



CDAST

Council of Deans of Architecture School of Thailand

สภาคณบดีคณะสถาปัตยกรรมศาสตร์แห่งประเทศไทย

ที่ สคส.21/ว 046/2560

คณะสถาปัตยกรรมศาสตร์
เลขที่ 2901
วันที่ 1 ส.ค. 2560
เวลา 14.14 น.

28 พฤศจิกายน 2560

เรื่อง ขอความอนุเคราะห์ประชาสัมพันธ์ Training Workshop BIM ของ Singapore Polytechnic

เรียน สถาบันสมาชิกสภาคณบดีคณะสถาปัตยกรรมศาสตร์แห่งประเทศไทย

สิ่งที่ส่งมาด้วย ข้อมูล Training Workshop BIM ของ Singapore Polytechnic จำนวน 9 แผ่น

ด้วย คณะสถาปัตยกรรมศาสตร์ มหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี ได้มีความร่วมมือทางวิชาการกับ Singapore Polytechnic เพื่อพัฒนาองค์ความรู้และจัดอบรมหลักสูตรทางวิชาการด้านสถาปัตยกรรม จำนวน 5 หลักสูตร

ในการนี้ สภาคณบดีคณะสถาปัตยกรรมศาสตร์แห่งประเทศไทย จึงขอความอนุเคราะห์สถาบันสมาชิกสภาคณบดีฯ ประชาสัมพันธ์การอบรม และขอเรียนเชิญคณาจารย์เข้าร่วมอบรมหลักสูตรดังกล่าว ทั้งนี้ สามารถสอบถามรายละเอียดเพิ่มเติมได้ที่ อาจารย์วิกิตตา สีคง คณะสถาปัตยกรรมศาสตร์ มหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี โทร. 083 - 1043494

จึงเรียนมาเพื่อโปรดให้ความอนุเคราะห์ประชาสัมพันธ์ จักขอบคุณยิ่ง

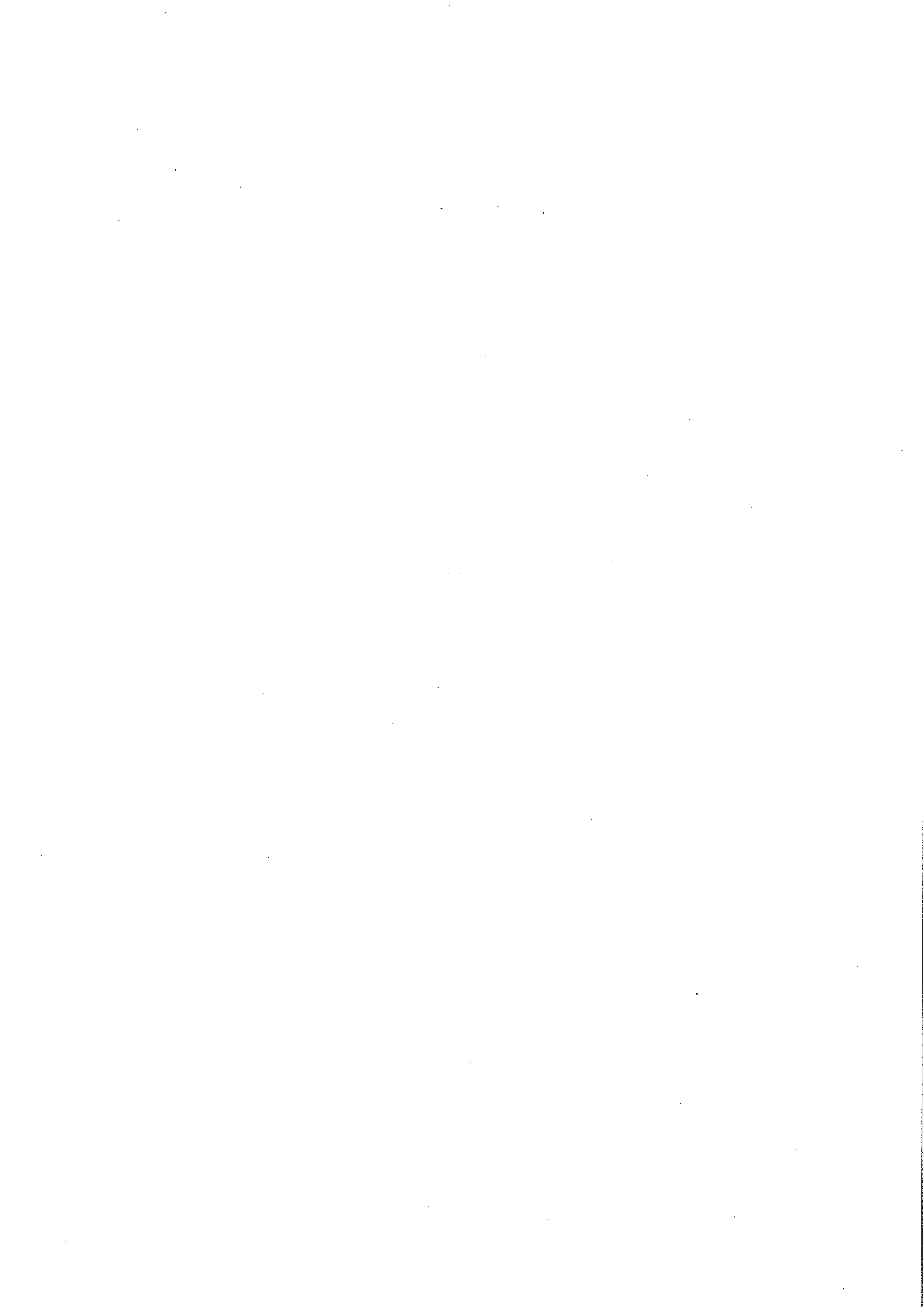
ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.สันต์ จันทรสมศักดิ์)

