structural steelwork design.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Full-time & Part-time Modes
The module consists of 18 hours of formal lecture and 10 hours of tutorial lessons and 2 hours of laboratory session.

During tutorial lessons, real or simulated case study discussion will be employed to
inspire learners of this module to develop both standard practices and design solutions in meeting general and specific site constraints in designing structural steelwork. Design and analytical type assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals throughout the semester to monitor the progress of the students.

**Assessment Scheme**

Coursework 100%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1 Appreciate limit state design philosophy for structural steelwork design.  (4 hours) | ● Identify different limit states for designing structural steelwork.  
● Understand the general applications of different types of structural steel members.  
● Appreciate the material properties of structural steel.  
● Overview of the commonly used national and international design codes. |
| 2 Examine design methods for simple structural steelwork connections. (8 hours) | ● Overview of different types of bolts and their connections.  
● Overview of different types of welds and their connections.  
● Produce valid designs for bolted and welded tension splice connections.  
● Produce valid designs for beam-column bolted double angle web cleat connections.  
● Produce valid designs for beam-column welded fin plate connections. |
| 3 Examine design methods for simply supported structural steel beams. (10 hours) | ● Appreciate the concept of effective length, lateral and torsional restraints, destabilizing effects of loads.  
● Acquire knowledge of calculating the design loads for different limit states.  
● Produce valid designs for simply supported steel beams: classification of sections, lateral torsional instability, moment capacity, buckling resistance moment, shear capacity, deflection check, web buckling resistance and web bearing resistance. |
| 4 Examine design methods for structural steel columns in both simple and continuous construction. (6 hours) | ● Appreciate the concept of effective length and classification of sections.  
● Produce valid designs for steel columns under axial force only.  
● Produce valid design for simple construction and continuous construction steel columns under combined axial force and moments. |
5. Develop skills in using computer software to do structural steelwork design.

<table>
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<tr>
<th>(2 hours)</th>
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<tbody>
<tr>
<td>● Introduce the commonly used computer software for structural steelwork design.</td>
</tr>
<tr>
<td>● Appreciate the required input data.</td>
</tr>
<tr>
<td>● Interpret the output results from computer software.</td>
</tr>
</tbody>
</table>
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
- Communication, IT and Numeracy
- Information Management
- Use of Numbers
- Creative Thinking
- Analytical & Problem Solving

Personal Management Skills
- Attitudes & behaviour
- Responsibility & Autonomy
- Adaptation
- Continuous Learning
- Work Safety

Teamwork Skills
- Working with others
- Participation in Projects & Tasks

Reference
1. *Code of Practice for the Structural Use of Steel*, (2005), Buildings Department, Hong Kong Government.
Module Syllabus

Module Title
ENVIRONMENT & SUSTAINABILITY

Module Code
CBE3029

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering /Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes
To achieve this module a student shall be able to:
- Identify the short term and long term need of the sustainable development policy for a living society;
- Explain the passive design principles and provisions in building designs in relation to local climatic conditions;
- Identify the new materials and technology available for sustainable construction;
- Describe and apply energy conservation practices in building design;
- Describe and apply water conservation and re-use practices in building design

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Full-time & Part-time Modes
The module consists of 5 hours of formal lecture, and 25 hours of tutorial lessons.

Formal lectures will inspire students to start “thinking green” at early stages of their
civil engineering studies. The lectures focus on principles and current practices in sustainable design and construction. A project-based learning approach will be employed for each individual student. The project could be a building design or any similar type of infrastructure which requires students to get general and project specific awareness of environmental constraints and added-value considerations from early planning, design, construction, and subsequent operation stages. Students will innovate their own design schemes and integrate different materials and technologies to make appropriate critical decisions for a final project proposal. It is expected that module delivery will adopt a project-based learning approach with the guidance of the module lecturer. The scope of the project, document submission, different milestones at various stages and final presentation will be agreed before the start of the project assignment. The students are encouraged to visit web-based resources and conventional literature throughout the learning process.

**Assessment Scheme**

Coursework 100%
### Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
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</thead>
<tbody>
<tr>
<td><strong>1.</strong> Identify the short term and long term need of the sustainable development policy for a living society. (8 hours)</td>
<td>● Establish the definition of sustainable development, concepts of needs and limits in the context of sustainable development; ● Describe the balancing act between society, the environment and the economy; ● Have an overview of urban planning and sustainable development in Hong Kong; ● Discuss the recent policy changes and building regulations in driving housing sector sustainability and future trends.</td>
</tr>
<tr>
<td><strong>2.</strong> Explain the passive design principles and provisions in building designs in relation to local climatic conditions. (6 hours)</td>
<td>● Describe the commonly adopted passive design principles used in highly density and low density residential buildings; ● Acquire a knowledge local climatic conditions in relation to passive design applications.</td>
</tr>
<tr>
<td><strong>3.</strong> Identify the new materials and technology available for sustainable construction. (7 hours)</td>
<td>● Get to know different materials and technology available in the market for sustainable construction; ● Describe the green features, technical specifications of construction materials, furniture and appliances, and discuss their pros and cons before selection; ● Consult appropriate industrial bodies, government departments including web sources for proven performance of the sustainable design and construction.</td>
</tr>
<tr>
<td><strong>4.</strong> Describe and apply energy conservation practices in building design. (5 hours)</td>
<td>● Define embodied energy and operational energy; ● Prepare a bill of embodied energy and estimate the cumulative embodied energy for a whole building unit; ● Describe and summarize energy smart technologies and appliances.</td>
</tr>
<tr>
<td><strong>5.</strong> Describe and apply water conservation and re-use practices in building design (4 hours)</td>
<td>● Define potable water conservation and wastewater recycling; ● Describe water smart strategies, technologies and appliances;</td>
</tr>
</tbody>
</table>
**Key Skills**
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

**Fundamental Skills**
Communication, IT and Numeracy ✓
Information Management ✓
Use of Numbers □
Creative Thinking ✓
Analytical & Problem Solving ✓

**Personal Management Skills**
Attitudes & behaviour ✓
Responsibility & Autonomy ✓
Adaptation ✓
Continuous Learning ✓
Work Safety □

**Teamwork Skills**
Working with others □
Participation in Projects & Tasks ✓

**Reference**
Module Syllabus

Module Title
PROJECT I

Module Code
CBE3030

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering /Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes

To achieve this module a student shall be able to:
• Select and determine the scope of study and determine methods and procedures;
• Carry out the study according to the defined specifications, procedures and the time frame;
• Develop and apply engineering skills in identifying and formulating problems under the agreed scope of work, and decide the most viable solution among all feasible alternatives for detail study and/or investigation in the next stage;
• Evaluate and present interim and final findings of the study through a full preliminary investigation/design proposal.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Students are required to work independently but under regular monitoring and
guidance provided by designated supervisor. This module develops each individual student’s ability to record, and present activities; to collect, analyse and interpret data; to find and use proper sources of information for the subsequent design and/or investigation work; and to develop a preliminary solution to the problem under study. All activities and progress attained will be recorded in their individual log books for his and supervisor’s regular checking. Throughout the study, the student will apply the skills, knowledge and understanding acquired and understood in other modules previously and/or currently being studied. It is expected each student will achieve the level of competence expected of professional project personnel upon completion of this module.

