

Accredited by NAAC with 'B+' Grade, 2(f) & 12B Status Institution by UGC

IG Valley, Madurai Main Road, Manikandam, Tiruchirappalli - 620012

## **NAAC DOCUMENTS**

**QUALITY INDICATOR FRAME WORK** 

**CRITERION – 1** 

## **CURRICULAR ASPECTS**

SUBMITTED BY

**IQAC** 

INTERNAL QUALITY ASSURANCE CELL INDRA GANESAN COLLEGE OF ENGINEERING





### DEPARTMENT OF ELECTRICAL AND ELECTRINICE ENGINEERING

### ACADEMIC YEAR 2022-2023 / ODD SEMESTER

### 1.2 Academic Flexibility (30)

1.2.1 Number of Certificate/Value added courses offered and online courses of MOOCs, SWAYAM, NPTEL etc. (where the students of the institution have enrolled and successfully completed during the last five years)

### AND

1.2.2 Percentage of students enrolled in Certificate/ Value added courses and also completed online courses of MOOCs, SWAYAM, NPTEL etc. as against the total number of students during the last five years

VAC Title:	POW	POWER GRID PROTECTION									
Resource Per	Resource Person:  Mr.M.Elangovan, Trainer, Startus Electric, Trichy.										
Date of cond	uct fro	m:	30.01.2023		To:	03.02.2023		<b>Duration:</b>	30 Hours		
Organized D	epartm	ent:	ELECTRIC	AL A	ND EI	LECTRINIC	E EN	GINEERIN	iG		
Participant Y	Participant Year: EEE- IV, III, II Sen				ester:	ODD	No.	of Students	of Students Registered:		
Venue: EEE III Year Class Room.											

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### COLLEGE OF ENGINEERING

Madurai Main Road (NH-45B), Manikandam, Tiruchirappalli - 620 012 Approved by AICTE, NewDellin & Affiliated to Anna University, Chemnai NAAC Accredited, 2(F) Status Institution by UGC



### Department of Electrical and Electronics Engineering

### Academic Year 2022-2023 -Odd Semester

25.01.2023

### **DEPARTMENT CIRCULAR**

Department of Electrical and Electronics Engineering and IQAC of IGCE in association with Startus Electric, Trichy is going to organize Value Added Course for all second, Third and Final year students on "Power Grid Protection" from 30.01.2023 to 03.02.2023. Certificates will be issued to the eligible participants at the end of the Course. This training is to be provided in our campus.

Resource Person Detail	Mr.M.Elangovan,     Trainer,     Startus Electric,     Trichy.	
Venue	EEE III yr Classroom, IGCE	

Gr. Ma lath

Principal

Cc:

- · Principal office
- IQAC Co-Ordinator
- Class In charges II, III & IV-Year
- II, III & IV-Year EEE Students
- Office File
- · Notice Board

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.



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### Value Added Course

"Power Grid Protection"

### SYLLABUS

S.NO	TOPIC COVERED	DURATION (in hours)	DATE		
1	Fundamentals of Power System	3	30,01.2023		
2	Fundamentals of Protective Relaying	3	30.01.2023		
3	Current based Relaying Scheme	3	31.01.2023		
4	Protection of Transmission Lines using Distance Relays	3	31.01.2023		
5	Carrier Aided Schemes for Transmission Lines and Auto-reclosing and Synchronizing	3	01.02,2023		
6	Protection of Generators, Transformers, Induction Motors and Bus bars	3	01.02.2023		
7	Protection against Transients and Surges along with System Response to Severe Upsets	3	02.02.2023		
8	Arc Interruption Theory in Circuit Breaker,	3	02.02.2023		
9	Types of Circuit Breakers and their Testing	3	03.02.2023		
10	Testing, Commissioning and Maintenance of Relays	3	03.02.2023		
11	Exam	1	03.02.2023		
ty – na military distribunius drum appille	Total Hours (Excluding Exam)	30	_		

John Teifer VAC Coordinator

Gr. Malathi HOD/EEE

Dr. G. Balakrishnan, M.E., Ph.D.,

Principal
Indra Ganesan College of Engineering
IG Valley, Madurai Main Road
Manikandam, Trichy-620 012.



