DAFTAR PUSTAKA

Allan, A. C., Garcia-Hansen, V., Isoardi, G., & Smith, S. S. (2019). Subjective assessments of lighting quality: A measurement review. Leukos, 15(2-3),

Al-Sallal, Khaled & Abouelhamd, Amira & Dalmouk, Maitha. (2018). UAE heritage buildings converted into museums: Evaluation of daylighting effectiveness and potential risks on artifacts and visual comfort. Energy and Buildings. 176. 333-359. 10.1016/j.enbuild.2018.06.067.

Amin, N. (2021). Optimasi Sistem Pencahayaan dengan Memanfaatkan Cahaya Alami (Studi Kasus Lab. Elektronika dan Mikroprosessor UNTAD). Jurnal Ilmiah Foristek, 1(1).

Andryadi, A. A., & Nugraha, G. (2021). Optimalisasi Kualitas Pencahayaan dalam Suatu Ruangan Berdasarkan pada Keseimbangan Kebutuhan Manusia, Efisiensi Energi, dan Pertimbangan Arsitektur dengan Menggunakan Metode Fuzzy Logic Control. Media Informatika. 20(1).

Arikunto, S. (2019). Prosedur Penelitian. Jakarta: Rineka cipta.

Ashdown, I. (2010). Lighting Design: A Practitioner's Guide. John Wiley & Sons.

Ayers, J. (2015). Conservation of Cultural Heritage: Key Principles and Approaches. Routledge.

Brenda dan Robert. (2021). Green Architecture Design for a Sustainable Future. London: Thames and Hudson.

Budi Pramono . (2021). Standar Pencahayaan di Ruang Kerja dan Cara Mengukurnya. Jakarta: Narmadi.

Budianto, 2019

Budianto, C. A., Wardoyo, A., Kristianto, T. A., Rucitra, A. A., & Ardianto, O. P. S. (2019). Studi Sistem Pencahayaan Buatan Adaptif untuk Selasar Aktivitas Gedung Baru Departemen Desain Interior ITS. Jurnal Desain Interior, 4(1),

Buser, M., & Valuch, C. (2019). Museum Lighting and Visual Perception: Understanding the Impact of Illumination on Visitors' Experience. Journal of Illumination Engineering, 34(3), 245-260.

Cuttle, C. (2003). Lighting by Design. Architectural Press.

Darmasetiawan, C, L, Puspakesuma. (2021). Teknik Pencahayaan dan Tata Letak Lampu. Gramedia: Jakarta.

Ghozali, I. (2013). Aplikasi Analisis Multivariate dengan Program IBM SPSS 21 Update PLS Regresi. Semarang: Universitas Diponegoro.

IESNA. (2020). The IESNA Lighting Handbook. IESNA Publication Department: New York.

Jamala, N. (2019). The effect of building façade on natural lighting (Case study: Building of Phinisi tower UNM). In AIP conference Proceedings (Vol. 1831, No. 1, p. 020061). AIP Publishing LLC.

Kartika Ayu, S. (2019). Analisi Konsumsi Energi dan Program Konservasi Energi (Gedung Perkantoran dan Kompleks Perumahan TI). Sebatik,

19). Analisis Tingkat Pencahayaan Alami (Studi Kasus Ruang egeri 9 Makassar. Jurnal Teknik Sipil & Perencanaan, UNM.

erdana, Agung Prasetya, dan Oswald P.M. Siahaan. (2019). manan Termal Pada Bangunan Student Center ITENAS ka Karsa. Vol 1. No 1.