Full-time Mode
The module consists of 30 hours of guided tutorial meetings between student and the assigned project supervisor.

Part-time Mode
The module consists of 15 hours of guided tutorial meetings between student and the assigned project supervisor, and 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

Assessment Scheme
Coursework 100%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| **1.** Select and determine the scope of study and determine methods and procedures | ● Establish with project supervisor the scope of work, meeting schedules, and the progress and final reports;  
● Agree with the project supervisor the necessary technical and non-technical specifications to be met;  
● Identify potential internal/external constraints and resources requirements of the study; |
| **2.** Carry out the study according to the defined specifications, procedures and the time frame | ● Produce a working plan of project activities including the intended interim milestones;  
● Provide evidences of work record;  
● Submit self-assessment report of work progress and performance against the agreed work schedule and assessment criteria; |
| **3.** Develop and apply engineering skills in identifying and formulating problems under the agreed scope of work, and decide the most viable solution among all feasible alternatives for detail study and/or investigation in the next stage | ● Agree with project supervisor the investigation/design brief, approach and methodology for the study undertaken;  
● Carry out the design and/or investigation for the work under study;  
● Formulate alternative solutions and carry out the cost-benefit analysis for the final preliminary design/investigation proposal; |
| **4.** Evaluate and present interim and final findings of the study through a full preliminary investigation/design proposal | ● Submit for evaluation interim self-assessment and progress reports  
● Submit and present for evaluation feasibility report and/or preliminary design scheme/investigation report;  
● Submit and present for evaluation full preliminary investigation/design report. |
**Key Skills**

The following skills are expected to be demonstrated by the students and will form as part of their coursework. The level and description of generic skills required shall be referred to the Section XX of the Course Scheme.

### Fundamental Skills

<table>
<thead>
<tr>
<th>Skill</th>
<th>Requirement</th>
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</thead>
<tbody>
<tr>
<td>Communication, IT and Numeracy</td>
<td>✓</td>
</tr>
<tr>
<td>Information Management</td>
<td>✓</td>
</tr>
<tr>
<td>Use of Numbers</td>
<td>☐</td>
</tr>
<tr>
<td>Creative Thinking</td>
<td>✓</td>
</tr>
<tr>
<td>Analytical &amp; Problem Solving</td>
<td>✓</td>
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</tbody>
</table>

### Personal Management Skills

<table>
<thead>
<tr>
<th>Skill</th>
<th>Requirement</th>
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<tbody>
<tr>
<td>Attitudes &amp; behaviour</td>
<td>✓</td>
</tr>
<tr>
<td>Responsibility &amp; Autonomy</td>
<td>✓</td>
</tr>
<tr>
<td>Adaptation</td>
<td>✓</td>
</tr>
<tr>
<td>Continuous Learning</td>
<td>✓</td>
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<tr>
<td>Work Safety</td>
<td>☐</td>
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### Teamwork Skills

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<tr>
<th>Skill</th>
<th>Requirement</th>
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<tbody>
<tr>
<td>Working with others</td>
<td>☐</td>
</tr>
<tr>
<td>Participation in Projects &amp; Tasks</td>
<td>✓</td>
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</tbody>
</table>
Module Syllabus

Module Title
FOUNDATION ENGINEERING

Module Code
CBE3031

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering/Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes
To achieve this module a student shall be able to:
- Demonstrate the knowledge of the underlying principles of foundation design.
- Demonstrate the knowledge of the underlying principles and methods of site investigation.
- Determine stresses in subsoil induced by surface and subsurface loadings.
- Design shallow foundations and assess the associated settlement.
- Design deep foundation and assess the associated settlement.
- Carry out structural design of foundation.

Pre-requisite(s):
CBE2021 – SOIL ENGINEERING AND GEOLOGY

Teaching & Learning Strategies
During tutorial lessons, review questions will be employed to inspire learners to develop the understanding and application of the subject matters. Course works including problem solving and analytical type assignments and mini project assignments, and quizzes on specific concepts and knowledge at suitable intervals throughout the semester will be used to monitor the progress of the students.
Full-time Mode
The module consists of 30 hours of formal lecture, 9 hours of tutorial lessons, and 6 hours of practical work.

Part-time Mode
The module consists of 20 hours of formal lecture, 4 hours of tutorial lessons, 6 hours of practical work and 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

Assessment Scheme

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<tr>
<th>Coursework</th>
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<tr>
<td>Examination</td>
<td>60%</td>
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Content

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<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
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</thead>
</table>
| 1 Demonstrate the knowledge of the underlying principles of foundation design.   | ● essential considerations in the design and construction of foundations  
● design approach and philosophy  
● common types of shallow and deep foundations.                                        |
|                                                                                 | (2 Hours)                                                                                                                                              |
| 2 Demonstrate the knowledge of the underlying principles and methods of site investigation. | ● objectives and extent of site investigation  
● methods of ground exploration and sampling  
● in-situ measurement and testing of soil and rock  
● design of laboratory testing programme  
● groundwater investigation and monitoring  
● ground movement monitoring  
● report writing.                                                                            |
|                                                                                 | (4 Hours)                                                                                                                                              |
| 3 Determine stresses in subsoil induced by surface and subsurface loadings.      | ● stress distribution under different shapes of loaded areas  
● increase of vertical and horizontal stresses under foundations  
● graphical solutions  
● computer software application.                                                           |
|                                                                                 | (6 hours)                                                                                                                                              |
| 4 Design shallow foundation and assess the associated settlement.                 | ● definition, types and behaviour of shallow foundations  
● ultimate bearing capacity  
● safe and allowable bearing pressures  
● immediate and consolidate settlements of shallow foundations  
● differential and tolerable settlements  
● effects of ground water  
● application of computer software in analysing shallow foundation                       |
<p>|                                                                                 | (12 hours)                                                                                                                                              |</p>
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| 5 | Design deep foundation and assess the associated settlement. | ● in-situ tests for shallow foundations  
(12 hours)  
● definition of deep foundations  
● common types of driven piles, bored piles, caissons  
● classification of piles  
● point bearing capacity and frictional resistance  
● ultimate capacity of single pile and pile group  
● pile driving formula  
● negative skin friction  
● pullout capacity of pile  
● settlement of piles and pile groups  
● testing of piles  
● application of computer software. |
| 6 | Carry out the structural design of foundation. | ● structural design of shallow footing: single spread footing, raft footing, strap beam  
(9 hours)  
● pile shaft, pile cap and capping beam design |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
- Communication, IT and Numeracy ☑
- Information Management ☐
- Use of Numbers ☑
- Creative Thinking ☑
- Analytical & Problem Solving ☑

Personal Management Skills
- Attitudes & behaviour ☐
- Responsibility & Autonomy ☑
- Adaptation ☑
- Continuous Learning ☑
- Work Safety ☐

