

**City University of Hong Kong  
Course Syllabus**

**offered by Department of Architecture and Civil Engineering  
with effect from Semester A 2022/23**

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**Part I Course Overview**

<b>Course Title:</b>	Virtual Design and Construction
<b>Course Code:</b>	CA5108
<b>Course Duration:</b>	1 Semester (Some courses offered in Summer Term may start a few weeks earlier than the normal University schedule. Please check the teaching schedules with CLs before registering for the courses.)
<b>Credit Units:</b>	3
<b>Level:</b>	P5
<b>Medium of Instruction:</b>	English
<b>Medium of Assessment:</b>	English
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	Nil
<b>Precursors:</b> <i>(Course Code and Title)</i>	Nil
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	Nil
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	Nil

## Part II Course Details

### 1. Abstract

The application of computers and Information Technology is vital to all industries, no need to mention the construction industry. This course aims at teaching how to implement Virtual Design and Construction (VDC) for building and infrastructure projects from both theoretical and practical perspectives. Upon completing this course, students shall be able to describe, implement and evaluate information/views/opinions related to VDC. Because Building Information Modeling (BIM) is an essential to implement VDC, students will also learn fundamental concept of BIM, up-to-date application examples of BIM, and how to apply BIM-related software packages. Students will be equipped with the most advanced knowledge of applying Information Technology to the construction industry.

### 2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	appraise and assess the essential principles of virtual design and construction;		✓	✓	
2.	identify the latest development of IT applications in VDC and evaluate their contribution to the construction industry;		✓	✓	
3.	apply the principles of VDC;		✓	✓	
4.	perform VDC using available software packages.		✓	✓	✓
		100%			

#### A1: Attitude

*Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.*

#### A2: Ability

*Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.*

#### A3: Accomplishments

*Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.*

### 3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.				Hours / week (if applicable)
		1	2	3	4	
Lectures	On topics related to construction management in related to VDC	✓	✓	✓	✓	2 hrs/wk
Tutorials/ Presentation	On selected topics	✓	✓	✓	✓	1 hr/wk

Semester Hours:	3 hours per week
Lecture/Tutorial/Laboratory Mix:	Lecture (2); Tutorial (1); Laboratory (0)

### 4. Assessment Tasks/Activities

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks / Activities	CILO No.				Weighting	Remarks
	1	2	3	4		
Continuous Assessment: 100%						
Assignments	✓	✓	✓	✓	25%	
Term Project	✓	✓	✓	✓	50%	
Mid-term Examination	✓	✓	✓	✓	25%	
Examination: 0%						
Examination					Nil%	
					100%	

## 5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

### Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
Assignments	Ability to understand, analyze and apply the theories acquired in the course	High	Significant	Basic	Not even reaching marginal levels
Term Project	Ability to understand, Analyze and apply the theories acquired in the course	High	Significant	Basic	Not even reaching marginal levels
Mid-term Examination	Ability to understand, Analyze and apply the theories acquired in the course	High	Significant	Basic	Not even reaching marginal levels

### Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Assignments	Ability to understand, analyze and apply the theories acquired in the course	High	Significant	Moderate	Basic	Not even reaching marginal levels
Term Project	Ability to understand, Analyze and apply the theories acquired in the course	High	Significant	Moderate	Basic	Not even reaching marginal levels
Mid-term Examination	Ability to understand, Analyze and apply the theories acquired in the course	High	Significant	Moderate	Basic	Not even reaching marginal levels

**Part III Other Information** (more details can be provided separately in the teaching plan)

**1. Keyword Syllabus**

*(An indication of the key topics of the course.)*

Development of IT applications in construction; Virtual Design and Construction (VDC); Building Information Modelling (BIM); 4D simulation; Clash Detection; Cost Estimation; Compliance Checking; Revit; MS Project; Navisworks; Industry Foundation Classes (IFC); AutoCAD Civil 3D; Smart Construction.

**2. Reading List**

**2.1 Compulsory Readings**

*(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)*

1.	Nil
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**2.2 Additional Readings**

*(Additional references for students to learn to expand their knowledge about the subject.)*

1.	BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors by Chuck Eastman, Paul Teicholz, Rafael Sacks, and Kathleen Liston (2011)
2.	Automation in Construction: <a href="http://www.journals.elsevier.com/automation-in-construction/">http://www.journals.elsevier.com/automation-in-construction/</a>
3.	Journal of Computing in Civil Engineering: <a href="http://ascelibrary.org/journal/jccee5">http://ascelibrary.org/journal/jccee5</a>
4.	BIM Journal: <a href="http://www.bimjournal.com/">http://www.bimjournal.com/</a>