

Simergy advanced training course

	Lesson 1: B	asic DW(G mod	el over with loa	d calcula	tions – Desi	gn Al	Iternative
1	Click on the File Menu							
2	Click on the	e New M	enu-Bı	itton to create a	a new pro	ject.		
3	In the Project workspace	е				-		
4	In the Project Inform	ation pa	lette					
5	For Design	Alternat	: ive 1 , s	et the Regio n o	lropdown	to		<i>"IL"</i>
6	Set the Loc	ation dro	opdow	n to (or type in	"Chicago"	' to filter the	2	"Chicago Ohare Intl Ap"
	list) - This le	oads the	weath	er data for the	project.			-
7	Rename th	e Design	Altern	ative 1 to	-			"Basic geometry"
Creat	e/Edit Design Alternatives						[New Copy Delete Validate Model
Nar	me / Description					Weather Source	Regio	on Location
•0	Basic geometry Automatically ge	enerated Baselir	ne Design			Standard	IL	Chicago Ohare Intl Ap
8	Go to the Buildings Wor	rkspace						
9	In the Create/Edit Bu	u <mark>ildings</mark> r	ribbon	menu				
10	In the Create/Edi	t Buildin	g palet	te				
11	In the Building	g Stories	tab					
12	Click on DV	VG Settir	ngs (a	ll the way in th	e lower ri	ght corner)		
13	Click on Ch	oose File	2					
14	Browse for	the "Sim	nergy10	02-DWGModel	Over.dwg'	,		
15	Click Ok							
16	Place the D	WG on t	op of t	he origin (by a l	eft click)			
		⊌ Layers					×	
		ID Check	Colors	Name	Line Style	Line Weight		
		1 🖌		0	CONTINUO	-3		
		2 🖋		22INTERNAL_WALL	CONTINUO	-3		
		3 ⊘ ∕		BaWalls BRXTOP2D	CONTINUO	-3 -3		
		5 🗙		_BRX_SUBTRACTORS	CONTINUO	-3		
		6 🗙		41FINISH_EXT_WALL	CONTINUO	-3		
		7 🗙		31FRAMES	CONTINUO	-3		
		8 W 9 V		BRX3D	CONTINUO	-3 -3		
		10 🖌		- 39GLASS	CONTINUO	-3		
		11 🖌		ASHADE	CONTINUO	-3		
		12 🔗		_BRX_SECTION	CONTINUO	-3		
		n						
		Choose File	R:\Simerg	vSVN\SimRes_Test_and_S	ample_Files\DW(G_Files\ Clear DW(à	
17	Unselect ur	nnecessa	iry laye	rs				
	• _BI	RXTOP2D)					
	• 41-	-FINISH	_EXT_\	VALL				
	• 31-	—FRAME	S					
	You can clo	ose the La	ayer wi	ndow now.				
18	Click the N							