Teamwork Skills
- Working with others ☑
- Participation in Projects & Tasks ☑

Reference
Module Syllabus

Module Title

STRUCTURES AND TALL BUILDING

Module Code

CBE3032

Class Contact Hours

45 hours

Module Value

3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering/Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes

To achieve this module a student shall be able to:
• Demonstrate an understanding of the underlying concepts in structural planning and tall building design.
• Explore and apply the design principles in two way slab and ribbed slab design for reinforced concrete structure;
• Explore and apply the design principles in simple prestressed concrete beam;
• Demonstrate an understanding of the design of water retaining structures;
• Employ simple theory of structural dynamics in seismic design.
• Develop skills in computer applications in tall building structures

Pre-requisite(s):

Nil

Teaching & Learning Strategies

During tutorial lessons, real or simulated case study discussion will be employed to inspire learners of this module to develop both standard practices and design solutions in meeting general and specific site constraints in designing tall building. Design and analytical type assignments and quizzes of specific concepts and knowledge under

Hong Kong Institute of Vocational Education
Department of Construction
this module will be held at suitable intervals throughout the semester to monitor the progress of the students.

**Full-time Mode**
The module consists of 30 hours of formal lecture, 10 hours of tutorial lessons and 5 hours of laboratory work.

**Part-time Mode**
The module consists of 20 hours of formal lecture, 5 hours of tutorial lessons, 5 hours of laboratory work and 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

**Assessment Scheme**

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<tbody>
<tr>
<td>Coursework</td>
<td>40%</td>
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<tr>
<td>Examination</td>
<td>60%</td>
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</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1. Demonstrate an understanding of the underlying concepts in structural planning and tall building design. (5 hours) | - Identify different structural forms of tall building.  
- Understand the vertical and lateral load transfer of rigid frame, braced frame, shear wall, tube structure and suspended structure.  
- Understand the function of transfer structure and load path. |
| 2. Explore and apply the design principles in two way slab and ribbed slab design for reinforced concrete structure. (9 hours) | - Overview of different forms of slab system.  
- Appreciate the design procedures of two way slab and ribbed slab.  
- Ascertain self-weight, dead load and imposed loads acting on floor slab and carry out the structural design.  
- Carry out design calculation of flexural reinforcement, shear reinforcement and check deflection using span effective depth approach. |
| 3. Explore and apply the design principles in simple prestressed concrete beam. (13 hours) | - Understand the basic theory of prestressed concrete structures and pre- and post-tensioning systems.  
- Appreciate the design procedures of simple prestressed beam to comply with codified stress limits.  
- Appreciate the procedures of deciding tendon profile and prestress force.  
- Identify different types of prestress loss and calculate prestress loss due to friction, unintentional variation of profile, elastic shortening and anchorage draw in.  
- Carry out structural check for moment capacity of a prestressed concrete section  
- Appreciate the procedure of calculating shear resistance and deflection check |
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</table>
| 4 | Demonstrate an understanding of the design of water retaining structures. (11 hours) | - Understand the design concepts and steel requirement for water retaining structures.  
- Appreciate the design procedures for crack width calculation due to flexure and direct tension.  
- Appreciate the design procedures for thermal crack width calculation due to creep and shrinkage.  
- Realize different types of waterproofing construction and joints. |
| 5 | Employ simple theory of structural dynamics in seismic design. (5 hours) | - Understand lumped mass idealization.  
- Appreciate simple and multi-degree of freedom system of vibration.  
- Appreciate free and forced vibration, resonance and damping effects.  
- Carry out simple analysis of vibration system to determine fundamental frequencies and mode shape for seismic design. |
| 6 | Develop skills in computer applications in tall building structures. (2 hours) | - Appreciate some common engineering software for use in tall building design and analysis.  
- Understand the use of engineering software in tall building analysis.  
- Interpret output results from computer software. |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
- Communication, IT and Numeracy
- Information Management
- Use of Numbers
- Creative Thinking
- Analytical & Problem Solving

Personal Management Skills
- Attitudes & behaviour
- Responsibility & Autonomy
- Adaptation
- Continuous Learning
- Work Safety

Teamwork Skills
- Working with others
- Participation in Projects & Tasks

Reference
Module Syllabus

Module Title
TEMPORARY WORKS

Module Code
CBE3033

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
55901  Higher Diploma in Civil Engineering/Level 4
53301F/55901F  Higher Diploma in Civil Engineering /Level 4

Learning Outcomes

To achieve this module a student shall be able to:
• Demonstrate the knowledge of roles of temporary works in execution of permanent works and the associated contractual and legal constraints and requirements throughout various planning, design, construction and dismantling stages in construction works;
• Explore and apply the design principles in formwork design for reinforced concrete structure construction including the related erection arrangement and special details for construction;
• Explore and apply the design principles in access scaffolding and falsework construction and the related erection details;
• Demonstrate the knowledge of the different types of cofferdam in civil engineering works and carry out preliminary design for steel sheet piling to support a vertical cut;
• Demonstrate the knowledge of temporary works in shoring existing structures and trench excavation works and the related possible hazards;
• Prepare and work out planning of traffic signing, lighting and guarding of roadworks on existing carriageway.

Pre-requisite(s):
Nil

**Teaching & Learning Strategies**

During tutorial lessons, real or simulated case study discussion will be employed to inspire learners of this module to develop both standard practices and design solutions in meeting general and specific site constraints in designing temporary works. Design and analytical type assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals throughout the semester to monitor the progress of the students.

**Full-time Mode**
The module consists of 30 hours of formal lecture and 15 hours of tutorial lessons.

**Part-time Mode**
The module consists of 20 hours of formal lecture, 10 hours of tutorial lessons and 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