ประธานสภาคณบดีคณะสถาปัตยกรรมศาสตร์แห่งประเทศไทย

รับทราบ
เรียน คุณพิมพันธ์
เพื่อประชาสัมพันธ์โครงการและบุคลากร

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**Singapore Polytechnic Built Environment Sector
Digitization for Productivity Programme in Thailand**

24 November 2017

Programme Background

This programme will consist of a five-part training workshop series. There will be lectures and lab hands-on practical sessions during the Training Workshops. It will commence with a three-day Introduction to Urban Planning with Singapore as a case study (Training Workshop 1), followed by BIM Basics (Training Workshop 2), which is aimed at providing trainees with general knowledge of BIM workflow and basic modelling skills, to equip trainees with basic fundamental skills necessary for building BIM capabilities.

This will then be followed by a four-day BIM Intermediate / Advanced (Training Workshop 3), which is aimed at providing participants on BIM standards and guidelines, which are necessary to steer BIM Implementation Plan (BIP) and BIM Execution Plan (BEP). Both Singapore and global standards will be introduced for holistic practices.

As Training Workshops 2 and 3 will equip the participants with the basic, intermediate and advanced BIM knowledge and modelling skills, a two-day BIM Project (Training Workshop 4) will then focus on a BIM project, simulating a project team scenario.

Upon completion of BIM Project workshop, participants will be led to the last workshop, Train-the-Trainer (Training Workshop 5). The workshop will focus on the requirement of hardware and software issues, teaching logistics and resources, etc. The participants will be assessed on their BIM teaching skills on some topics in BIM. This will be in the form of a BIM mock-class, with teaching, demo and hands-on taking place between the participant and the 'students'. The participant is now assessed as the trainer.

About Urban Planning

Singapore's urban planning history dates back to 1822 when Sir Stamford Raffles wanted to alleviate the haphazard situation at that time. Singapore never looked back since the Jackson Plan, the first detailed city plan for Singapore. Today, Singapore's Population White Paper aims for "A Sustainable Population for a Dynamic Singapore", projecting its population to 6.9

million by 2030 (population is 5.6million in 2017, according to Singapore Department of Statistics). With sound urban planning, Singapore aspires to preserve a high quality living environment for all Singaporeans and maintain the ranks amongst “the most liveable cities” globally.

The urban planning strategies respond to the needs and the growth of the country. Changes in urban planning are essential for regulatory processes for planning for the future, alleviating problems and systematic maintenance of the urban spaces. Urban Planning needs multi-disciplinary considerations, tremendous efforts for coordination and accuracy to implement.