10			Change	Num of Sto	ries to					1	
20			Select th	"Freeform Shape"							
21			Select th		"On	e Zone Per S	torv"				
	Cre	eate/E	dit Buildin	a		New	Save				
	Build	inas Build	ding Sections B	uilding Stories Gla	zina Roof				Cancel	Update Defaults	
		Build	ling Section: B	uilding Section A							
		Building	Story Type:	- Office Building Stor	ical) Space Typ 🗸	Edit					
			Base Story:	1 Num of	Stories: 1	Shape	Parameters	(Origin		
	Shape: FreeForm-shape X1: ft Y1: ft x 50.00 ft										
	Plenum Configuration: No plenum X2: ft Y2: ft Y2:										
	Oct	cupied Co	onfiguration: C	ne Zone Per Floor	\sim	X3:	ft Y3:	ft Z:	0.00 ft		
	(Ceiling Co	onfiguration: S	ame as Occupied	~	-		Rotation:	0.0 °		
	Picor Configuration: Same as Occupied										
22			Click on	the Glazing	; tab	<u> </u>					
23			Change	the Calcula	tion Metho	od dropdow	n to			Percentage	
24			Set Targ	et Win/Wa	II Ratio (10	r north and	south) to			"40%" "25%"	
25			Set Targ	et win/wa	ni katio (10	r east and w	est) to			35% "10 ft"	
20			Set Win	dow TOP Li dow Width	to					"8 ft"	
28			Set Win	dow Offset	From Left	to				"1 ft"	
29			Set Win	dow Offset	From Righ	t to				 "1 ft"	
Διτου	e: One V	Mindow 4	larav 🗸	Calci	lation Method:	Percentage	~			,	
Allay	s. one v	VIII IOOVV 7	vidy *	Calco	induorr metriod.	reicentage	•				
Arra	y One	V	Vindow Type:	Default By Ori	entation 🗸		Overhang	Type: Overhan	g (1.5 🗸 🖓 Fin	Type: Fin (1.5	ft) 🗸
Wir Orier	ndow ntation	Strip	Target Win/Wall Ratio	Win Top Elevation	Window Width	Window Height	Window Minimum Gap	Window Offset From Left	Window Offset From Right	Exterior Sha Horiz. Cont.	ding Fin L R
N	orth		40 %	10.00 ft	8.00 ft	NaN ft	2.00 ft	1.00 ft	1.00 ft		
S	outh		40 %	10.00 ft	8.00 ft	NaN ft	2.00 ft	1.00 ft	1.00 ft		
E	ast		35 %	10.00 ft	8.00 ft	NaN ft	2.00 ft	1.00 ft	1.00 ft		
w	est		35 %	10.00 ft	8.00 ft	NaN ft	2.00 ft	1.00 ft	1.00 ft		
30	Zoom in and start drawing the exterior wall clockwise on the outside face. Tip 1: On top of the drawing window you can change the reference line from left/right or center of the wall. Tip 2: You can zoom in and out with your mouse wheel. Tip 3: If you misplaced a point you can click Undo in the ribbon or the other state state.										
31	For this DWG each corner point will be automatically snapped										
	 For this bive each corner point will be automatically shapped to. You can adjust the Snap Type in the lower right of the drawing window in include more options like: Intersection Point Middle Point Nearest Point 								North) DWG DWG Settings		
			There is	also a chec	kbox to tur	n orthogon	al mode or	n and off.			
32	Click on Save Stories (your 2D window should look like this)										

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÷.			-
33	You may have noticed that our wall construction does not have		
	the same thickness as the DWG. We will correct this now:		
34	In the 2D window select a wall and right click properties.		
35	The thickness of the exterior wall in too thick. Let's adjust the		
	Click on the button right next to the Construction Name		
	property		
36	The total thickness is 11.5 in, but we need 8 in.		
37	Set the thickness of the	3 in	
	FRAME-INSUL_MetalStudsInsulation_6"(152.4mm) to		
38	Set the thickness of the AIRGAP_WallAirSpace_1"(25.4mm) to	0.5 in	
39	Click on Savethis Ref Only (this will make a copy of the		
	material layer set and assign it to this wall only)		
40	Click on the Building tab		
41	Click on Edit Building Construction	(()) ())	
42	Select the just created in the Exterior Wall dropdown	WALL-	
		for Wall A 1 2	witiStudGyp "
43	Click on Save Changes	101 Wall A.1.2	
44	Click on Save (now the external walls align with the lines in the		
	drawing)		
	Tip 4: Create or adjust a Building Construction template and all		
	relevant material properties before you create geometry of		
	your model.		
45	Right click on the Story: Building Story A.A.1 node in the project		
	tree and select Copy Building Story		
46	Set the Number of Building Stories to Insert to	2	
47	And Click Copy		