). Indoor Parameters of Museum Buildings for Guaranteeing

Artworks Preservation and People's Comfort: Compatibilities, Constraints, and Suggestions. Energies.
Pease, A. (2016). Lighting Design in Museums and Galleries. Thames & Hudson.
Picco, M., Lollini, R., & Marengo, M. (2014). Towards energy performance evaluation in early stage building design: A simplification methodology for commercial building models. Energy and Buildings, 76, 497–505.
Puspitasari & Citraningrum. (2020). Optimalisasi Pencahayaan Buatan Untuk Mendapatkan Kenyamanan Visual Pada Museum Oei Hong Djien Di Magelang. Jurnal Mahasiswa Departemen Arsitektur. 8(2). https://arsitektur.studentjournal.ub.ac.id/index.php/jma/article/view/1175.
R. Amoêda, R. Amoêda, and S. Carneiro, (2020). Daylighting simulation on restoration projects of vernacular architecture: an application of DIALux ® evo 9.1, Available: https://www.researchgate.net/publication/347262818
Sasmoko, D. (2021). Arduino dan Sensor pada Project Arduino DIY. Semarang: Yayasan Prima Agus Teknik.
Setiati, T. W., & Wardhani, D. U. Y. (2020). Evaluasi Kenyamanan Visual pada Ruang Kuliah Non-Konvensional (Studi Kasus: Ruang Kuliah di Menara Universitas Tridinanti Palembang). Arsir, 4(1),
Sriwahyuni & Indraswara, M.S. 2022. Sistem Pencahayaan pada Museum Rekor Dunia Indonesia, Semarang Dini. Journal of Engineering and Informatic. 1(1). 7-13. https://ejurnal.bangunharapanbangsa.id/index.php/JEI DOI : 10.56854/jei.v1i1.13 7.
Standar Nasional Indonesia. (2011). Konservasi Energi pada Sistem Pencahayaan,
Standar Nasional Indonesia. (2019). Pengukuran Intensitas Pencahayaan di Tempat Kerja. Badan Standarisasi Nasional
Stec, W., & van Paassen, A.H.C. (2020). Integration of the Double Skin Façade with the buildings, Energy in Built Environment, Energy Technology, TU Delft, Mekelweg 2, 2628 CD, Delft, The Netherlands
Steffy, Gary, (2022), Architectural Lighting Design, John Wiley and Sons. Inc, New York.
Sugiyono.(2019).Metode Penelitian Kuantitatif Kualitatif dan R&D. Bandung: Alfabeta Bandung
Veitch, J. A., & Newsham, G. R. (2000). Determinants of Lighting Quality I: State of the Science. Journal of the Illuminating Engineering Society, 29(1), 92-106.
Wisnu, & Indarwanto, M. (2021). Evaluasi Sistem Pencahayaan Alami Dan Buatan Pada Ruang Kerja Kantor Kelurahan Paninggilan Utara, Ciledug, Tanggerang. Jurnal Arsitektur, Bangunan, & Lingkungan, 7, 41–46.
Yohardi *et al* (2020). Lighting Design for Artifacts Preservation Purposes and Visual Comfort in Museums *Conf. Ser.: Earth Environ. Sci.* 452 012049.
Yuliantina, M & Suharyani (2020). Kinerja Sistem Pencahayaan Pada Museum Keris Nusantara Surakarta. Seminar Ilmiah Arsitektur.