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### Value Added Course

"Power Grid Protection"

### STUDENTS PARTICIPATION LIST

S.N O	Register Number	Name	Department
1	811219105002	M.BARATH	IV/EEE
2	811219105003	A.MANIKANDAN	IV/EEE
3	811219105005	C.PONNALAGU	IV/EEE
4	811219105006	A.SALAMON	IV/EEE
5	811219105007	M.SARAVANAKUMAR	IV/EEE
6	811219105008	K.SOLAIMATHI	IV/EEE
7	813919105001	P.DHEVENTHIRAN	IV/EEE
8	811219105301	A. VENKATRAMAN	IV/EEE
9	811220105001	ABINESH T	III/EEE
10	811220105002	ALEX IMMANVEL S	III/EEE
11	811220105006	BALAMURUGAN A	III/EEE
12	811220105011	DIVYA B	III/EEE
13	811220105013	GAYATHRI M	III/EEE
14	811220105017	KARTHIK D	III/EEE
15	811220105019	LATCHIYA K	III/EEE
16	811220105022	MANIKANDAN K	III/EEE
17	811220105023	MOHANDOSS S	III/EEE





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S.N O	Register Number	Name	Department
18	811220105024	NAVEEN R	III/EEE
19	811220105031	SANDURU K	III/EEE
20	811220105032	SANTHIYA A	III/EEE
21	811220105035	SHANMUGAM S	III/EEE
22 811220105037		SNEKA T	III/EEE
23	811220105038	SOPHIYA K	III/EEE
24	811220105301	AARTHI S	III/EEE
25	811220105303	THIRUNAVUKARASU M	III/EEE
26	811220105305	VENKATESHWARAN.A	III/EEE
27	811220105306	DIVYA BHARATHI	III/EEE
28	811220105307	SATHEESH KUMAR	III/EEE
29	811221105012	HARIHARAN E	II/EEE
30	811221105018	LINGESWARAN R	II/EEE
31	811221105027	SANGILI S	II/EEE
32	811221105039	SRIKANTH M	II/EEE

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## **Department of Electrical and Electronics Engineering**

Academic Year 2022-2023 - Odd Semester

## STUDENTS ATTENDANCE LIST

### Value Added Course

"Power Grid Protection"

			"Powe	orio is	11010	CIOIL									
				30.01	.2023	31.01	.2023	01.02	.2023	02.02	.2023	03.02	.2023	NO OF SESSIONS	SIGNA OF THE
S.NO	Register Number	Name	YEAR/ BRANCH	FN	AN	FN	AN	FN	AN	FN	AN	FN	AN	ATTENDED	STUDENT
			IV/EEE								<u></u>	/		10	H. Bara
1	811219105002	M.BARATH				-		-				1		10	Mand K
2	811219105003	A.MANIKANDAN	IV/EEE	/	~	/	~							9	Pom
3	811219105005	C.PONNALAGU	IV/EEE	/	1	/	a				0			9	Je Sul
4	811219105006	A.SALAMON	IV/EEE	/		~		-	/		a	0	-	a	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
5	811219105007	M.SARAVANAKUMAR	IV/EEE	/	a	-	-	/		-	-	0		a	M. Serra
6	811219105008	K,SOLAIMATHI	IV/EEE	~	~	V	~	/	a	1					Polier
7	813919105001	P.DHEVENTHIRAN	IV/EEE				1	/	V	~	V	/	1	10	Dher
8	811219105301	A. VENKATRAMAN	IV/EEE	~		,	/	a		V	~	~		9	Vefteral
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12	811220105011	DIVYA B	III/EEE	~	0	~	·V	- ~	V	CL	- 1	/	1		Divy
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S.NO	Register	Name	YEAR/	30.0	1.2023	31.01	1.2023	01.02	2.2023	02.02	2.2023	03.02	2.2023	NO OF	CICNIA
	Number		BRANCH	FN	AN	FN	AN	FN	AN	FN	AN	FN	AN	SESSIONS	SIGNA OF THE
14	811220105017	KARTHIK D	III/EEE	1	-								7 81 4	ATTENDED	STUDENT
15	811220105019	LATCHIYA K	III/EEE	1			_		~	~		/	~	10	Krething ( )
16	811220105022	MANIKANDAN K	III/EEE	V	V		a			~	V	/	/	9	Latchya
17	811220105023		III/EEE	~	01	-	V	a	CL	V	~		/	- 8	Man kanda
18	811220105024	NAVEEN R	III/EEE	a	CL				V	~		/	/	8	Mohanhord
19	811220105031	SANDURU K	III/EEE	V		V	V	V	V	/	a	<u></u>	~	g	Davark
20	811220105032	SANTHIYA A	III/EEE		~		V	V		V	V		~	10	Sandren
21	811220105035	SHANMUGAM S	III/EEE	V	~	a	-		~	V		~	~	9	Santrue
22	811220105037	SNEKA T	III/EEE		V	V		/	V	a	OL	0	/	8	Shann
23	811220105038	SOPHIYA K	TIT/EID	V			CL	~	~	-				9	Sneka.
24	811220105301	AARTHI S	III/EEE				-	V	V	V	V		/	lo	Sophing
25	811220105303	THIRUNAVUKARASU M	III/EEE		-		-	V	-	V	V	/		10	AARTAY
26	811220105305	VIDALIZ A CINCOTTO	III/EEE	V			-	~	~	1				10	Rome
27	811220105306	DIVIZA DILABAGO	III/EEE				1		-					10	Vealent
	811220105307	CATHERON STATE	III/EEE	a	V		1	0	~		<u></u>		V.	9	Dun
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B	D. males				4			a	1	V		c		9	En light