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		Copy Insert Building Sto	ories	· · · · · · · · · · · · · · · · · · ·		×	
		Building Story To	Be Conied:	Building Story (A.A.1)			
		Insert Above Bu	ilding Story:	Building Story (A.A.1)	~		
		Number of Building Stor	ies to Insert:	2 ≑			
				Conv	Cancel		
				сору	Cancer		
48	Go to the System	s Workspace					
49	In the Systems	Creator ribbon menu					
50	Selec	ct the Template Name	dropdown	as		"Def	ault Loads calculation"
51	Set t	he radio button for Zo	ne HVAC Gi	roups to			"One per building"
52	Click	on Generate Systems					
	Template Name:	Default Load Calculation	¥	Generate Systems	Save as Te	mplate	Delete Systems
	Zone HVAC Group:	Ideal	~	One per building	One pe	r story	One per zone
53	Go to the Simulat	e Workspace		m			
54	In the EnergyPlus ribbon menu						
55	In the lower left palette						
56	Click	on New Configuration	า				
57	Selec	ct the Simulation Para	meter temp	plate dropdown as		"Full	2020 with design days"
	For the load calculations (sizing) we do not necessarily need the						
	annu	ial run, but since we w	ant to comp	pare results of ann	ual runs		
ΕQ	later,	, we are selecting a ful	annuai rui	n nere. anlata drandawn a	<u> </u>	"Cuct	om Variables Detailed
58	Selec	t the Request Set Par	ameterten	ipiate dropdown a	5	Syste Se	t w/Zones + Meters"
	New Configuration						
	Delete Row			Edit Template			Edit Template
	Configuration	Date	EII 2020	Simulation Parameters		tom Variab	Output Request Set
		24-F6D-20	Full 2020 V	win design days	~ ^{5ys}		
59	Click on the File N	lenu					
60	CIICK	on the Save Button to	save the c	urrent model.		"	imargu102 Laccon1"
62	In the Simulate W					3	1111E1 YY 102-LESSOII1
63	In the Simulate Workspace						
64	In the lower right palette						
65	Click on Run Simulation – watch the progress bar and progress						
	messages thereafter						
	(Step 1: Simulation preparation, Step 2: Simulation)						
	The Simergy UI is disabled for a short period of time. After that						
	the s	imulation and its prep	aration run	s in the backgroun	d and		
	Sime	rgy is enabled again.					
66	Wait	tor simulation to finis	h and go to	the Results Visua	lization		
	work	space					
	Simkuni 15-Aug-18	Simulation Warnings Results					×
67	In the Results Vis	ualization Workspace					

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68	Click on the Envr Colum in the upper table, select the filter and	
	choose the lowest checkbox for the annual simulation run	
	results. Click on OK	
	Envr VarTp	
	Environment	_
	Select All)	
	CHICAGO OHARE INTL AP ANN CLG	
	CHICAGO OHARE INTL AP A CHICAGO OHARE INTL AP ANN CLG	
	CHICAGO OHARE INTL AP A CHICAGO OHARE INTL AP ANN HTG	
	CHICAGO OHARE INTL AP A M Chicago Ohare Intl Ap IL USA TMY3	
	Chicago Ohare Intl Ap IL USA. OK Cancel	
	CHICAGO OHARE INTL AP A	
69	Click the button in the ribbon menu for two horizontally divided	Results Visualization
	graphs.	
		Views
70	Multiselect cooling and heating and click in the ADD to	Coolina:DistrictCoolina
	Selection button	Heating:DistrictHeating
71	Change the Timeinterval from Hourly to	Monthly
72	Change the chart type to 2D Bar Chart	and the state and the
		2D Bar Chart
		3D Bar Chart
		Cluster Stack Bar Chart
73	Select View V2 by clicking either clicking on the V2 heading or	
	by selecting View 2 in the dropdown in the Output Variable	
	Selection	
74	Multiselect interior equipment and lights electricity and click in	InteriorEquipment:Electricity
	the ADD to Selection button	InteriorLights:Electricity
75	Click the Data Zoom button to look at about a week of data, so	0
	access the weekly patterns of the internal load schedules.	
	Tip 5: You can click on the Zoom button again to view the full	
	range, the control below the graph enables to move the zoom	
-	The second se Second second se Second second sec	
	window along the time axis and well as changing its zoom level.	





Lesson 2: DESIGN ALTERNATE 1 – Simplified geometry

77	In the Project workspace	
78	In the Project Information palette	
79	Select the "Basic geometry" design alternative and click on the	
	Copy button	
80	Rename the Design Alternative 1 to	"Simplified geometry"
81	Go to the Buildings Workspace	
82	In the Create/Edit Buildings ribbon menu	
83	In the Create/Edit Building palette	
84	In the Building Stories tab	
85	Select the Building Story A-2 and A-3 in the tree	
86	Right click and Delete	
87	Select the Building Story A-1 in the tree	
88	Select the Occupied Configuration dropdown as	"Custom Zones"
89	Click on Save Stories on the Create/Edit Building palette	
90	Go to the Interiors ribbon menu	
91	Click on the New Wall button.	