**Assessment Scheme**

- Coursework 40%
- Examination 60%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1 Demonstrate the knowledge of the roles of temporary works in execution of permanent works and the associated contractual and legal constraints and requirements throughout various planning, design, construction and dismantling stages in construction works. (5 hours) | ● Identify different types of temporary works in construction sites.  
● Interpret the role of temporary works under conditions of construction contracts.  
● Understand the duties of a temporary works designer under the common law.  
● Differentiate between standard and design solution options and appreciate their pros and cons in designing temporary works. |
| 2 Explore and apply the design principles in formwork design for reinforced concrete structure construction including the related erection arrangement and special details for construction. (10 hours) | ● Overview common formwork systems and details for construction of reinforced concrete slab, beam, column and wall elements including combined formwork and falsework solutions, and slip-form construction.  
● Understand quality, safety, and economy requirements in formwork design and construction.  
● Appreciate the formwork checking, caring and striking procedures.  
● Ascertain self-weight, concrete pressure and imposed loads acting on formwork components and carry out the structural design.  
● Carry out stability calculation for formwork system during concreting including the effects of wind, and operatives and their plants. |
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Explore and apply the design and construction principles in access scaffolding and falsework works and the related erection details. &lt;br&gt; (10 hours)</td>
</tr>
</tbody>
</table>
|         | ● Acquire a knowledge of terminology in defining a general scaffolding and falsework layout and their components.  
|         | ● Understand the basic features of different types of scaffolds and falsework structures.  
|         | ● Compare the pros and cons in using standard tube & fittings scaffold and some common proprietary scaffolds.  
|         | ● Compare the pros and cons in using bamboo access scaffolds and metal access scaffolds.  
|         | ● Design an access scaffold for a multistory building.  
|         | ● Carry out a complete structural checking for a metal falsework structure including diagonal bracing, lateral and foundation stability.  
|         | ● Prepare a check list for scaffolding requirements and the related provisions allowed in scaffolding contracts.  
|         | ● Explore relevant site safety regulations for scaffolding and falsework construction under the Law of Hong Kong. |
| 4       | Demonstrate the knowledge of the different types of cofferdam in civil engineering works and carryout the preliminary design for steel sheet piling to support a vertical cut. <br> (10 hours) |
|         | ● Understand the importance and means of ground water control in relation to its effects in cofferdam construction.  
|         | ● Appreciate internally and externally supported cofferdams to suit excavation needs and its effects to the neighborhood.  
|         | ● Realize different important construction and support details for steel sheet piling cofferdam.  
|         | ● Understand various successive processes in cofferdam construction.  
|         | ● Recollect different causes which lead to cofferdam failures.  
|         | ● Analyse earth pressure to calculate prop load and design the embedded length of steel sheet piles to be driven for a vertical cut. |
| 5 | Demonstrate the knowledge of temporary works in shoring existing structures and trench excavation works and the related possible hazards (5 hours) | | Identify damages to existing underground utilities and adjacent property structures and safety hazards in trench and bulk excavation works and implement necessary preventive measures. | | Identify damages to existing structures and safety hazards in trench excavation works. | | Define shoring support to existing structures and trenching works. | | Select different shoring and trenching support materials and methods available from the construction market to suit project needs. | | Distinguish raking flying and dead shoring structures in respect of their layout configuration, construction details and shoring applications. | | Distinguish sheeting, waling and struts method, soldier piling method and other proprietary support systems available in trenching works and their respective pros and cons. | | Explore relevant site safety regulations for shoring and excavation works under the Law of Hong Kong. | | Analyse shoring, trench support structures. |
| 6 | Prepare and work out planning of traffic signing, lighting and guarding of roadworks on existing carriageway. (5 hours) | | Understand the general warning, regulatory and informatory signs for use at road works. | | Recollect the standard practices in traffic controlling, lighting, signing and guarding equipments employed for construction works on carriageway and footpath. | | Prepare a layout plan and method statement for road works in compliance with the code of practice issued by the local highways authority. |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ✓
Information Management ✓
Use of Numbers □
Creative Thinking ✓
Analytical & Problem Solving ✓

Personal Management Skills
Attitudes & behaviour □
Responsibility & Autonomy ✓
Adaptation ✓
Continuous Learning ✓
Work Safety □

Teamwork Skills
Working with others ✓
Participation in Projects & Tasks ✓

Reference
6. Construction Sites (Safety) Regulations, CAP 59, Law of Hong Kong, Hong Kong Government
7. Guide to the Factories and Industrial Undertakings (Safety Officers and safety Supervisors) Regulations, (1990), Labour Department, Hong Kong Government.
Module Syllabus

Module Title
HIGHWAYS AND TRAFFIC ENGINEERING

Module Code
CBE3034

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
55901  Higher Diploma in Civil Engineering/Level 4
53301F/55901F  Higher Diploma in Civil Engineering/Level 4

Learning Outcomes
To achieve this module a student shall be able to:

• Demonstrate the knowledge of the underlying principles of geometric design of highways.
• Differentiate different types of pavement and the methods of design and maintenance.
• Illustrate the importance and practice of drainage provisions for highways.
• Aware of the different modes of transportation and the principles of modelling in traffic forecast.
• Demonstrate the knowledge of the elements of traffic analysis and highway capacity analysis
• Apply techniques in junction design

Pre-requisite(s):
Nil

Teaching & Learning Strategies
During tutorial lessons, real or simulated case study discussion will be employed to inspire learners of this module to develop their understanding in highway design and traffic analysis.
traffic analysis. Design and analytical type assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals throughout the semester to monitor the progress of the students.

**Full-time Mode**
The module consists of 30 hours of formal lecture and 15 hours of tutorial lessons.

**Part-time Mode**
The module consists of 20 hours of formal lecture, 10 hours of tutorial lessons and 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

**Assessment Scheme**

| Coursework | 40% |
| Examination | 60% |
### Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1. Demonstrate the knowledge of the underlying principles of geometric design of highways. | • Classification and standard cross-sections  
• Sight distances and superelevation  
• Horizontal and vertical alignment  
• Design standards in Hong Kong SAR |
|                                                                                 | (9 hours)                                                                            |
| 2. Differentiate different types of pavement and the methods of design and maintenance. | • Flexible and rigid pavement  
• Design Practice in Hong Kong SAR of flexible and rigid pavement  
• Pavement defects and standard methods of repair |
|                                                                                 | (6 hours)                                                                            |
| 3. Illustrate the importance and practice of drainage provisions for highways. | • Standard provision for surface and sub-soil drainage  
• General principles in drainage design of surface drainage and sub-soil drainage  
• Road drainage practice in Hong Kong SAR |
|                                                                                 | (6 hours)                                                                            |
| 4. Aware of the different modes of transportation and the principles of modelling in traffic forecast. | • Different mode of transportation and their characters  
• Sequential traffic forecast modelling including trip generation and distribution, modal split and network assignment techniques  
• Introduction to Hong Kong SAR Comprehensive Transport Study |
<p>|                                                                                 | (9 hours)                                                                            |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>5.</td>
<td>Demonstrate the knowledge of the elements of traffic analysis and highway capacity analysis. (9 hours)</td>
</tr>
</tbody>
</table>
|   | - Macroscopic and microscopic traffic stream models  
|   | - Car-following Theory. Shock Waves. Queuing theories  
|   | - Highway capacity analysis and level of services for interrupted and uninterrupted flow facilities  
|   | - Highway route choice  
| 6. | Apply the techniques in junction design. (6 hours) |
|   | - Signalised junctions  
|   | - Non-signalised junctions: priority junctions and roundabouts  
|   | Define ductility, toughness, elasticity, electrical and thermal conductivity, durability for engineering materials. |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ✓
Information Management ✓
Use of Numbers ✓
Creative Thinking ✓
Analytical & Problem Solving ✓

Personal Management Skills
Attitudes & behaviour □
Responsibility & Autonomy ✓
Adaptation ✓
Continuous Learning ✓
Work Safety □

Teamwork Skills
Working with others ✓
Participation in Projects & Tasks ✓

Reference
2. *Transport, Planning & Design Manuals*, Transport Department, Hong Kong SAR.
3. *Road Note 6, Road Pavement Drainage*, (1994), Highways Department, Hong Kong SAR.
4. *Guidance Notes on Pavement Design*, (1993), Highways Department, Hong Kong SAR.
6. *General Specifications for Civil Engineering Works*, (1992), Hong Kong SAR.
7. *TRRL Laboratory Reports (TRRL).*
10. *Hong Kong Comprehensive Transport Study (CTS-2 & 3)*, Transport Department, Hong Kong SAR
Module Syllabus

Module Title
PUBLIC HEALTH ENGINEERING

Module Code
CBE3035

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering /Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes

To achieve this module a student shall be able to:
• Demonstrate the knowledge of water quality management, water treatment, water supply and distribution; and perform simple design.
• Demonstrate the knowledge of underlying principles of wastewater treatment; and perform simple design.
• Demonstrate the knowledge of air and noise pollution for public health, their measurement and control.

