



ELEMENTS OF ELECTRICAL ENGINEERING

Course Code : UE25EE141A/B

FACULTY CONTRIBUTED:

Department of EEE, RR Campus

Prof . Jyothi T N

Prof. Vadhira^J K P P

Prof. Kruthika N

Prof. Suma S

Prof. Pushpa K R

Prof. Sangeeta Modi

Department of ECE, EC Campus

Prof. Lokesh L

Prof. Dhanashree G Bhate

Dr. Renuka R Kajur

Prof. Rajesh Chandrashekhar

Prof. Sangam Kumar G H

ELEMENTS OF ELECTRICAL ENGINEERING



ENERGY CONSUMPTION & TARIFF CALCULATION

Jyothi T.N

Department of Electrical & Electronics Engineering

- Electrical Energy consumed is recorded by the energy meter.
- Energy consumed = (Power consumed)*(No. of hours in operation)
- The unit of energy consumed is Kilowatt-hour (KWHr) which is often referred to as 'UNIT'
- 1 UNIT = 1KWHr = 1000WHR



For example,

- **An appliance 'A' rated at 1KW if used for 1 hour,**
Energy consumed = $1\text{KW} \times 1 \text{ Hr} = 1\text{KWHr} = 1 \text{ Unit}$
- **An appliance 'B' rated at 100W if used for 10 hours,**
Energy consumed = $100\text{W} \times 10\text{Hr} = 1000\text{WHr} = 1\text{KWHr} = 1 \text{ Unit}$
- **An appliance 'C' rated at 2000W if used for half-an hour,**
Energy consumed = $2000\text{W} \times (1/2)\text{Hr} = 1000\text{WHr} = 1\text{KWHr} = 1 \text{ Unit}$

ELEMENTS OF ELECTRICAL ENGINEERING

Energy consumption & Tariff calculation



ಬೆಂಗಳೂರು ವಿದ್ಯುತ್ ಸರಬರಾಜು ಕಂಪನಿ ನಿಯಮಿತ Sub Divn. (140029)	
ವಿದ್ಯುತ್ ಬಿಲ್ / ELECTRICITY BILL	
ಆರ್.ಆರ್.ಸಂಖ್ಯೆ/RR Number :	14543E
ವಾತೆ ಸಂಖ್ಯೆ/Account ID:	1100157649
ಮಾ.ಎ. ಸಂಕೇತ/Mtr. Rdr. Code:	14002901
ಹೆಸರು ಮತ್ತು ವಿಳಾಸ / Name and Address	
BANGALORE	
ಜಾತಿ / Tariff :	LT2A1 - N
ಮಂ. ಪ್ರಮಾಣ / Sanct. Load :	0.00HP+ 3.00KW
ಬಿಲ್ಲಿಂಗ್ ಪರಿಧಿ / Billing Period:	01/08/16 - 01/09/16
ರೇಡಿಂಗ್ ದಿನಾಂಕ / Reading Date:	09/10/16
ಬಿಲ್ ಸಂಖ್ಯೆ / Bill Number:	1100157649 - 01/09/2016
ಮಾಪಕ ಕ್ರ.ಸಂ. / Meter Sl. No. :	1100157649
ಇಂದಿನ ಮಾಪನ / Pres. Rdg. :	2765
ಹಿಂದಿನ ಮಾಪನ / Prev. Rdg. :	2400
ಮಾಪನ ಸ್ಥಿರಾಂಕ / Constant :	1.00
ಬಳಕೆ / Consumption :	325
ಸರಾಸರಿ / Average :	0000
ದಾಖಲಿತ ಚೇಡಿಕೆ/Recorded MD:	0000
ವರ್ವೋ ಪ್ಯಾಕ್ಟರ್ / Power Factor:	0000

Revenue Register Number

Tariff Category

Sanctioned Load of your building

Two Cumulative readings from which your consumption is calculated

Consumption in Units (KWh)