Lesson 3: DESIGN ALTERNATE 2 – Active beam (water heating and cooling) with DOAS (gas heating and DX cooling)

103	In the Project workspace	
104	In the Project Information palette	
105	Select the "Basic geometry" design alternative and click on the	
	Copy button	
106	Rename the Design Alternative 1 to	"Active beam with DOAS"
107	Go to the Systems Workspace	
108	In the Systems Creator ribbon menu	
109	Select the Template Name dropdown as	"ChilledBeam wDOAS dxC
		gasH"
110	Set the radio button for Zone HVAC Groups to	"One per story"

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	1							"
111		Set the r	"One per story"					
112		Click on						
		All existing systems	will be	replaced				
Temp	plate Name:	ChilledBeam wDOAS	dxC gas	H v Generate Systems]	CW-1		
		Grouping		Primary Templates				
Z	one HVAC Group:	One Per Story	\sim	AT_4PipeInduction_Active	\checkmark		сню	1
	SHW Group:	One Per Building	\sim	None Selected	\checkmark			
	Air loop:	One Per Story	\sim	DOAS_CAV_dxC_gasH_HR_BT	\checkmark			
	VRF loop:	One Per Project	\sim	None Selected	\checkmark			Air-1 ZHG-1
	Hot water loop:	One Per Project	\sim	Boil(2)_HW_VSD(2)_Radiant	\checkmark			Air-2 7HG-2
(Chilled water loop:	One Per Project	\sim	Chlr(2)_VC-Elec_VSD(2)_Radiant	~			
	Mixed water loop:	One Per Project	\sim	None Selected	\checkmark			Air-3 ZHG-3
	SHW Loop:	One Per Project	\sim	None Selected	\checkmark			
	Condenser loop:	One Per Project	\sim	CoolTwr(2)_2SP_VSD	\checkmark			
	Steam loop:	One Per Project	\sim	None Selected	\sim			HW-1
113	Go to th	e Systems W	orks	oace				
114	Go to	o the Air Loop	os rib	bon menu within Cr	reate/Edit Bu	uilding Syst	ems	
115		Select th	e siz	ing object by clicking	g the butte	on in the Lo	ор	
		Properti	es Si	zing property	-		-	
116		Set the T	Гуре	of Load to Size On t	to			Sensible
117	Click On Save							
118	Click on the File Menu							
119	Click on the SaveAs Button to save the current model.							
120	Set File name to "Simergy102-Lesson3"						"Simergy102-Lesson3"	
121	Go to the Simulate Workspace							
122	In the EnergyPlus ribbon menu							
123	In	the lower rig	ght p	alette				
124		Click on	Run	Simulation				

Lesson 4: DESIGN ALTERNATE 3 – Active chilled beam (water heating and cooling) with DOAS (water heating and cooling)

In the Project workspace	
In the Project Information palette	
Select the "Active beam with DOAS" design alternative and click	
on copy	
Rename the Design Alternative 1 to	"Active beam with DOAS
	water"
Go to the Systems Workspace	
Go to the Air Loops ribbon menu within Create/Edit Building Systems	
Select the DX cooling coil and click the Delete key	
Confirm the deletion by selecting Yes	
Drag and drop the "Cooling Coil 2-Port" at the same place in the	
diagram	
Select the following library entry and click on Save	"CoolingCoilWaterAutosize"
In the CHW Loop Dropdow select	"—Create new Loop"
Select the gas heating coil, right click and select Delete from the	
right click menu options	
	In the Project workspace In the Project Information palette Select the "Active beam with DOAS" design alternative and click on copy Rename the Design Alternative 1 to Go to the Systems Workspace Go to the Air Loops ribbon menu within Create/Edit Building Systems Select the DX cooling coil and click the Delete key Confirm the deletion by selecting Yes Drag and drop the "Cooling Coil 2-Port" at the same place in the diagram Select the following library entry and click on Save In the CHW Loop Dropdow select Select the gas heating coil, right click and select Delete from the right click menu options