Pre-requisite(s):
CBE2029 – ENVIRONMENTAL ENGINEERING

Exemption Criteria
Nil

Teaching & Learning Strategies

There will be design assignments and class quizzes and at suitable intervals.
throughout the course to monitor the progress of the students.

**Full-time Mode**
The module consists of 30 hours of formal lecture, 9 hours of tutorial lessons, and 6 hours of laboratory work.

**Part-time Mode**
The module consists of 20 hours of formal lecture, 4 hours of tutorial lessons, 6 hours of laboratory work and 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

**Assessment Scheme**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>40%</td>
</tr>
<tr>
<td>Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
</table>
| 1. Demonstrate the knowledge of water quality management, water treatment, water supply and distribution; and perform simple design. (23 hours) | ● Understand the water quality requirement and local standard.  
● Study water purification processes in natural systems and the response of streams to biodegradable organic waste.  
● Acquire the knowledge of individual water treatment units including screening, flocculation and coagulation, sedimentation, filtration, disinfection, softening and aeration.  
● Design of some simple water treatment units.  
● Understand the water consumption, water supply and distribution system. |
| 2. Demonstrate the knowledge of the underlying principles of wastewater treatment, and perform simple design. (10 hours) | ● Understand the sewerage system and required local standard.  
● Study of individual wastewater treatment units such as grit removal, sedimentation, activated sludge process, sludge treatment and disposal. Design of some simple wastewater treatment units. |
| 3. Demonstrate the knowledge of air pollution, its measurement and control. (6 hours) | ● Acquire the knowledge of air pollution and local regulations.  
● Understand the influence of meteorological phenomena on air quality.  
● Investigate the engineered systems for air pollution control. |
| 4. Demonstrate the knowledge of noise pollution, its measurement and control. (6 hours) | ● Acquire the knowledge of noise pollution and local regulations.  
● Predict the noise levels generated by road traffic and construction sites.  
● Investigate engineered methods for noise pollution control. |
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ☑
Information Management ☑
Use of Numbers □
Creative Thinking ☑
Analytical & Problem Solving ☑

Personal Management Skills
Attitudes & behaviour □
Responsibility & Autonomy ☑
Adaptation ☑
Continuous Learning ☑
Work Safety □

Teamwork Skills
Working with others ☑
Participation in Projects & Tasks ☑

Reference
4. Environment Hong Kong, (1998), Environmental Protection Department, Hong Kong Government.
Module Syllabus

Module Title
CONSTRUCTION MANAGEMENT

Module Code
CBE3036

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering/Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes
To achieve this module a student shall be able to:

• Demonstrate the knowledge of the underlying principles of site management.
• Apply fundamental techniques in resources planning and management for construction sites.
• Demonstrate the knowledge of site practice for Communication and Records;
• Illustrate the fundamental knowledge in Site Organisation and Layout.
• Demonstrate an understanding of Construction Planning in relation to Selection of Plant, Methods of Construction and Method Statement.
• Differentiate the different approaches of financial control adopted in construction industry.

Pre-requisite(s):
Nil

Teaching & Learning Strategies
During tutorial lessons, real or simulated case study discussion will be employed to
inspire learners of this module to develop both theoretical and practical solutions in meeting general and specific site constraints in setting up a construction site of project. Theoretical and practical type assignments and quizzes of specific concepts and knowledge under this module will be held at suitable intervals throughout the semester to monitor the progress of the students.

**Full-time Mode**
The module consists of 30 hours of formal lecture and 15 hours of tutorial lessons.

**Part-time Mode**
The module consists of 20 hours of formal lecture, 10 hours of tutorial lessons and 15 hours of guided study hours.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

**Assessment Scheme**

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<tr>
<th>Coursework</th>
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<tbody>
<tr>
<td>Examination</td>
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</table>
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
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</tr>
</thead>
</table>
| **1.** Demonstrate the knowledge of the underlying principles of site management. | ● Acquire basic knowledge of site management processes;  
● Identify the role and skill requirement for the project management;  
● Understand the decision making processes;  
● Carry out calculation of decision analysis. |
| *(8 hours)*                                                                      |                                                                                                                                                     |
| **2.** Apply fundamental techniques in resources planning and management for construction sites. | ● Acquire knowledge of planning for required principal resources.  
● Identify the methods for establishing quality and quantity of materials.  
● Understand the storing, handling and protection of materials; wastage and stock inventory & control.  
● Carry out calculation of stock inventory and control  
● Identify the construction plants and equipment: planning, utilization, servicing and training of operatives. |
| *(10 hours)*                                                                     |                                                                                                                                                     |
| **3.** Demonstrate the knowledge of site practice for Communication and Records.   | ● Appreciate effective systems of communication and working relationships on site, with head office, with external bodies and local authorities.  
● Realise site instruction, site meeting; site records and documents.  
● Identify systems for handling working drawings and as-built drawing.  
● Appreciate recording written and verbal site instructions, progress of work and delays.  
● Understand record keeping and types of records. |
| *(8 hours)*                                                                      |                                                                                                                                                     |
4. Illustrate the fundamental knowledge in Site Organisation and Layout.

   (7 hours)

   - Acquire effective site organization and layout.
   - Identify site boundaries.
   - Understand investigation of site requirements.
   - Realise locating temporary buildings, workshops, materials storage, plants and equipment.

5. Demonstrate an understanding of Construction Planning in relation to Selection of Plant, Methods of Construction and Method Statement.

   (4 hours)

   - Acquire selection of plant and methods of construction
   - Understand method statements

6. Differentiate the different approaches of financial control adopted in construction industry.

   (8 hours)

   - Appreciate the importance of budgetary control;
   - Carry out calculation of working capital and cash flow; cumulative expenditure and income;
   - Realise objectives and methods of cost control;
   - Understand cost data and time allocation;
   - Identify effective cost control;
   - Understand types of costs and break-even point.
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
- Communication, IT and Numeracy
- Information Management
- Use of Numbers
- Creative Thinking
- Analytical & Problem Solving

Personal Management Skills
- Attitudes & behaviour
- Responsibility & Autonomy
- Adaptation
- Continuous Learning
- Work Safety

Teamwork Skills
- Working with others
- Participation in Projects & Tasks

Reference
Module Syllabus

Module Title
INFRASTRUCTURE PLANNING AND MANAGEMENT

Module Code
CBE3037

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering/Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes
The aims of this module are to introduce to the students different types of infrastructure and a macroscopic view of the planning and management processes in the provision and utilization of different types of infrastructure. To achieve this, a student shall be able to:
• Explain the differences between various types of infrastructure and the responsible agencies and organizations;
• Discuss the importance of infrastructure to the local and regional economic development;
• Demonstrate an understanding of the planning procedures & techniques in the acquisition and provision for different types of infrastructure;
• Demonstrate an understanding of the implementation process and methods; and
• Be familiar with the operational and maintenance management systems and tools for different types of infrastructure.