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Dr. G. Balakrishnan, M.E., Ph.D., Principal

Indra Ganesan College of Engineering
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G. Malati





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Name	of the	Student:
Tame	OI HIC	Studente

Year/Sem:

AU Register Number:

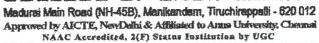
Value Added Course										
	"Power Grid Protection"									
	MULTIPLE CHOICE QUESTIONS (25X1 = 25 Marks)									
1.	Which of the follo	wing circuit breakers l	has the lowest o	perating voltage?						
	(a) SF6 gas.	(b) Air-break.	c) Air-blast.	(d) Minimum oil.						
2.	Which of the follo	owing circuit breakers	produce the lea	st arc energy?						
	(a) Plain oil.	(b) Minimum oil.	(c) Air-blast.	(d) Air break.						
3.	Which of the folio	owing circuit breakers	has high reliabi	lity and negligible maintenance?						
	(a) Air-blast.	(b) SF6 (c) Oil	. (d) Va	cuum.						
4. V	Vhich of the follow	ing circuit breakers tal	ke minimum tir	ne in installation?						
	(a) Air-blast.	(b) Minimum oil.	(c) Bulk oil.	(d) SF6						
5. V	Vhere voltages are	high and current to be	interrupted is	low, the circuit breaker preferred						
is	one.									
	(a) air-break	(b) vacuum	(c) oil	(d) air-blast						
6. F	6. For rural electrification in a country like India with complex network, the circuit breaker									
pre	ferred isone	ė.								
	(a) air-break	(b) oil	(c) vacuum	(d) minimum oil						
			./							

Dr. G. Balakrishnan, M.E., Ph.D.,

Principal

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.







7. The most suitable circuit breaker for short line fault without switching resistor isone.									
(a) Minimum oil	(b) air-blast	(c) SF6	(d) air-break						
8. The rating of a circuit breaker is usually determined on the basis offault.									
(a) Symmetrical (c) single line to groun	(b) line to line d (d) double line								
9. The transient phenomenon lasts in a power system for a period ranging from									
(a) Few ms to 1 s (b) 1 s to 2 s (c) 2 s to 3 s. (d) greater than 3 s.									
10. Circuit breakers usually operate under									
<ul> <li>(a) Steady short-circuits current.</li> <li>(b) Sub-transient state of short-circuit current.</li> <li>(c) Transient state of short-circuit current.</li> <li>(d) None of these</li> </ul>									
11. The restriking vol	tage is measured in								
(a) RMS value.	(b) Peak value.	(c) Instantaneo	us value.	(d) Average value.					
12. The making and b	oreaking currents of 3-p	ohase ac circuit	breakers in pow	er system are					
(a) rms value, rms value.		ous value, rms va ous value, instant							
13. The making to breaking current ratio for an EHV circuit breaker is									
(a) More than 1.	(b) Equal to 1.	(c) Less than 1.	(d) A ne	egative number.					
14. The making capacity of a circuit breaker is									
<ul> <li>(a) Less than the asymmetrical breaking capacity of the breaker.</li> <li>(b) Greater than the asymmetrical breaking capacity of the breaker.</li> <li>(c) Equal to the symmetrical breaking capacity of the breaker.</li> <li>(d) Equal to the asymmetrical breaking capacity.</li> </ul>									