LAMPIRAN

Lampiran 1 Deviasi Pengukuran Zona A pada Bangunan A

TITIK UKUR	PAGI			SIANG			SORE		
	EKSISTING	SIMULASI	DEVIASI	EKSISTING	SIMULASI	DEVIASI	EKSISTING	SIMULASI	DEVIASI
A1	41.235	33	20%	33.335	30	10%	0.00	0.11	11%
A5	20.88	25	-20%	19.88	19	4%	0.00	0.13	13%
B1	36.215	29	20%	31.385	29	8%	0.00	0.1	10%
B5	21.51	23	-7%	20.965	20	5%	0.00	0.11	11%
C1	35.61	29	19%	29.445	29	2%	0.00	0.9	90%
C5	21.875	19	13%	21.355	22	-3%	0.00	0.09	9%
D1	33.385	28	16%	27.255	25	8%	0.00	0.1	10%
D5	24.19	22	9%	24.19	29	-20%	0.00	0.09	9%
E1	34.165	28	18%	28.705	24	16%	0.00	0.1	10%
E5	26.705	22	18%	29.165	32	-10%	0.00	0.1	10%
F1	31.17	25	20%	25.155	21	17%	0.00	0.11	11%
F2	27.42	32	-17%	22.775	27	-19%	0.00	0.12	12%
F3	20.97	24	-14%	29.325	35	-19%	0.00	0.11	11%
F4	26	31	-19%	28.075	32	-14%	0.00	0.11	11%
F5	27.96	23	18%	32.02	29	9%	0.00	0.1	10%
G1	28.355	23	19%	23.955	20	17%	0.00	0.12	12%
G2	29.355	34	-16%	16.145	16	1%	0.00	0.12	12%
G3	28.66	30	-5%	31.905	38	-19%	0.00	0.1	10%
G4	35.16	42	-19%	19.63	21	-7%	0.00	0.1	10%
G5	26.095	21	20%	27.34	26	5%	0.00	0.1	10%
H1	34.255	37	-8%	20.745	19	8%	0.00	0.14	14%
H2	37.505	43	-15%	19.42	23	-18%	0.00	0.13	13%
H3	40.015	46	-15%	30.255	36	-19%	0.00	0.12	12%
H4	29.87	35	-17%	28.855	32	-11%	0.00	0.13	13%
H5	20.4	17	17%	27.53	26	6%	0.00	0.13	13%
I1	34.69	37	-7%	21.355	20	6%	0.00	0.16	16%
I2	36.705	44	-20%	21.835	26	-19%	0.00	0.16	16%
I3	38.66	44	-14%	27.63	34	-23%	0.00	0.16	16%
I4	28.625	32	-12%	29.095	33	-13%	0.00	0.16	16%
I5	21.045	18	14%	26.29	29	-10%	0.00	0.15	15%
J1	33.72	36	-7%	20.745	22	-6%	0.00	0.17	17%
J2	37.045	42	-13%	25.165	28	-11%	0.00	0.18	18%
J3	36.24	43	-19%	27.975	33	-18%	0.00	0.18	18%
J4	31.69	35	-10%	30.075	35	-16%	0.00	0.17	17%
J5	26.465	24	9%	26.405	29	-10%	0.00	0.16	16%
RERATA	**30**	**31**	**-1%**	**26**	**27**	**-5%**	**0**	**0**	**15%**

Lampiran 2 Deviasi Pengukuran Zona B dan Zona C pada Bangunan A

Deviasi Pengukuran Zona B pada Bangunan A

TITIK UKUR	PAGI			SIANG			SORE		
	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI
A1	7.5	6.2	17%	6.85	5.5	20%	1.21	1.1	9%
A2	9.25	7.4	20%	7.94	6.5	18%	1.34	1.3	3%
A3	12.9	11	15%	9.4	7.5	20%	1.365	1.3	5%
A4	9.33	11	-18%	7.58	8.8	-16%	1.4	1.5	-7%
A5	8.92	10	-12%	7.87	9	-14%	1.27	1.5	-18%
A6	10.42	10	4%	10.42	9.4	10%	1.245	1.5	-20%
A7	10.31	8.9	14%	9.855	8.2	17%	1.26	1.2	5%
A8	10.145	8.1	20%	8.63	6.9	20%	1.11	1.22	-10%
A9	8.55	6.9	19%	7.5	6	20%	1.21	1	17%
RERATA	**10**	**9**	**9%**	**8**	**8**	**10%**	**1**	**1**	**-2%**