Pre-requisite(s):
Nil
Teaching & Learning Strategies

During tutorial lessons, real or simulated case study discussion will be employed to inspire learners of this module to develop a general understanding of the subject and the various processes covered in this module.

Full-time Mode
The module consists of 30 hours of formal lecture and 15 hours of tutorial lessons.

Part-time Mode
The module consists of 20 hours of formal lecture, 10 hours of tutorial lessons and 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

Assessment Scheme

<table>
<thead>
<tr>
<th>Coursework</th>
<th>40%</th>
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</thead>
<tbody>
<tr>
<td>Examination</td>
<td>60%</td>
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</tbody>
</table>
### Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Explain the differences between various types of infrastructure and the responsible agencies and organizations</td>
<td>● Public Utilities – energy, telecommunications, gas&lt;br&gt;● Public Works - water, waste management&lt;br&gt;● Transportation – roads, transit, rail, ports, airports&lt;br&gt;● Agencies and organizations responsible for different infrastructure and their interdependencies&lt;br&gt;● Strategy on infrastructure of HKSAR and the inter-relationship between the government and the private organizations</td>
</tr>
<tr>
<td>2. Discuss the importance of infrastructure to the local and regional economic development</td>
<td>● Contributions of various types of infrastructure to economic growth&lt;br&gt;● Benefits to individuals and the community&lt;br&gt;● Land use, growth and development and infrastructure&lt;br&gt;● Roles of infrastructure in sustainable development</td>
</tr>
<tr>
<td>3. Demonstrate an understanding of the planning procedures &amp; techniques in the acquisition and provision for different types of infrastructure</td>
<td>● Planning procedures, Urban planning policies and legislation in HKSAR&lt;br&gt;● Problem diagnosis and goal setting&lt;br&gt;● Demand forecasts techniques and reliability&lt;br&gt;● Design of alternatives&lt;br&gt;● Evaluation – socio-economic, environmental and financial</td>
</tr>
<tr>
<td>4. Demonstrate an understanding of the implementation process and methods</td>
<td>● Funding (public, private, international, joint ventures)&lt;br&gt;● Legal process – gazette, land acquisition and ordinances&lt;br&gt;● Design &amp; construction (value engineering, project management, consultants and contractors)</td>
</tr>
</tbody>
</table>
5. Be familiar with the operational and maintenance management systems and tools for different types of infrastructure (15 hours)

- Organizational structures of agencies and government departments for different types of infrastructure
- Various forms of Operation and Maintenance management structures for different types of infrastructure
- Different management systems and tools—asset management, risk management, needs assessment, whole of life-cycle cost analysis, risk-cost-benefits analysis, condition assessment, performance monitoring and level of services, total quality management.
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

<table>
<thead>
<tr>
<th>Fundamental Skills</th>
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</thead>
<tbody>
<tr>
<td>Communication, IT and Numeracy</td>
<td>✓</td>
</tr>
<tr>
<td>Information Management</td>
<td>☐</td>
</tr>
<tr>
<td>Use of Numbers</td>
<td>✓</td>
</tr>
<tr>
<td>Creative Thinking</td>
<td>✓</td>
</tr>
<tr>
<td>Analytical &amp; Problem Solving</td>
<td>✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personal Management Skills</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes &amp; behaviour</td>
<td>☐</td>
</tr>
<tr>
<td>Responsibility &amp; Autonomy</td>
<td>✓</td>
</tr>
<tr>
<td>Adaptation</td>
<td>✓</td>
</tr>
<tr>
<td>Continuous Learning</td>
<td>✓</td>
</tr>
<tr>
<td>Work Safety</td>
<td>☐</td>
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<table>
<thead>
<tr>
<th>Teamwork Skills</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Working with others</td>
<td>☐</td>
</tr>
<tr>
<td>Participation in Projects &amp; Tasks</td>
<td>☐</td>
</tr>
</tbody>
</table>

Reference
Module Syllabus

Module Title
GEOTECHNICAL ENGINEERING PRACTICE

Module Code
CBE3038

Class Contact Hours
45 hours

Module Value
3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering/Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes

To achieve this module a student shall be able to:

• Design of rigid and flexible earth retaining structures.
• Describe the components, method of installation and testing of soil nails.
• Perform preliminary design of soil-nails reinforced soil slopes and earth retaining structures.
• Demonstrate the use of soil improvement and ground modification, and carry out preliminary design.
• Develop an understanding of the index and engineering properties of rock materials and rock masses, their measurement and classification.
• Collect and present rock survey data for use in related rock engineering problems.
• Demonstrate the principles and assessment methods of rock slope stability.
• Develop skills in rock index properties tests.

Pre-requisite(s):
CBE2021 – SOIL MECHANICS AND GEOLOGY
Teaching & Learning Strategies

During tutorial lessons, review questions will be employed to inspire learners to develop the understanding and application of the subject matters. Courseworks include problem solving type questions and mini group project, and quizzes on specific concepts and knowledge at suitable intervals throughout the semester will be used to monitor the progress of the students.

Full-time Mode
The module consists of 30 hours of formal lecture, 9 hours of tutorial lessons and 6 hours of laboratory work.

Part-time Mode
The module consists of 20 hours of formal lecture, 4 hours of tutorial lessons, 6 hours of laboratory work, and 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