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137	Confirm the deletion by selecting Yes	
138	Drag and drop the "Heating Coil 2-Port" at the same place in	
	the diagram	
139	Select the following library entry and click on Save	"HeatingCoilWaterAutosize"
140	In the HW Loop Dropdow select	"—Create new Loop"
141	Reconnect the connectors to both coils and check the loop	
	consistency by clicking the Validate button	
142	Click on the Save as Template button in the controls just above	
	the diagram	
143	In the popup window, set the name of the template to	"DOAS Loop with water
		heating and cooling"
144	Click Ok on the Template saved successfully popup dialog	
145	Select Manage Systems in the lower left palette and click on	"Air Loop 2"
146	In the Air Loop Template dropdown select the just created	"DOAS Loop with water
	template	heating and cooling"
147	In the diagram, select the cooling coil and select the following	"CHW Loop 2"
	CHW Loop in the dropdown	<i>"</i>
148	In the diagram, select the heating coil and select the following	"HW Loop 2"
1.40	HW Loop in the dropdown	"Ain Loon 2"
149	Select Manage Systems in the lower left palette and click on	Air Loop 3
150	In the Air Loop Template dropdown select the just created	"DOAS Loop with water
1 - 1	template	
121	CHW Loop in the drondown	CHW LOOP 2
152	In the diagram, select the heating coil and select the following	"HW Loop 2"
152	HW Loop in the dropdown	110 2000 2
153	Go to the Water Loops ribbon menu within Create/Edit Building Systems	
154	In the lower left palette click on	"CHW Loop 2"
155	In the Water Loop Template dropdown select the template	"Chir(2) VC-Elec VSD"
156	Select both chiller and assign them to the following loop in the	"CW Loop 1"
150	CW Loop dropdown	
157	Select Manage Systems in the lower left palette and click on	"HW Loop 2"
158	In the Water Loop Template dropdown select the template	"Boil(2) HW VSD"
159	Select Manage Systems in the lower left palette and click on	"HW Loop 1"
160	From the Water Loop Template dropdown select	"< Empty System >"
161	Drag and dron the following shape onto the diagram	"Heat Exchanger HWtoHW"
162	Set the required holded properties to	"autosize"
163	Select the following loop in the HW Loop dropdown	"HW Loop 2"
164	Drag and drop the following shape onto the diagram left of the	"Pump VSD LtP HW/"
104	heat exchanger	
165	Select the following library entry	"Pump-HW-VSD_COMNET"
166	Drag and drop the following shape onto the diagram over the	"Water Temperature
100	pump	Setnoint"
167	Select the following library entry	"Setpoint Controller - 100F -
		HW – Radiant"
168	Drag and drop the following shape onto the diagram and dock it	"T Sensor"
	to the right outlet of the heat exchanger	
169	Create the proper connections for hot water and controls	



171	Click on the SaveAs Button to save the current model.	
172	Set File name to	"Simergy102-Lesson4"
173	Go to the Simulate Workspace	
174	In the EnergyPlus ribbon menu	
175	In the lower right palette	
176	Click on Run Simulation	

Lesson 5: Results Visualization

177	Go To Results Visualization workspace	
178	Press the button New from Scratch	
179	Filter the Environment column to include only annual runs	
180	Filter the Alternative column for "Basic and Detailed geometry"	
181	Select the view with 3 graphs, 2 on top and one below	
182	Add the following variables of both alternatives to View 1	"Cooling:DistrictCooling"
183	Add the following variables of both alternatives to View 3	"Heating:DistrictHeating"
184	Add the following variables of both alternatives to View 2	"Electricity:Facility"
		"InteriorEquipment:Electricity
		"InteriorLights:Electricity"
185	Set all three time intervals to run period to enable better	
	comparison of the overall results	
186	Right click into the graphs and click the checkbox "alternative	
	Names" in the Name Composition area for all graphs	
187	For the lower graph you can also move the legend to the right	
188	The decrease in electricity is coming from the additional wall	
	volume that is subtracted from the spaces/zone volumes.	







Lesson 6: DESIGN ALTERNATE 1 – Really detailed geometry

205	In the Project workspace	
206	In the Project Information palette	
207	Select the "Basic geometry" design alternative and click on the	
	Copy button	
208	Rename the Design Alternative 1 to	"Detailed geometry"
209	Go to the Buildings Workspace	
210	In the Create/Edit Buildings ribbon menu	
211	In the Create/Edit Building palette	
212	In the Building Stories tab	
213	Select the Building Story A-2 and A-3 in the tree	
214	Right click and Delete	
215	Select the Building Story A-1 in the tree	
216	Select the Occupied Configuration dropdown as	"Custom Zones"
217	Click on Save Stories on the Create/Edit Building palette	
218	Go to the Interiors ribbon menu	



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251	Go to the Simulate Workspace		
252	In the EnergyPlus ribbon menu		
253	In the lower right palette		
254	Click on Run Simulation		