Deviasi Pengukuran Zona C pada Bangunan A

TITIK UKUR	PAGI			SIANG			SORE		
	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI
A1	71	83	-16%	65	52	20%	17	16	6%
A2	71	83	-17%	58	52	10%	17	16	7%
A3	63	72	-14%	44	46	-4%	13	14	-8%
A4	74	82	-11%	66	70	-6%	17	19	-13%
A5	86	97	-13%	77	87	-13%	20	24	-20%
A6	89	99	-11%	75	88	-17%	20	24	-20%
A7	69	83	-20%	71	71	0%	18	20	-14%
A8	56	51	10%	52	60	-14%	15	14	8%
A9	65	63	2%	56	67	-19%	16	17	-5%
A10	73	61	16%	67	68	-1%	18	16	11%
B1	77	70	9%	59	47	20%	17	14	18%
B2	70	68	3%	59	47	20%	16	14	13%
B3	67	72	-7%	46	47	-3%	12	14	-15%
B4	68	79	-16%	57	63	-10%	16	18	-16%
B5	77	85	-10%	63	78	-24%	19	20	-5%
B6	75	86	-14%	66	76	-15%	19	20	-5%
B7	62	74	-19%	63	65	-3%	15	17	-13%
B8	52	47	10%	52	57	-9%	16	14	13%
B9	68	56	17%	63	56	11%	16	14	13%
B10	61	49	20%	66	57	14%	12	13	-5%
C1	73	58	20%	53	41	23%	11	12	-8%
C2	75	60	20%	51	43	16%	12	12	-2%
C3	69	67	3%	53	46	14%	14	14	0%
C4	61	74	-20%	68	57	16%	13	15	-13%
		79	-20%	63	71	-13%	17	18	-7%
		85	-19%	59	67	-14%	15	18	-18%
		63	-10%	62	62	0%	14	16	-14%
		60	17%	63	58	8%	14	14	-2%
		45	19%	65	56	13%	15	13	11%
		46	18%	56	47	16%	13	11	18%
		70	**-2%**	**61**	**60**	**1%**	**16**	**16**	**-3%**

Lampiran 3 Deviasi Pengukuran Zona A pada Bangunan B

TITIK UKUR	PAGI			SIANG			SORE		
	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI
A1	41.235	33	20%	33.335	30	10%	0.00	0.11	11%
A5	20.88	25	-20%	19.88	19	4%	0.00	0.13	13%
B1	36.215	29	20%	31.385	29	8%	0.00	0.1	10%
B5	21.51	23	-7%	20.965	20	5%	0.00	0.11	11%
C1	35.61	29	19%	29.445	29	2%	0.00	0.9	90%
C5	21.875	19	13%	21.355	22	-3%	0.00	0.09	9%
D1	33.385	28	16%	27.255	25	8%	0.00	0.1	10%
D5	24.19	22	9%	24.19	29	-20%	0.00	0.09	9%
E1	34.165	28	18%	28.705	24	16%	0.00	0.1	10%
E5	26.705	22	18%	29.165	32	-10%	0.00	0.1	10%
F1	31.17	25	20%	25.155	21	17%	0.00	0.11	11%
F2	27.42	32	-17%	22.775	27	-19%	0.00	0.12	12%
F3	20.97	24	-14%	29.325	35	-19%	0.00	0.11	11%
F4	26	31	-19%	28.075	32	-14%	0.00	0.11	11%
F5	27.96	23	18%	32.02	29	9%	0.00	0.1	10%
G1	28.355	23	19%	23.955	20	17%	0.00	0.12	12%
G2	29.355	34	-16%	16.145	16	1%	0.00	0.12	12%
G3	28.66	30	-5%	31.905	38	-19%	0.00	0.1	10%
G4	35.16	42	-19%	19.63	21	-7%	0.00	0.1	10%
G5	26.095	21	20%	27.34	26	5%	0.00	0.1	10%
H1	34.255	37	-8%	20.745	19	8%	0.00	0.14	14%
H2	37.505	43	-15%	19.42	23	-18%	0.00	0.13	13%
H3	40.015	46	-15%	30.255	36	-19%	0.00	0.12	12%
H4	29.87	35	-17%	28.855	32	-11%	0.00	0.13	13%
H5	20.4	17	17%	27.53	26	6%	0.00	0.13	13%
I1	34.69	37	-7%	21.355	20	6%	0.00	0.16	16%
I2	36.705	44	-20%	21.835	26	-19%	0.00	0.16	16%
I3	38.66	44	-14%	27.63	34	-23%	0.00	0.16	16%
I4	28.625	32	-12%	29.095	33	-13%	0.00	0.16	16%
I5	21.045	18	14%	26.29	29	-10%	0.00	0.15	15%
J1	33.72	36	-7%	20.745	22	-6%	0.00	0.17	17%
J2	37.045	42	-13%	25.165	28	-11%	0.00	0.18	18%
J3	36.24	43	-19%	27.975	33	-18%	0.00	0.18	18%
J4	31.69	35	-10%	30.075	35	-16%	0.00	0.17	17%
J5	26.465	24	9%	26.405	29	-10%	0.00	0.16	16%
RERATA	**30**	**31**	**-1%**	**26**	**27**	**-5%**	**0**	**0.15**	**15%**