The technical aspects of Urban Planning encompass the following:

- Topography (platform height, benchmarks, survey of existing elements) to understand the existing landforms to minimize the impact of soil disturbances and recommend the best land use for the site.
- Land use, amenities and buildings (commercial, industrial, public residential, private residential, mixed development, recreational, institutions, train stations, bus interchanges, bus-stops) to assess the need for new buildings and usage of existing buildings in the densely populated cities; to maximize space for efficient linkages to amenities to fulfil people’s needs.
- Green infrastructure (conservation areas, parks, gardens, landscape in the streets, community gardens, skyrise greenery, vertical greenery, urban farming, park connectors) that supports aspirations to be more environmentally friendly to alleviate global warming and achieve the standard of a biophilic city, connecting people to greenery for countless benefits towards a more sustainable future.
- Blue infrastructure (sea, mangroves, rivers, lakes, canals, culverts, storm-water drains, water catchment areas, reservoirs) to minimize water pollution delivered to water catchment areas for safe potable water and keeping water clean bearing in mind the water connections in the global context.

- Circulation (pedestrian walkways, covered link ways, universal design elements, bicycle paths, void decks, park connectors, pick-up and drop-off points, nodes, civic plazas) determines the primary and secondary circulation paths to ascertain the flow of vehicular, bicycle and human traffic in order to identify the concentration of activities at different times of the day to minimize congestions and ensure efficiency.
- Urban ecology (all living things are bio-indicators of the air, land and sea) studies about relationships between living things in the built environment; so data on the impact of urban infrastructure on flora and fauna determines the health of green and blue infrastructure as habitats for flora and fauna.

Building Information Modelling (BIM)

What is Building Information Modelling (BIM)? In November 2010, Singapore Building Construction Authority (BCA) formulated the BIM Roadmap to steer the building industry towards wide adoption of Building Information Modelling (BIM) by 2015. BIM was identified as one of the key technology drivers to improve productivity and level of integration across the various disciplines in the construction value chain.

Since July 2015, the Singapore authority submissions for building plans are mandated to be submitted in BIM format for regulatory approval. BIM is a process that utilises information to execute modelling. BIM facilitates coordination and collaboration works with building professional of various disciplines in a digital realm. This facilitation is applied from the inception of the project design up to design development and tender stage and its eventual construction and completion stages.

About Building Information Modelling (BIM) in the Public Sector

Building Information Modelling (BIM) is now considered the ultimate in project delivery within the AEC (Architecture, Engineering & Construction) Industry, and has the potential to revolutionize the industry.

It is a process involving the generation and management of digital representations of physical and functional characteristics of a facility. The resulting model becomes shared knowledge-resources to support decision-making about a facility from the earliest conceptual stages, through design, construction, operational life and eventual demolition. Thus, it is a singular central system suitable for the entire project process.

It involves the co-ordinated efforts of all consultants being combined within one highly detailed model with all elements required for a building project. This breakthrough technology is responsible for the complex collaboration systems now in place within many organisations who have integrated BIM as their preferred project delivery method.

Singapore Polytechnic's Expertise

Singapore Polytechnic offers a module, Urban Environment and Society (UES) in the Diploma in Landscape Architecture. This module covers what entails good urban space and landscape design in Singapore's context. As user empathy is important in the design process, UES aims to create opportunities to understand the impact and implications on lifestyles and wellbeing of the people in Singapore. The Landscape Architecture discipline looks into the layers similar to the Urban Planning technical aspects. Diploma in Landscape Architectural teaching staff are trained in the landscape architecture discipline; some of whom are accredited Landscape Architects.

The pre-empting and preparation for the adoption of BIM started as early as 2008. Several Architectural teaching staff received some formal BIM training, and took on the challenge to participate in BIM competitions, including the Autodesk Panorama Competition in Putrajaya, Malaysia in 2010. This provided useful testing grounds to both understand the software and integrate BIM teaching into the curriculum. Students were also encouraged to be early adopters of the software in their Final Year Projects, and were supported by the trained staff, as well as our industry partners. Simultaneously, our Diploma in Architecture Teaching Staff were also giving some formal training to our Diploma in Landscape Architecture and Diploma in Civil Engineering with Business teaching staff internally to bring up our BIM capabilities

The unique position of Singapore Polytechnic's expertise lies in our ability to assemble the full suite of relevant staff, with the united strength of a multi-disciplinary panel of staff across SP,

ranging from design, production, delivery, and occupation to knowledge creation. Thus offering wholesome training and differentiated services, maximising the learning experiences of participants and project outcomes for targeted clients.