### EGE OF ENGINEERING





15.	Which	of the	following	statements	is	not	correct?
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- (a) Arc chutes are used in air break circuit breakers.
- (b) Air-blast circuit breakers are employed for high voltage traction system.
- (c) Resistance switching is employed for overcoming current chopping.
- (d) Linear resistors are used in resistance switching.
- 16. Capacitor switching in 33 kV power systems is better done with......circuit breakers.
- (a) air-blast
- (b) minimum oil
- (c) vacuum
- 17. The probable cause(s) for fall in insulation resistance between phase terminal and earthed frame could be
- (a) Dirty insulation surface.
- (b) Ingress of moisture.
- (c) Sticking of carbon or copper particles to the internal surface.
- (d) all of the above.
- 18. The probable cause(s) for failure of a circuit breaker on electrical compound could be
- (a) Trip circuit open.
- (b) Trip latch defective.
- (c) Spring defective.
- (d) Any of the above.

### 19. An isolator is installed

- (a) To isolate one portion of the circuit from another.
- (b) Usually on both sides of a circuit breaker.
- (c) As a substitute for a circuit breaker.
- (d) Both (a) and (b).
- 20. Current rating is not necessary in case of
- (a) Isolators.
- (b) Circuit breakers.
- (c) Load break switches.
- (d) Circuit breakers and load break switches.

Dr. G. Balakrishnan, M.E., Ph.D.,

**Principal** 

**Indra Ganesan** College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.



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(a) Breaking abnormal current.

- (b) Making under fault condition.
- (c) Breaking the circuit under no-load condition.
- (d) None of the above.
- 22. Isolators used in transmission lines are capable of breaking:
- (a) Fault current.
- (b) No current.
- (c) Charging current.
- (d) All the above
- 23. For a fault at the terminals of synchronous generator, the fault current is maximum for a
- (a) 3-phase fault.
- (b) 3-phase to ground fault.
- (c) line-to-ground fault.
- (d) line-to-line fault.
- 24. If all the sequence voltages at the fault point in a power system are equal, then the fault is a
- (a) three-phase fault.
- (b) line-to ground fault.
- (c) line-to-line fault.
- (d) double-line-to ground fault.
- 25. The material used in liquid fuses is
- (a) SF6
- (b) distilled water.
- (c) Carbon tetra chloride.
- (d) Transformer oil.

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Principal

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Manikandam, Trichy-620 012.



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### Value Added Course

"Power Grid Protection"

### Answer Kev

1	b	6	c	11	Ъ	16	C	21	c
2	c	7	c	12	d	17	d	22	c
3	b	8	a	13	a	18	d	23	c
4	d	9	a	14	b	19	d	24	đ
5	ь	10	b	15	d	20	a	25	c

Schu Jerife VACCOORDINATOR

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Principal

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## COLLEGE OF ENGINEERING



INSTITUTIONS	Madurai Main Road (NH-45B), Manikandam, Tiruchirappalli - 620 0 Approved by AICTE, NewDelhi & Affiliated to Anna University, Chem NAAC Accredited, 2(F) Status Institution by UGC