Lampiran 4 Deviasi Pengukuran Zona B dan Zona C pada Bangunan B

Deviasi Pengukuran Zona B pada Bangunan B

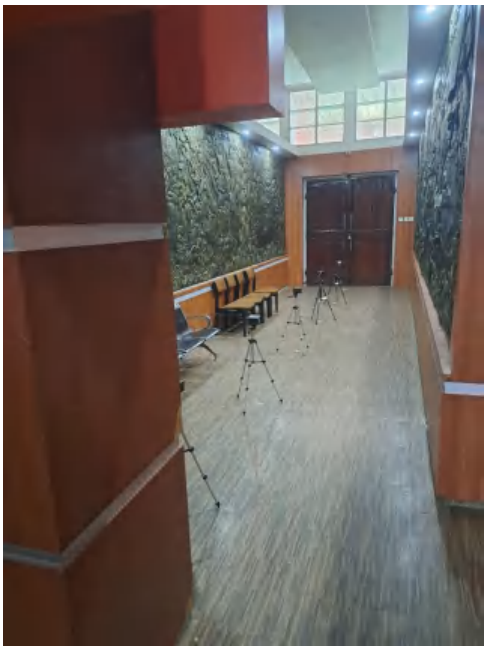
TITIK UKUR	PAGI			SIANG			SORE		
	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI
A1	7.5	6.2	17%	6.85	5.5	20%	1.21	1.1	9%
A2	9.25	7.4	20%	7.94	6.5	18%	1.34	1.3	3%
A3	12.9	11	15%	9.4	7.5	20%	1.365	1.3	5%
A4	9.33	11	-18%	7.58	8.8	-16%	1.4	1.5	-7%
A5	8.92	10	-12%	7.87	9	-14%	1.27	1.5	-18%
A6	10.42	10	4%	10.42	9.4	10%	1.245	1.5	-20%
A7	10.31	8.9	14%	9.855	8.2	17%	1.26	1.2	5%
A8	10.145	8.1	20%	8.63	6.9	20%	1.11	1.22	-10%
A9	8.55	6.9	19%	7.5	6	20%	1.21	1	17%
RERATA	**10**	**9**	**9%**	**8**	**8**	**10%**	**1**	**1**	**-2%**