Building Information Modelling Curriculum in SP

SP's School of Architecture & the Built Environment has infused BIM based curriculum across three out of five of our Diploma programmes, namely, Diploma in Architecture, Diploma in Landscape Architecture and Diploma Civil Engineering with Business.

- **Diploma in Architecture (DARCH) Curriculum**

In 2011, BCA launched Singapore Construction Productivity Roadmap, where BIM was identified as a key driver to improve the level of integration and collaboration across the various disciplines in the construction value chain. This helped cemented DARCH's push for the full integration of BIM into its curriculum. Initially, BIM was taught as part of a first-year module. From 2015, BIM was formalised as a dedicated module, which is taught in second-year. From 2018 onwards, all graduates will be conversant in BIM, having used it extensively as their primary modelling, submission and visualisation tool in DARCH, in their Year Two and Year Three projects.

- **Diploma in Landscape Architecture (DLA) Curriculum**

DLA teaches BIM in Second Year in preparation for the government regulatory submissions in Year 2020. DLA teaches BIM in Second Year and applies the usage of software a tool to draw the landscape design in the three-dimensional environment with more accurate specifications and materials consideration for all the landscape elements proposed in the design. This course aims to enable our graduates to apply the software skills more fully to collaborate with other professionals in the multi-disciplinary practice of the Built Environment.

- **Diploma in Civil Engineering with Business (DCEB) Curriculum**

DCEB is a broad-based and versatile course. To align our training to the national needs as guided by the BIM roadmap from BCA, the essential contents of BIM as in Structural

Engineering Discipline such as use of authoring tools for developing Structural Model, Structural detailing, BIM e-submission were introduced across all 3 years of our programme since 2014.

Besides adopting BIM in our curriculum, technical talks on BIM are organised for our students every year. In addition, we engage and collaborate with industry partners on our Internship program with job placement relevant to BIM.

Building Information Modelling (BIM) Development in BIM Centre (BIMC)

In addition, SP is in the progress of establishing an industry-facing BIM Centre (BIMC) to help business enterprises and public organisations develop their BIM capabilities. The BIMC aims to be a platform for progressive learning, integrative research and continuous training in the Built Environment (BE) industry. It serves as the BE industry catalyst to drive towards supporting the digital technological adoption to transform collaboration, productivity, and innovation across the different genres of the professional building disciplines.

The BIMC will provide training, utilising BIM Implementation Plan (BIP) and BIM Execution Plan (BEP) as global standards to train industry for their necessary conversion to become BIM fit, engage industry, transfer knowledge and collaborate on project with BE stakeholders. It will help build capability, setting up company's BIM system and work on integrative research projects. Potential projects include:

- Virtual and Augmented Realities could be tested.
- Record modelling – creating an accurate depiction of the physical conditions, environment, & assets of a facility could be developed.
- Preventive Maintenance Scheduling – tracking & maintaining lifecycle information about the building & schedule a program for maintenance activities could be monitored and analysed.
- Building System Analysis – focuses on mechanical systems & track building energy use, lighting analysis, airflow analysis using CFD and solar analysis to improve the building's energy consumption performance.

- Asset Management – linking data in a BIM record model to a database of building assets to assist in maintaining & operating the facility to be developed.
- Space Management – allocating, managing & tracking spaces and related resources within a facility to be monitored and analysed.

Given SP's thought-leadership positioning in the Built Environment, we are currently underway a project with Bukit Panjang Town Council to BIM convert site terrains and volumetric building including landscape and tree profiling.

The BIMC will bring Continuous Education Training (CET) courses to working adults, alongside, injects versatility to Pre Employment Training (PET) curriculum, benefitting both adult learners and SP students and staff. While the main targets are the local trainees and companies, the centre has included plans to offer the training courses and BIM knowledge services to the region.