ELEMENTS OF ELECTRICAL ENGINEERING

Energy consumption & Tariff calculation



ನಿಗದಿತ ಶುಲ್ಕ / Fixed Charges (Unit, Rate, Amount)		
1.00	30.00	30.00
2.00	40.00	80.00
ವಿದ್ಯುತ್ ಶುಲ್ಕ / Energy Charges (Unit, Rate, Amount)		
30 . 000	3.00	90 . 00
70 . 000	4.40	308 . 00
100 . 00	5.90	590 . 00
125 . 00	6.90	862 . 50
ಇಂಥನ ಹೊಂದಾಡಿಕೆ ಶುಲ್ಕ /F.A.C. :		
		0 . 00
ರಿಯಾಯಿತಿ/ Rebates, TOD charges :		
ಪವರ್ ಪಾಕ್ಸರ್ ದಂಡ / PF Penalty :		0 . 00
ಹ.ಲೋ. ದಂಡ /Ex.Load/MD Penalty:		0 . 00
ಬಡ್ಡಿ / Interest :		
ಇತರೆ / Others :		
ತರಿಗೆ / Tax :		78 . 42
ಒಟ್ಟುಬಿಲ್ ಮೊತ್ತ /Current Bill Amt.:	2038.92	
ಬಾಕಿ / Arrears :		
ಜಮ್ಮೆ / Credits & Adj. :		
ಸರ್ಕಾರದ ಸಹಾಯಧನ /GOK Subsidy :		
ಖಾದ್ಯತಿಖಿನಿಕಾದ ಮೊತ್ತ/Net Amt. Due :		
ಪಾವತಿ ಕಡೆಗೆ ದಿನಾಂಕ/Due Date : 15 / 09 / 2016		
Amount to be paid ASD Amount to be paid:500 Rs		
Amount to be paid ASD Amount to be paid:500 Rs		
Amount to be paid ASD Amount to be paid:500 Rs		

110015764929269 09/10/2013 15:42

3<

Fixed Charges for Sanctioned Load

Tariff Slabs for Residential

What you will pay now

DOMESTIC CONSUMERS

URBAN AREAS

Monthly consumption	Old rates /unit	New rates /unit
Up to 30 units	₹3	₹3.25
Between 31 and 100 units	₹4.40	₹4.70
101 to 200 units	₹5.90	₹6.25
Above 200 units	₹6.90	₹7.30

RURAL AREAS

Monthly consumption	Old rates /unit	New rates /unit
Up to 30 units	₹2.90	₹3.15
Between 31 and 100 units	₹4.10	₹4.40
101 to 200 units	₹5.60	₹5.95
Above 200 units	₹6.40	₹6.80

Fixed charges up in the range of ₹5/KW to ₹10/KW

INDUSTRIAL

LT industrial consumers
Overall increase of 10 to 20 paise a unit

HT industrial users
Increase in tariff in the range of 20 paise to 40 paise a unit

COMMERCIAL CONSUMERS

LT category
Increase of 35 paise a unit
HT category
Increase of 20 to 40 paise a unit

1. The list of loads and average consumption hours per day of a typical household is given below:

S.No.	Name of the Appliance	Wattage	Average consumption hours per day
1.	4 Incandescent Bulbs	60W/Bulb	10 hours each
2.	4 Ceiling fans	75W/fan	12 hours each
3.	Geysers	1 KW	1 hour
4.	Refrigerator	100W	16 hours
5.	Television	50W	10 hours
6.	Mixer Grinder	750W	1 hour

Considering a 30 day month, Determine

- i) Total number of units consumed in a month
- ii) Monthly bill for the above consumption units considering a domestic connection of 3KW sanctioned load with the tariff details given below:

S.No	Type of Charges	Tariff Details	
1.	Fixed Charges for the sanctioned load	Rs. 50 /- for first KW Rs. 60/- for every additional KW	
2.	Energy consumption Charges	0 to 30 units @ Rs. 3.5 per unit 31 to 100 units @ Rs. 4.95 per unit 101 to 200 units @ Rs. 6.50per unit 201 to 300 units @ Rs. 7.55 per unit 301 to 400 units @ Rs. 7.60 per unit Above 400 units @ Rs. 7.65per unit	

Consider a tax 7.3% on Energy charges. Neglect any other charges.

Text Book:

1. "Basic Electrical Engineering" S.K Bhattacharya, 1st Edition Pearson India Education Services Pvt. Ltd., 2017
2. "Basic Electrical Engineering", D. C. Kulshreshtha, 2nd Edition, McGraw-Hill. 2019
3. "Special Electrical Machines" E G Janardanan, PHI Learning Pvt. Ltd., 2014

Reference Books:

1. "Engineering Circuit Analysis" William Hayt, Jack Kemmerly, Jamie Phillips and Steven Durbin, 10th Edition McGraw Hill, 2023
2. "Electrical and Electronic Technology" E. Hughes (Revised by J. Hiley, K. Brown & I.M Smith), 12th Edition, Pearson Education, 2016.



PES
UNIVERSITY

THANK YOU

Jyothi T N

Department of Electrical & Electronics Engineering

jyothitn@pes.edu