Deviasi Pengukuran Zona C pada Bangunan B

TITIK UKUR	PAGI			SIANG			SORE		
	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI	EKSISTING (Lux)	SIMULASI (Lux)	DEVIASI
A1	71	83	-16%	65	52	20%	17	16	6%
A2	71	83	-17%	58	52	10%	17	16	7%
A3	63	72	-14%	44	46	-4%	13	14	-8%
A4	74	82	-11%	66	70	-6%	17	19	-13%
A5	86	97	-13%	77	87	-13%	20	24	-20%
A6	89	99	-11%	75	88	-17%	20	24	-20%
A7	69	83	-20%	71	71	0%	18	20	-14%
A8	56	51	10%	52	60	-14%	15	14	8%
A9	65	63	2%	56	67	-19%	16	17	-5%
A10	73	61	16%	67	68	-1%	18	16	11%
B1	77	70	9%	59	47	20%	17	14	18%
B2	70	68	3%	59	47	20%	16	14	13%
B3	67	72	-7%	46	47	-3%	12	14	-15%
B4	68	79	-16%	57	63	-10%	16	18	-16%
B5	77	85	-10%	63	78	-24%	19	20	-5%
B6	75	86	-14%	66	76	-15%	19	20	-5%
B7	62	74	-19%	63	65	-3%	15	17	-13%
B8	52	47	10%	52	57	-9%	16	14	13%
B9	68	56	17%	63	56	11%	16	14	13%
B10	61	49	20%	66	57	14%	12	13	-5%
C1	73	58	20%	53	41	23%	11	12	-8%
C2	75	60	20%	51	43	16%	12	12	-2%
C3	69	67	3%	53	46	14%	14	14	0%
C4	61	74	-20%	68	57	16%	13	15	-13%
		79	-20%	63	71	-13%	17	18	-7%
		85	-19%	59	67	-14%	15	18	-18%
		63	-10%	62	62	0%	14	16	-14%
		60	17%	63	58	8%	14	14	-2%
		45	19%	65	56	13%	15	13	11%
		46	18%	56	47	16%	13	11	18%
		70	**-2%**	**61**	**60**	**1%**	**16**	**16**	**-3%**

Lampiran 5 Dokumentasi Pengukuran Lapangan Gedung A

Gedung A



Lampiran 6 Dokumentasi Pengukuran Lapangan Gedung B

Gedung A

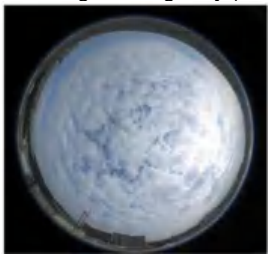
Lampiran 7 Cara mengetahui kondisi langit

Sky Condition	*Opaque Cloud Coverage*
Cloudy / Overcast	88-100%
Mostly Cloudy / Considerable Cloudiness	70-87%
Partly Sunny / Mostly Cloudy	51-69%
Mostly Sunny / Partly Cloudy	26-50%
Sunny / Mostly Clear	6-25%
Sunny / Clear	0-5%

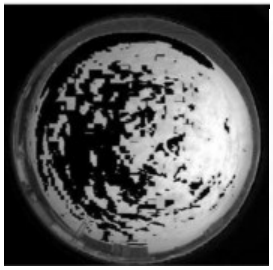
Sumber klasifikasi kondisi langit : https://www.weather.gov/media/pah/ServiceGuide/A-forecast

Tutorial

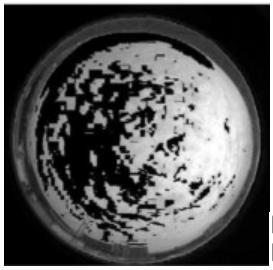
1. Original image sky (taken with 360º camera/ Fish Eye Lens)



2. Make RGB greyscale color



3. Plot the white area (Cloud) to find out the value of the area of cloud coverage in the sky (you can use Autocad to calculate the plot area)



Type = Mostly Cloudy

Cloud Coverage = **61%**
Sky = 39%

M., Shazana Abdul Hamid, N., Mohd Aimran Wan Mohd Kamil, W., & Sakinah
1). *universe Communication Daytime Cloud Detection Method Using the All-Sky
ATA pintar Observatory*. https://doi.org/10.3390/universe
López, G., & Ternero, A. (2014). Sky camera imagery processing based on a
ion using radiometric data. *Energy*, *68*, 599–608.
016/j.energy.2014.02.035
ikas, P., Baiz, A., & Fotopoulus, S. (2012). Cloud Detection and Classification
ole-Sky Ground-Based Images. *Atmospheric Research*.