Programme Description

The proposed 3-year programme comprises the following training workshops:

Programme Training Workshops	Participants
<p><u>Training Workshop 1 (3 Days)</u></p> <p>Introduction to Urban Planning – Singapore as a case-study</p> <ol style="list-style-type: none"> 1. Topography and Land use, amenities and buildings 2. Green and Blue Infrastructure 3. Circulation and Urban Ecology 	120
<p><u>Training Workshop 2 (3 Days)</u></p> <p>BIM Basics</p> <ol style="list-style-type: none"> 1. Introduction to BIM and workflow 2. BIM tool / User interface 3. Architectural / Structural modelling basic 	40

<p><u>Training Workshop 3 (4 Days)</u></p> <p>BIM Intermediate / Advanced</p> <ol style="list-style-type: none"> 1. Introduction to BIM standards / BIP & BEP 2. Template / Family creation 3. Scheduling / Quantity Take-Off 4. Design Coordination / Documentation 5. Work-sharing / Worksets 6. Conceptual Design / Visualisation 	40
<p><u>Training Workshop 4 (2 Days)</u></p> <p>BIM Project</p> <ol style="list-style-type: none"> 1. Hands-on approach to modelling a project in BIM within a simulated project team 	40
<p><u>Training Workshop 5 (2 Days)</u></p> <p>Train-the-Trainer</p> <ol style="list-style-type: none"> 1. Introduction to BIM studio setup, hardware / software 2. Teaching resources / logistics 3. BIM mock-class by participants with 'students' (teach, demo, hands-on) 	40
<p>Total unique participants</p>	<p>40</p>

Programme Timeline

The duration of the programme is 36 months. An indicative programme date for the training workshops and activities is illustrated in the table below:

Stage	Component	Proposed Workshop Schedule (Tentative)
1	<p><u>Training Workshop 1 (3 Days)</u></p> <p>Introduction to Urban Planning – Singapore as a case-study</p> <ol style="list-style-type: none">1. Topography and Land use, amenities and buildings2. Green and Blue Infrastructure3. Circulation and Urban Ecology	19 - 21 March 2018
2	<p><u>Training Workshop 2 (3 Days)</u></p> <p>BIM Basics</p> <ol style="list-style-type: none">1. Introduction to BIM and workflow2. BIM tool / User interface3. Architectural / Structural modelling basic	5 - 7 June 2018
3	<p><u>Training Workshop 3 (4 Days)</u></p> <p>BIM Intermediate / Advanced</p> <ol style="list-style-type: none">1. Introduction to BIM standards / BIP & BEP2. Template / Family creation3. Scheduling / Quantity Take-Off4. Design Coordination / Documentation5. Work-sharing / Worksets6. Conceptual Design / Visualisation	8 - 11 Oct 2018

4	<p><u>Training Workshop 4 [2 Days]</u></p> <p>BIM Project</p> <ol style="list-style-type: none"> 1. Hands-on approach to modelling a project in BIM within a simulated project team 	10 – 11 Dec 2018
5	<p><u>Training Workshop 5 (2 Days)</u></p> <p>Train-the-Trainer</p> <ol style="list-style-type: none"> 1. Introduction to BIM studio setup, hardware / software 2. Teaching resources / logistics 3. BIM mock-class by participants with ‘students’ (teach, demo, hands-on) 	4 - 5 Mar 2019

Programme Outline

Training Workshop 1 - Introduction to Urban Planning - Singapore as a case-study

(3 days)

- Topics for Day 1 : Topography and Land use, amenities and buildings
Topics for Day 2 : Green and Blue Infrastructure
Topics for Day 3 : Circulation and Urban Ecology

This Training Workshop aims to introduce urban planning with Singapore as a case study. In each day of the workshop, content will be covered in lecture format for topics of the day, break out sessions to 20 discussion groups, hands-on to “build a city” on a 2D plan (the same hypothetical site will be given to all groups in a big scale drawing). At the end of each day, there will be gallery walks and presentations by 20 discussion groups. All the technical aspects in urban planning will be completed at the end of the third day.

Training Workshop 1 introduces Urban Planning with Singapore as a case-study and an overview to its various technical aspects. Dissecting the technical aspects of: topography; land use, amenities and buildings; green and blue infrastructure; circulation and urban ecology; will provide insights with different lenses in appreciation of the planning of the urban environment. The workshop facilitates ignition of user empathy through individual’s perspective and relationship with the urban environment.

At the end of the Training Workshop, the participants will be able to:

- Describe the technical aspects of urban planning.
- Identify the challenges of every technical aspect of urban planning.
- Understand decision-making in urban planning with regards to the interconnectedness of its technical aspects.

