Supplementary Materials: A Comparative Study on Sustainability in Architectural Education in Asia—With a Focus on Professional Degree Curricula

Santiago Porras Álvarez, Kyungsun Lee, Jiyoung Park and Sun-Young Rieh

Table S1. Schools and Courses Matrix.

	YEAR	I		II		III		IV		V		VI	
	SEM.	1	2	3	4	5	6	7	8	9	10	11	12
CHINA	SEU					Arch. Physics I 2	Arch. Physics II 2		*Housing Envr. & Design Principle 1*	Urban Envr. Survey 2	*Urban Envr. & Ecology 2*		
							Arch. Systems 3			*Arch. Energy Conservation 1*			
	TONGJI				Building Lighting Physics 2	Design Studio Technology & Environment 4	Social and Historical Anlysis 3	*Design Studio Interior Environment 2*					
					Building Thermal Physics 2								
					Architectural Acoustics 2								
	THU				Intro. to Arch. Tech. 1	Arch. Acoustics 1	Bldg. Thermal Envr. 1	MEP Systems for Bldg. 3	*Principles of Sustainable Design (1) 1*	*Urban Ecology & Envr. Design (1) 2*	*Landscape Ecology (1) 1*		
							Bldg. Lighting Envr. 1		*Trad. Houses, Vernacular Arch. (1) 1*				
	XJTLU			Introduction to Envr. Science 5			Envr. Design & Sustainability 5		Arch. Tech. 5	Design Studio 1 10			

* Required Course — Design Studio — Techonology — Theory — * Optional Course — *Design Studio* — *Techonology* — *Theory*

Table S1. *Cont.*

	YEAR	I		II		III		IV		V		VI	
	SEM.	1	2	3	4	5	6	7	8	9	10	11	12
HONG-KONG	CUHK			Introduction to Bldg. Tech. 3			Design Studio U4 (Passive Envr.) 5	Bldg. Systems Integration 3		Design Studio G1 6	Design Studio G2 6		
							Bldg. Tech. III (Envr. Tech.) 3	Land & City 3		*Façade +Tech.* 3	Advanced Envr. Systems 3		
										China Urban Housing 3	*Climatic Spatial Planning* 3		
										Nature In Arch.: History & Design 3	*Performance Based Sim. in Design & Planning* 3		
	HKU	Sustainability & the Built Envr. 6					Bldg. Tech. III (Sustainability) 6	Bldg. Tech. IV (Integration) 6		*Sustainable Bldg. Systems* [2] 3	Design & Tech. of Sustainable Bldg. 3	*Sustainability Field Workshop* [2] 3	*Design Research on Arch. & the Envr.* [2] 3
										Design research on Arch. Sustainability [2] 3	*Sustainable Design Methods* [2] 3	*Arch. by Nature* [2] 3	*Vernacular Arch. of Asia* [2] 3

* Required Course — Design Studio — Techonology — Theory — * Optional Course — *Design Studio* — *Techonology* — *Theory*

Table S1. *Cont.*

	YEAR	I		II		III		IV		V		VI	
	SEM.	1	2	3	4	5	6	7	8	9	10	11	12
INDIA	IITKGP			Climatology & Solar Arch. 3	Energy Efficient Design 3	Illumination & Elec. Services 3		Bldg. Acoustics 3		*Traditional Arch. 3*	*Disaster Resistant Bldg. & Managmt. 3*		
				Environmental Studies 3	Water Supply & Sanitation 3					*Energy & Env. Systems For Green Bldg. 3*			
	IITR		Climatology in Arch. 3				Bldg. Services 2	Arch. Design IV 5		*Vashtushastra [3] 3*			
							Bldg. Tech. I 4	Sustainable Arch. 4					
							Acoustic & Lighting 3						
							Vernacular Arch. 3						