Name of the Student: M. Baxath

Year/Sem: 14/VII

	He of the progent.				1 2
ΑU	Register Number	: 8112191056	002		( 7
		Value A	Added Cours	se	
		"Power	Grid Protection	n <b>"</b>	
	ļ	MULTIPLE CHOICE	QUESTIONS (25	X1 = 25 Marks	
1.	Which of the fol	lowing circuit breakers	s has the lowest op	erating voltage?	
	(a) SF6 gas.	(b) Air-break.	c) Air-blast.	(d) Minimum oil.	
2.	Which of the fo	llowing circuit breakers	s produce the leas	t arc energy?	
	(a) Plain oil.	(b) Minimum oil.	(c) Air-blast.	(d) Air break.	
3.	Which of the fo	llowing circuit breaker	s has high reliabil	ity and negligible main	tenance?
	(a) Air-blast.	(b) 9F6 (c) C	oil. (d) Vac	cuum.	
4.	Which of the follo	owing circuit breakers	take minimum tin	ne in installation?	
	(a) Air-blast.	(b) Minimum oil.	Bulk oil.		
5.	Where voltages a	re high and current to	be interrupted is l	low, the circuit breaker	preferred
	one.				
	(a) air-break	(b) acuum	(c) oil	(d) air-blast	
6	For rural electrif	fication in a country lik	e India with comp	olex network, the circui	t breaker
	referred is				
Pi	referred is			(1) winimum oil	
	(a) air-break	(b) if	(c) vacuum	(d) minimum oil	
			100		
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Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road

Manikandam, Trichy-620 012.



(d) Equal to the asymmetrical breaking capacity.

## Indra Ganesan

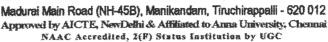


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7. The most suitab	le circuit breaker for	r short line fault with	out switchin	g resistor isone.		
(a) Minimum oil	(b) air-blast	(G) F6	(d) air-break	k		
8. The rating of a c	ircuit breaker is usu	ally determined on th	he basis of	fault.		
(a) Symmetrical (c) single line to gro	(b) line to	o line le line to ground		¥		
9. The transient ph	enomenon lasts in a	power system for a p	eriod rangin	g from		
(a) Few ms to 1 s	(b) 1 s to 2 s (c)	c) 2 s to 3 s. (d) great	ater than 3 s.			
10. Circuit breaker	s usually operate und	der				
(a) Steady short-circle (c) Transient state of	uits current. short-circuit current.	(b) Sub-transier (d) None of the		rt-circuit current.		
11. The restriking v	oltage is measured in	1				
(a) RMS value.	(b) Peak value.	(c) Instantaneou	ıs value.	(d) Average value.		
12. The making and respectively in what		f 3-phase ac circuit b	reakers in po	ower system are		
(a) rms value, rms value. (b) Instantaneous value, rms value. (c) rms value. (d) Instantaneous value, instantaneous value.						
13. The making to breaking current ratio for an EHV circuit breaker is						
(a) Nore than 1.	(b) Equal to 1.	(c) Less than 1.	(d) A	negative number.		
14. The making capacity of a circuit breaker is						
(a) Less than the asym (b) Greater than the as (c) Equal to the symmetry	ymmetrical breaking	capacity of the breaker	r. \	D:-		



### COLLEGE OF ENGINEERING





15.	Which	of th	e following	statements	is	not	correct?
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- (a) Arc chutes are used in air break circuit breakers.
- (b) Air-blast circuit breakers are employed for high voltage traction system.
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- minimum oil
- (c) vacuum
- 17. The probable cause(s) for fall in insulation resistance between phase terminal and earthed frame could be
- (a) Dirty insulation surface.
- (b) Ingress of moisture.
- (c) Sticking of carbon or copper particles to the internal surface.
- dall of the above.
- 18. The probable cause(s) for failure of a circuit breaker on electrical compound could be
- (a) Trip circuit open.

(b) Trip latch defective.

(c) Spring defective.

Any of the above.

### 19. An isolator is installed

- (a) To isolate one portion of the circuit from another.
- (b) Usually on both sides of a circuit breaker.
- (c) As a substitute for a circuit breaker.
- (d) Both (a) and (b).
- 20. Current rating is not necessary in case of

(a) Isolators.

(b) Circuit breakers.

(c) Load break switches.

(d) Circuit breakers and load break switches.