The 3-day workshop that will increase the awareness of urban planning in Singapore and appreciate the interconnectedness of all technical aspects of urban planning in general for future innovation in respective disciplines.

Training Workshop 2 - BIM Basics (3 days)

Topics for Day 1 :

- Introduction to BIM concept, terminologies and workflow
- BIM authoring tools / Revit user interface
- Navigating through Project Browser
- Basic architectural modelling with Revit authoring tools (create model via massing)

Topics for Day 2 :

- Basic architectural modelling with Revit authoring tools (create model from scratch)
- Basic structural modelling

Topics for Day 3:

- Dimensions / texts
- Views / callouts / symbols
- Room tags / legends / areas / schedules

Participants will be introduced to the Singapore BIM Roadmap that encompasses strategies and initiatives to enable businesses and professionals to migrate from a conventional 2D building environment to a 3D modelling environment. Expediting BIM Adoption Industry-Wide BIM has shown to save costs and time. It demonstrates how BIM can improve the efficiency of manpower resources for businesses.

To learn BIM, REVIT will be the primary BIM software to facilitate learning for this module. Introduction to beginners on BIM Authoring tools for modelling, overview of the user interface and views navigation via Project Browsers.

Basic modelling with REVIT Authoring Tools such as, Starting projects / View commands, Basic Drawing, Modify Tools, Setting Up Levels and Grids, Structural Framing, Modelling /Modify walls, Modelling Modify floors, Stairs Shaft Openings, Modelling, Windows & Doors, Curtain walls /Curtain grids/ Mullions, Roofs, Dimensions / Texts and Views, Elevation & Sections, Room tags / Areas / Legends, Schedules / Tabulation.

At the end of Training Workshop 2, participants will be equipped with the general knowledge of BIM workflow and basic modelling skills, to equip trainees with basic fundamental skills necessary for building BIM capabilities.

Training Workshop 3 - BIM Intermediate / Advanced (4 days)

Topics for Day 1:

- Introduction to BIM standards / BIP & BEP
- Introducing custom template
- Schedules / Quantity take-off

Topics for Day 2:

- System families / families creation
- Component families / in-place families
- Architectural specific families

Topics for Day 3:

- Work-sharing / worksets
- Design coordination / documentation

Topics for Day 4:

- Conceptual Design / visualisation / walkthrough
- Stereo Panorama

At the end of Training Workshop 3, participants will be equipped with the knowledge of BIM standards, through BIP and BEP. These are methodical approaches for full adoption, which will ensure consistency in projects delivery and to improve productivity within the organisation's workflow. The design will also be reviewed through visualisation tools such as creation of camera views, stereo panorama and walkthroughs. Some preliminary virtual visualisation will be introduced to review the design. Creation of custom template is also necessary to start a project and to maintain some form of standardisation. Creation of families will help to populate the organisation's standard details or libraries of product literature.

In addition, design coordination and documentation ensures the need to review the different discipline models to ensure consistency and accuracy.

Training Workshop 4 - BIM Project (2 days)

Topics for Day 1:

- Introduction to project brief / BIM Group project briefing
- Assignment judging criteria
- Team formation
- Submission and deliverable format
- Group project development
- In-class mentoring

Topics for Day 2:

- Group project development
- In-class mentoring
- Group presentation
- Panel assessment

At the end of Training Workshop 4, participants will be equipped with the knowledge attained through Training Workshops 2 and 3. They will be competent to execute a given project in BIM within a group / team setting.

Training Workshop 5 - Train-the-trainer (2 days)

The programme aims to equip and prepare the master-trainers to be able to conduct the internal cascading training workshops. This 2-day workshop focuses on how to prepare, plan and organise BIM training programme including pre-work and logistics requirements. It also trains the master-trainers in workshop facilitation skills including tips and techniques in guiding workshop participants in applying the design methods and tools.

Topics for Day 1:

- Trainer Program overview
- Learning cycles
- Mastering action verbs
- Orientation statement
- Instructor presentation
- Peer evaluation / group critique

Topics for Day 2:

- Instructor presentation
- Peer evaluation / group critique

At the end of Training Workshop 5, participants will be assessed on their ability to conduct a BIM class, with demo, hands-on session and group critique.