Assessment Scheme

| Coursework | 40% |
| Examination | 60% |
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Design rigid and flexible earth retaining structures.</strong></td>
<td>● types of retaining wall</td>
</tr>
<tr>
<td></td>
<td>● rigid soil retaining structure systems: design and application</td>
</tr>
<tr>
<td></td>
<td>● flexible soil retaining structure systems: design and application</td>
</tr>
<tr>
<td></td>
<td>● maintenance of soil retaining structure</td>
</tr>
<tr>
<td>(8 Hours)</td>
<td></td>
</tr>
<tr>
<td><strong>2 Describe the components, method of installation and testing of soil nails.</strong></td>
<td>● application of soil nails</td>
</tr>
<tr>
<td>Design soil-nails reinforced soil slopes and earth retaining structures</td>
<td>● soil nail components and installation</td>
</tr>
<tr>
<td></td>
<td>● design of soil nails</td>
</tr>
<tr>
<td></td>
<td>● testing of soil nails</td>
</tr>
<tr>
<td>(8 Hours)</td>
<td></td>
</tr>
<tr>
<td><strong>3 Demonstrate the use of soil improvement and ground modification, and carry out</strong></td>
<td>● Vibroflotation technique for in-situ ground improvement</td>
</tr>
<tr>
<td>preliminary design.</td>
<td>● precompression of soft ground</td>
</tr>
<tr>
<td></td>
<td>● application of sand drain in accelerating consolidation of soft ground</td>
</tr>
<tr>
<td></td>
<td>● application of dynamic compaction technique</td>
</tr>
<tr>
<td>(6 hours)</td>
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</tr>
<tr>
<td><strong>4 Develop an understanding of the index and engineering properties of rock</strong></td>
<td>● material and mass properties of rocks</td>
</tr>
<tr>
<td>materials and rock masses, their measurement and classification.</td>
<td>● index properties of rocks, their measurement and use</td>
</tr>
<tr>
<td></td>
<td>● weathering effects on rock mass properties</td>
</tr>
<tr>
<td></td>
<td>● rock and rock mass classification systems</td>
</tr>
<tr>
<td></td>
<td>● shear, compressive, and tensile strength of intact rock, their measurement and use</td>
</tr>
<tr>
<td></td>
<td>● strength of rock mass</td>
</tr>
<tr>
<td></td>
<td>● measurement and use of strength parameters of rock discontinuities</td>
</tr>
<tr>
<td>(6 hours)</td>
<td></td>
</tr>
</tbody>
</table>
|  | Collect and present rock survey data for use in related rock engineering problems. | types of discontinuity  
measurement, plotting and analysis of discontinuities in rock masses  
use of stereographic projections |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(7 hours)</td>
<td>--------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 5                | Demonstrate the principles and assessment methods of rock slope stability. | rock slope stability analysis  
rock slope stabilization method  
maintenance of rock slopes  
application of computer software in rock slope engineering. |
|  (8 hours)       |--------------------------------------------------------------------------------------------------------|
| 6                | Develop skills in rock index properties tests. | rock-core logging  
point load strength  
Schmidt hammer test  
Robertson shear-box test  
Profilometer |
|  (2 hours)       |--------------------------------------------------------------------------------------------------------|
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

Fundamental Skills
Communication, IT and Numeracy ✓
Information Management ✓
Use of Numbers ✓
Creative Thinking ✓
Analytical & Problem Solving ✓

Personal Management Skills
Attitudes & behaviour □
Responsibility & Autonomy ✓
Adaptation □
Continuous Learning ✓
Work Safety ✓

Teamwork Skills
Working with others ✓
Participation in Projects & Tasks ✓

Reference
Module Title
PROJECT II

Module Code
CBE3039

Class Contact Hours
60 hours

Module Value
4.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering /Level 4
53301F/55901F Higher Diploma in Civil Engineering /Level 4

Learning Outcomes
To achieve this module a student shall be able to:
• Select and determine the scope of study and determine methods and procedures;
• Carry out the study according to the defined specifications, procedures and the time frame;
• Carry out detail study and/or investigation following the preliminary proposal derived in the previous study and further develop and apply engineering skills in formulating final design solution/conclusion to the problems under the agreed scope of work;
• Evaluate and present interim and final findings of the study through a full investigation/design proposal.

Pre-requisite(s):
Nil

Teaching & Learning Strategies

Hong Kong Institute of Vocational Education
Department of Construction
Students are required to work independently but under regular monitoring and guidance provided by designated supervisor. This module develops each individual student’s ability to record, and present activities; to collect, analyse and interpret data; to find and use proper sources of information for the subsequent design and/or investigation work; and to develop from the preliminary design/investigation proposal into a final solution/conclusion to the problem under study. All activities and progress attained will be recorded in their individual log books for his and supervisor’s regular checking. Throughout the study, the student will apply the skills, knowledge and understanding acquired and understood in other modules previously and/or currently being studied. It is expected each student will achieve the level of competence expected of professional project personnel.

Full-time Mode
The module consists of 60 hours of guided tutorial meetings between student and the assigned project supervisor.

Part-time Mode
The module consists of 45 hours of guided tutorial meetings between student and the assigned project supervisor, and 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

Assessment Scheme
Coursework  100%

Individual student’s performance will be assessed by the project supervisor and moderator throughout the prescribed project activities. Assessment will be based on the following:
1. Engineering concept and technical content
2. Organisation and management
3. Quality of the work, including the written report and oral presentation
4. Individual initiative and effort
5. Response to questions from an evaluation panel
## Learning Outcome

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Indicative Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Select and determine the scope of study and determine methods and procedures</td>
<td>● Establish with project supervisor the scope of work, meeting schedules, and the progress and final reports;</td>
</tr>
<tr>
<td></td>
<td>● Agree with the project supervisor the necessary technical and non-technical specifications to be met;</td>
</tr>
<tr>
<td></td>
<td>● Identify potential internal/external constraints and resources requirements of the study;</td>
</tr>
<tr>
<td>2. Carry out the study according to the defined specifications, procedures and</td>
<td>● Produce a working plan of project activities including the intended interim milestones;</td>
</tr>
<tr>
<td>the time frame</td>
<td>● Provide evidences of work record;</td>
</tr>
<tr>
<td></td>
<td>● Submit self-assessment report of work progress and performance against the agreed work schedule and assessment criteria;</td>
</tr>
<tr>
<td>3. Carry out detail study and/or investigation following the preliminary proposal</td>
<td>● Agree with project supervisor the investigation/design brief, approach and methodology for the study undertaken;</td>
</tr>
<tr>
<td>derived in the previous study and further develop and apply engineering skills</td>
<td>● Carry out the detail design and/or investigation following the preliminary proposal derived in the previous study for the work under study;</td>
</tr>
<tr>
<td>in formulating final design solution/conclusion to the problems under the agreed</td>
<td>● Develop the final design solution/conclusion for the study;</td>
</tr>
<tr>
<td>scope of work</td>
<td></td>
</tr>
<tr>
<td>4. Evaluate and present interim and final findings of the study through a full</td>
<td>● Submit interim self-assessment and progress reports</td>
</tr>
<tr>
<td>investigation/design proposal</td>
<td>● Submit and present feasibility report and/or preliminary design scheme/investigation report;</td>
</tr>
<tr>
<td></td>
<td>● Submit and present full final investigation/design report.</td>
</tr>
</tbody>
</table>
Key Skills
The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

<table>
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<th>Fundamental Skills</th>
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<tbody>
<tr>
<td>Communication, IT and Numeracy</td>
<td>✓</td>
</tr>
<tr>
<td>Information Management</td>
<td>✓</td>
</tr>
<tr>
<td>Use of Numbers</td>
<td></td>
</tr>
<tr>
<td>Creative Thinking</td>
<td>✓</td>
</tr>
<tr>
<td>Analytical &amp; Problem Solving</td>
<td>✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personal Management Skills</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes &amp; behaviour</td>
<td>✓</td>
</tr>
<tr>
<td>Responsibility &amp; Autonomy</td>
<td>✓</td>
</tr>
<tr>
<td>Adaptation</td>
<td>✓</td>
</tr>
<tr>
<td>Continuous Learning</td>
<td>✓</td>
</tr>
<tr>
<td>Work Safety</td>
<td></td>
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<table>
<thead>
<tr>
<th>Teamwork Skills</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Working with others</td>
<td></td>
</tr>
<tr>
<td>Participation in Projects &amp; Tasks</td>
<td>✓</td>
</tr>
</tbody>
</table>
Module Syllabus

Module Title

STRUCTURAL DETAILING

Module Code

CBE3040

Class Contact Hours

45 hours

Module Value

3.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering/Level 4

Part-time Mode
55901 Higher Diploma in Civil Engineering/Level 4
53301F/55901F Higher Diploma in Civil Engineering/Level 4

Learning Outcomes

To achieve this module a student shall be able to:

- Be with judicious use of computer-aided drafting to flesh out structural engineering drawings.
- Act as intermediary between structural design and practical working environment.
- Be felicitous in coding and decoding of self-contained but inter-dependent drawings in structural systems.
- Be perspicacious in structural engineering systems and details.