* Required Course — Design Studio — Techonology — Theory

* Optional Course — *Design Studio* — *Techonology* — *Theory*

Table S1. *Cont.*

	YEAR	I		II		III		IV		V		VI	
	SEM.	1	2	3	4	5	6	7	8	9	10	11	12
INDONESIA	ITB			**Sustainable Built Environment** 2		**Arch. Design Studio III** 5	**Arch. Design Studio IV** 5		*Preservation of Historic Bldg. and Sites* 2	**Design Studio 1** 6	*Analysis of Built Envr.* 2		
						Bldg. Physics 2	**Bldg. Service** 2				*Bamboo Bldg. Tech.* 2		
						Site Planning & Design Studio 3					*Vernacular Arch. of Indonesia* 2		
						Appropriate Arch. 2							

* Required Course — **Design Studio** — **Techonology** — **Theory** — * Optional Course — *Design Studio* — *Techonology* — *Theory*

Table S1. *Cont.*

	YEAR	I		II		III		IV		V		VI	
	SEM.	1	2	3	4	5	6	7	8	9	10	11	12
JAPAN	Kyoto[4]	Envr. & Ecology 2	Intro. to Structural & Envr. Engg. 2	Envr. Engg. I 2	Envr. Engg. II 2	Bldg. Envr. Systems 2	Arch. Lighting & Acoustics 2	Urban Envr. Engg. 2	Bldg. Systems Design Theory 2				
				Theory of Landscape Design 2	Housing Planning (Integrated) 2	Design Studio 3 (Integrated Envr. Engg.) 3	*Design Studio 4 (Integrated Envr. & Safety)* 3	*Arch. Thermal Envr. Design* 2	Envr. Engg. Practice 2				
	Utokyo[5]				Intro. System Design of Bldg. Engg. Systems 1.5	Acoustic Envr. of Bldg. 1.5	Air & Water Envr. of Bldg. 1.5	Design Basics III (Envr., History, Urban Integration) 2	Design Basics VI (Tech. & Envr., Integration) 4				
					Principles of Envr. Engg. 1.5	Lighting & Visual Envr. of Bldg. 1.5	Envr. Systems Design[6] 2	Mechanical Equipment in Bldg. I & II 3					
					Exercises of Arch.& Bdg. Systems (Engg. Envr.) 2		Thermal Envr. of Bldg. 1.5	Intro. to Advanced Envr. Planning & Engg. 1.5					
							Principles of Arch. Design III (Envr. & Behavior) 1.5	History of Japanese Dwelling 1.5					

* Required Course — Design Studio — Techonology — Theory — * Optional Course — *Design Studio* — *Techonology* — *Theory*

Table S1. *Cont.*

	YEAR	I		II		III		IV		V		VI	
	SEM.	1	2	3	4	5	6	7	8	9	10	11	12
KOREA	SNU			Design Studio 3 (Arch. & Envr.) 3		Bldg. Mat. 3	Arch. Envr. Planning 3	Arch. & Urban Design 3	Arch. Design Studio 4-2 6	Bldg. System 3			
				Arch. Envr. System 3		*Asian Architecture & Urbanism* (7) *3*	*The City Cultures & Urban 3*		M&E Systems for Bldg. 3				
									Arch., City & Planning (7) *3*				
	SKKU				Design Studio 2 6	Design Studio 3 6	Design Studio 4 6	Integrated Arch. System Design 3	Sustainable Arch. 3				
					Envr. Tech. in Arch. 3	Bldg. Mech.& Engg. Service 3	Arch. Cons. Managmt. 3						
						Site Planning 3	Arch. Mat., Process & Struc. 3						
							Socio-cultural Context & Arch. 3						
	UOS					Design Studio 3 6	Design Studio 4 6	Design Studio 5 6	M&E Systems for Bldg. 3		*Arhictectire and Hanok 3*		
					Arch.Mat. 3	Bldg. System 3	Sustainable Arch. 3	Envr. Tech. 3					
						Intro. Cons. Tech. 3	*Site Planning 3*						
						Theory of Housing and Settlement 3							

* Required Course — Design Studio — Techonology — Theory — * Optional Course — *Design Studio* — *Techonology* — *Theory*