Dr. G. Balakrishnan, M.E., Ph.D.,

Principal

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.





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NAAC Accredited, 2(F) Status Institution by UGC				

21. An isolator is meant for							
(a) Breaking abnormal current. (b) Making under fault condition.							
(c) Breaking the circuit under no-	-load condition.	(d) None of the above.					
22. Isolators used in transmission lines are capable of breaking:							
(a) Fault current. (b)	No current.						
(c) Charging current. (d)	All the above						
23. For a fault at the terminals of	synchronous generato	r, the fault current is maximum for a					
	3-phase to ground fault line-to-line fault.	t.					
24. If all the sequence voltages at	the fault point in a pov	ver system are equal, then the fault is a					
(a) three-phase fault. (b) line-to ground fault. (c) line-to-line fault. (d) double-line-to ground fault.							
25. The material used in liquid fuses is							
(a) SF6 (b) distilled water.	(c) Parbon tetra ch	loride. (d) Transformer oil.					



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Name of the Student: HARIHARANE

Year/Sem: II / III

AU Register Number: 811 2 21105012

		Value.	Added Cou	rse	1/25
		"Power	r Grid Protecti	on"	
		MULTIPLE CHOICE	QUESTIONS (2	25X1 = 25 Marks)	
1.	Which of the fo	ollowing circuit breaker	rs has the lowest o	operating voltage?	
	(a) SF6 gas.	(b) Air-break.	c) Air-blast.	(d) Minimum oil.	
2.	Which of the fo	llowing circuit breaker	rs produce the lea	st arc energy?	
	(a) Plain oil.	(b) Minimum oil.	Air-blast.	(d) Air br	eak.
3.	Which of the fo	llowing circuit breaker	s has high reliabi	lity and negligible	maintenance?
	(a) Air-blast.	(c) C	Oil. (d) Va	cuum.	
4. \	Which of the follo	owing circuit breakers t	ake minimum tin	ne in installation?	
	(a) Air-blast.	(b) Minimum oil.	Bulk oil.	(d) SF6	
5. V	Where voltages ar	re high and current to b	oe interrupted is	low, the circuit bre	aker preferred
is	one.	/			
	(a) air-break	(6) vacuum	(c) oil	(d) air-bla	st
6. I	For rural electrifi	cation in a country like	India with comp	lex network, the ci	rcuit breaker
pre	ferred iso	ne.			
	(a) air-break	(b) oil	Vacuum	(d) minimum oil	
		10:1			



### COLLEGE OF ENGINEERING





7. The most suitable circuit breaker for short line fault without switching resistor is	ne.					
(a) Minimum oil (b) air-blast (c) SF6 (d) air-break						
8. The rating of a circuit breaker is usually determined on the basis offault.						
(a) Symmetrical (b) line to line (c) single line to ground (b) line to line (c) double line to ground						
9. The transient phenomenon lasts in a power system for a period ranging from						
Few ms to 1 s (b) 1 s to 2 s (c) 2 s to 3 s. (d) greater than 3 s.						
10. Circuit breakers usually operate under						
<ul> <li>(a) Steady short-circuits current.</li> <li>(b) Sub-transient state of short-circuit current.</li> <li>(c) Transient state of short-circuit current.</li> <li>(d) None of these</li> </ul>						
11. The restriking voltage is measured in						
(a) RMS value. (c) Instantaneous value. (d) Average value.	lue.					
12. The making and breaking currents of 3-phase ac circuit breakers in power system are respectively in what form?						
(a) rms value, rms value. (b) Instantaneous value, rms value. (d) Instantaneous value, instantaneous value.						
13. The making to breaking current ratio for an EHV circuit breaker is						
(a) More than 1. (b) Equal to 1. (c) Less than 1. (d) A negative number.						
14. The making capacity of a circuit breaker is						
(a) Less than the asymmetrical breaking capacity of the breaker. (b) Greater than the asymmetrical breaking capacity of the breaker. (c) Equal to the symmetrical breaking capacity of the breaker. (d) Equal to the asymmetrical breaking capacity.						