Pre-requisite(s):

CBE2028 – COMPUTER-AIDED DRAFTING

Teaching & Learning Strategies

Workshop sessions include formal teaching and practice of CAD in Structural and Civil Engineering drawings. Series of structural systems and their presentation in engineering drawings will be demonstrated. To edify the students to amuse knowledge.
and skill acquired in this course, students are not mere adhere to visual drawings, but also the conversion of their concept from structural design and construction technology. To monitor the progress and evaluate the achievement of students, assignments and/or quizzes are to be held at suitable intervals throughout the semester.

**Full-time Mode**
The module consists of 45 hours of formal workshop sessions.

**Part-time Mode**
The module consists of 30 hours of formal workshop sessions, 15 hours of guided study sessions.

More student-centered learning materials could be given to students to replace part of the conventional classroom lecturing while guided study sessions will be scheduled to offer help to students who are in need for personal consultation with module lecturers on any subject matters. Close monitoring of individual students’ performance will be undertaken by the module lecturers. Students who identified as underperformed will be supplemented with guidance and additional tutoring during these scheduled guided study lessons.

**Assessment Scheme**

Coursework          100%
## Content

<table>
<thead>
<tr>
<th>Learning Outcome</th>
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</thead>
</table>
| 1. Master advanced CAD techniques. | - Set up of CAD drawings and files.  
- Customize and establish the CAD features.  
- Practice commands for drawing, editing and dimensioning.  
- Use of scale, viewing and plotting.  
- Organize and manage CAD file. |
| (5 hours) | |
| 2. Carry out advanced detailing techniques for reinforced concrete structures. | - Preparation of general arrangement and framing plan.  
- Slab detailing: staircase, flat slab and waffle slab.  
- Beam detailing: cranked beam, deep beam and corbel.  
- Column detailing: jointing of re-bars and beam-column connection.  
- Wall detailing: load bearing and wind resisting shear wall; retaining wall.  
- Foundation detailing: footing and pile cap. |
| (25 hours) | |
| 3. Carry out advanced detailing techniques for structural steel structures. | - Preparation of general arrangement and structural framing plan.  
- Structural connection detailing: rigid and semi-rigid connection; splice connection.  
- Structural element detailing: plate girder, haunch beam and composition construction.  
- Steel frame detailing: truss and portal frame. |
| (15 hours) | |
**Key Skills**

The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

**Fundamental Skills**

<table>
<thead>
<tr>
<th>Skill</th>
<th>✔️</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication, IT and Numeracy</td>
<td>✔️</td>
</tr>
<tr>
<td>Information Management</td>
<td>✔️</td>
</tr>
<tr>
<td>Use of Numbers</td>
<td></td>
</tr>
<tr>
<td>Creative Thinking</td>
<td>✔️</td>
</tr>
<tr>
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</tr>
</tbody>
</table>

**Personal Management Skills**

<table>
<thead>
<tr>
<th>Skill</th>
<th>☐</th>
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</thead>
<tbody>
<tr>
<td>Attitudes &amp; behaviour</td>
<td></td>
</tr>
<tr>
<td>Responsibility &amp; Autonomy</td>
<td>✔️</td>
</tr>
<tr>
<td>Adaptation</td>
<td>✔️</td>
</tr>
<tr>
<td>Continuous Learning</td>
<td>✔️</td>
</tr>
<tr>
<td>Work Safety</td>
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</table>

**Teamwork Skills**

<table>
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<th>Skill</th>
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<tr>
<td>Working with others</td>
<td></td>
</tr>
<tr>
<td>Participation in Projects &amp; Tasks</td>
<td></td>
</tr>
</tbody>
</table>

**Reference**

2. *Standard Method of Detailing Structural Concrete,* (1989), IStructE,
5. *Code of Practice for the Structural Use of Concrete,* (2004), Buildings Department of HKSAR.
Module Syllabus

Module Title
PROJECT ON CULTURE OF CHINA

Module Code
CBE6014

Class Contact Hours
30 hours

Module Value
2.0

Course Code/Level

Full-time Mode
51301F Higher Diploma in Civil Engineering /Level 1
51309F Higher Diploma in Urban Renewal, Building Inspection and Maintenance /Level 1
51310F Higher Diploma in Architectural Design and Technology /Level 1

Learning Outcomes
The module is an optional module designed for students who do not possess the pre-requisite Chinese language skills to complete the Level 1 Chinese language module. Upon completion of this alternative module, it is expected that the student shall be able to:

• Acquire a basic knowledge of commonly used Chinese characters, spoken and written Chinese;
• Carry out an in-depth study on the development of China including Hong Kong from ancient times to modern times; and
• Develop an awareness and insight into the cultural aspects of China

Pre-requisite(s):
Nil

Teaching & Learning Strategies
The module consists of 30 hours of guided tutorial meetings between the project tutor and the student.

Each student shall work on his/her own under guidance and close supervision of the
project tutor. A wide range of literature review will be expected from the student including library materials, local newspaper and journals/magazines, and internet information resources. The following cultural aspects will be covered in the project study:

- Geography
- History
- Government
- Economy
- Life Style
- Religion
- Language
- Arts
- Leisure
- Festivals and Foods
- New opportunities and challenges in Modern China

**Assessment Scheme**

| Coursework | 100% |

Interim assessments will be carried out by the tutor for the work done during intermediate stages before the final report submission. An oral presentation is required with a question and answer session after the submission of the final report.

**Key Skills**

The following key skills are expected to be demonstrated by the students in their coursework activities under this module. The skills intended shall align with the requirements as described under the “Section 6.7 - Key Skills” in the Volume 1 of the Course Validation Document for 51301F/55901/53201/55201/53501/55501 C/D/HD in Civil Engineering Courses.

**Fundamental Skills**

- Communication, IT and Numeracy ✔
- Information Management ✔
- Use of Numbers ✔
- Creative Thinking
- Analytical & Problem Solving

**Personal Management Skills**

- Attitudes & behaviour ✔
- Responsibility & Autonomy ✔
- Adaptation ✔
- Continuous Learning ✔
- Work Safety

**Teamwork Skills**

- Working with others
- Participation in Projects & Tasks

**Text/Reference**