Table S1. *Cont.*

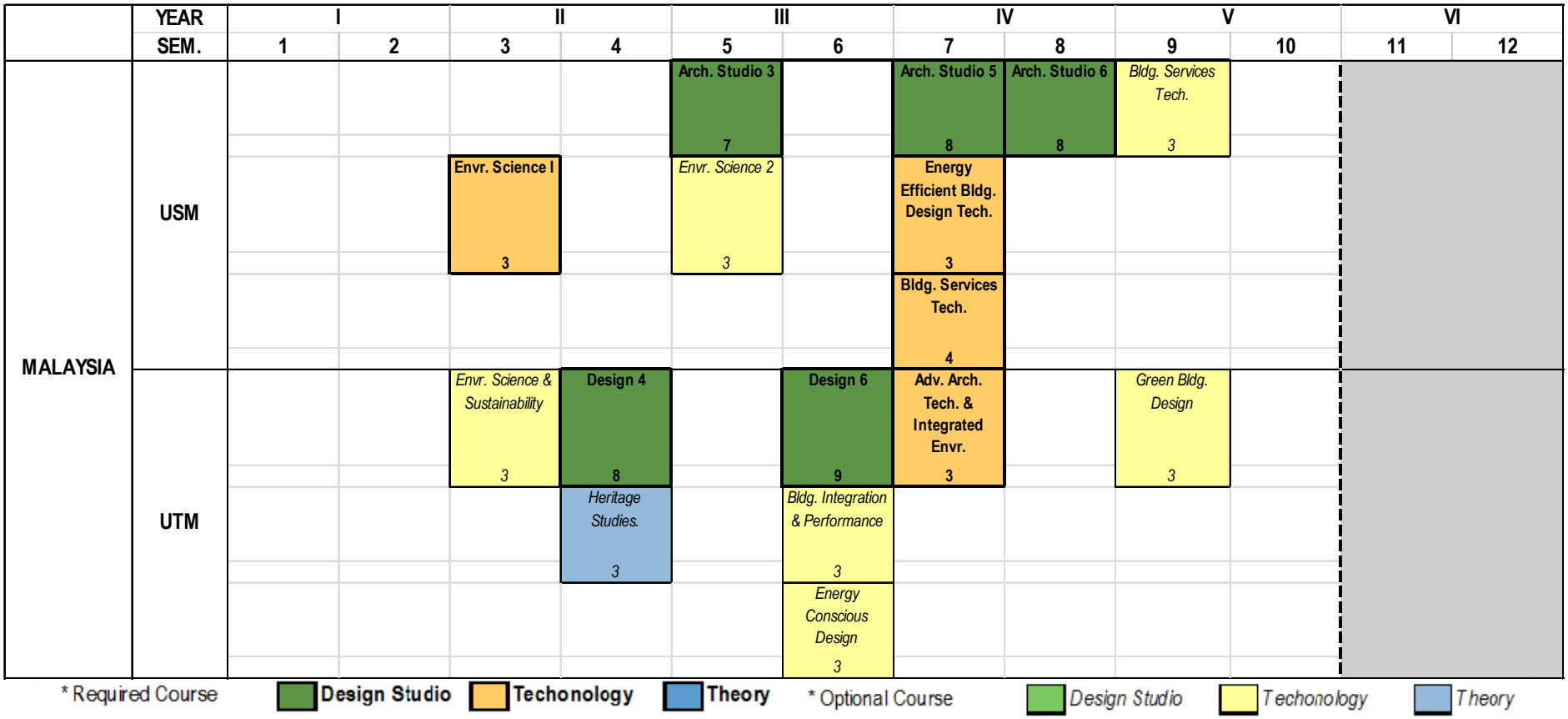

Table S1. *Cont.*

	YEAR	I		II		III		IV		V		VI	
	SEM.	1	2	3	4	5	6	7	8	9	10	11	12
PHILIPPINES	UPD			*History, Theory & Criticism II: Philippine Arch.* 2	*History, Theory & Criticism III: Arch. of Asia & the Pacific* 2	**Arch. Design V: Site Context & Arch. Design** 3	**Arch. Design VI: Arch., Tech. & the Envr.** 3	**Arch. Design VII: Integrative Design Project I** 4	**Arch. Design VIII: Integrative Design Project II** 4	**Utilities V: Health & Safety in Bldg.** 2	*Utilities VI: Utilities for Bldg. Interiors* 3		
							Design with Nature: Tropical Design 2	**Utilities II: Mech. & Elec. Systems of Bldg.** 3	**Utilities IV: Arch. Acoustics** 3		*Utilities VII: Envr. Lighting* 2		
							Utilities I: Plumbing & Sanitary Services 3	**Utilities III: Arch. Lighting** 3			*Utilities VIII: Envr. Acoustics* 3		
SINGAPORE	NUS		**Climate Responsive Arch.** 4		**Strategies for Sustainable Arch.** 4	**Design 5** 8	**Design 6** 8	*Arch.& Tech. Design 1* [8] 8	*Arch.& Tech. Design 2* [8] 8	*Technical Dissertation* [8] 8	*Final Design Project* [8] 20		
							Envr. Systems & Cons. 4	*Adv. Arch. Tech.* [8] 4	*Tech. Module 1* [8] 4	*Renewable Energy and Architecture* [8] 4			
								Tech. Module 1 [8] 4		*Special Topics in Technology* [8] 4			

* Required Course — **Design Studio** — **Techonology** — **Theory** — * Optional Course — *Design Studio* — *Techonology* — *Theory*

Table S1. *Cont.*

	YEAR	I		II		III		IV		V		VI	
	SEM.	1	2	3	4	5	6	7	8	9	10	11	12
TAIWAN	NCKU			Physical Envr. of Arch. I 2	Physical Envr. of Arch. II 2	Physical Envr. of Arch. III 2	Arch. Planning (Envr.& Integration) 2		*Arch. Design Integration* 2	Arch. Design 8 6	Arch. Design 9 6		
						Systems of Envr. Control I 2	*Planning of Green Bldg.* 2		*Bldg. Systems Design* 2				
						Bldg. Cons. II (LCA) 3							
THAILAND	CU		Arch. Design 1 4	Arch. Design 2 4	Arch. Design 3 4	Arch. Design 4 4	Arch. Design 5 4	Arch. Design 6 4	Arch. Design 7 4	Arch. Design 8 4			
					Bldg. Tech. and Cons.1 4	*Daylighting in Arch. Design* 2	Bldg. Tech. and Cons. 2 4	*Pollution Problems and Control* 2	Bldg. Tech. and Cons. 3 4	Bldg. Tech. and Cons. 4 4			
			Thai Arch. Heritage 3	Intro. to Thai Arch. 3		*Intro.to Urban & Arch. Conservation* 2				Arch. Design Seminar 3			

* Required Course — Design Studio — Techonology — Theory — * Optional Course — *Design Studio* — *Techonology* — *Theory*

Notes: (1) Optional courses can be taken in any semester.

(2) Optional courses can be taken in any semester from 9 to 12.

(3) *Vastushastra* is similar to feng shui which teaches sustainable design practices and arrangement based on the traditional Indian techniques.

(4) Students must take 70% of basic major courses, among them the sustainability courses in this table. For the present study, we used a rough approximation by applying a coefficient of 0.7 to the number of credits.

(5) All the courses of U-Tokyo in this table belong to the category of "limited elective", which are about 65% of the whole curriculum (minimum 55 credits out of the total 84). These 55 credits are elected from a total choice of 68. For the present study, we used a rough approximation by applying a coefficient of $55/68 \approx 0.8$ to the number of credits.

(6) Full name: *Exercises in Mechanical Equipment & Environmental Engineering in Building*

(7) Optional courses can be taken in any semester from fifth to tenth. (8) Required courses for B.A. (Arch) (DTS) curriculum: Specialization in Design Technology and Sustainability.

Abbreviations

Arch.	Architecture or Architectural
Bldg.	Building
Cons.	Construction
Elec.	Electrical
Engg.	Engineering
Envr.	Environment or Environmental
Intro.	Introduction
Managmt.	Management
Mat.	Material
Mech.	Mechanical
Struc.	Structure
Sim.	Simulation
Tech.	Technology