### COLLEGE OF ENGINEERI





### 15. Which of the following statements is not correct?

- (a) Arc chutes are used in air break circuit breakers.
- (b) Air-blast circuit breakers are employed for high voltage traction system.
- (c) Resistance switching is employed for overcoming current chopping.
- (d) Linear resistors are used in resistance switching.
- 16. Capacitor switching in 33 kV power systems is better done with......circuit breakers.
- (a) air-blast
- (b) minimum oil



### 17. The probable cause(s) for fall in insulation resistance between phase terminal and earthed frame could be

- (a) Dirty insulation surface.
- (b) Ingress of moisture.
- (c) Sticking of carbon or copper particles to the internal surface.
- (a) all of the above.
- 18. The probable cause(s) for failure of a circuit breaker on electrical compound could be
- (a) Trip circuit open.
- (b) Trip latch defective.
- Spring defective.
- (d) Any of the above.

### 19. An isolator is installed

- (a) To isolate one portion of the circuit from another.
- (b) Usually on both sides of a circuit breaker.

20. Current rating is not necessary in case of

- (c) As a substitute for a circuit breaker.
- (d) Both (a) and (b).

Dr. G. Balakrishnan, M.E., Ph.D.,

Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road

(a) Isolators. c Load break switches. (b) Circuit breakers.

Manikandam, Trichy-620 012. (d) Circuit breakers and load break switches.

21. An isolator is meant for

Breaking abnormal current.

(b) Making under fault condition.

(c) Breaking the circuit under no-load condition.

(d) None of the above.







22.	<b>Isolators</b>	used in	n transmission	lines are	capable of	breaking:
	200101010	4044 11	* ** ******************	HIREOU MI C	cabante or	. vi caminz.

(a) Fault current.

(b) No current.

(c) Charging current.

(d) All the above

23. For a fault at the terminals of synchronous generator, the fault current is maximum for a

(a) 3-phase fault.

(b) 3-phase to ground fault.

(c) ine-to-ground fault.

(d) line-to-line fault.

24. If all the sequence voltages at the fault point in a power system are equal, then the fault is a

(a) three-phase fault.

line-to ground fault.

(c) line-to-line fault.

(d) double-line-to ground fault.

25. The material used in liquid fuses is

(a) SF6

(b) distilled water.

Carbon tetra chloride.

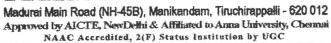
(d) Transformer oil.

Dr. G. Balakrishnan, M.E., Ph.D.,

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.



### COLLEGE OF ENGINEERING





Name of the Student:	B. DIVYA		Year/Sem: 111 / V
AU Register Number:	811220,109	5011	
	Value A	Added Cour	rse
	"Power	Grid Protection	on"
<u>M</u>	ULTIPLE CHOICE	QUESTIONS (2	5X1 = 25  Marks
	wing circuit breakers		
(a) SF6 gas.	(b) Air-break.	c) Air-blast.	(d) Minimum oil.
(	wing circuit breakers		
(a) Plain oil.	(b) Minimum oil.	(c) Air-blast.	(d) Air break.
3. Which of the follo	wing circuit breakers	has high reliabi	lity and negligible maintenance?
(a) Air-blast.	(c) O	il. (d) Va	cuum.
4. Which of the followi	ing circuit breakers ta	ake minimum tin	ne in installation?
(a) Air-blast.	(b) Minimum oil.	(c) Bulk oil. (	(d) SF6
5. Where voltages are	high and current to b	e interrupted is l	ow, the circuit breaker preferred
isone.	*		
(a) air-break	(b) acuum	(c) oil	(d) air-blast
6. For rural electrificat	tion in a country like	India with comp	lex network, the circuit breaker
preferred isone	,		
(a) air-break	(b) oil	(c) acuum	(d) minimum oil







7. The most suitable circuit breaker for short line fault without switching resistor is......one.



Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

(a) Minimum oil	pir-blast	(c) SF6	(d) air-break	
8. The rating of a circ	cuit breaker is usually d	letermined on tl	ne basis of	.fault.
(a) Symmetrical (e) single line to groun	(b) line to line and (d) double line	to ground		ner -
9. The transient phen	omenon lasts in a powe	r system for a p	eriod ranging f	rom
(a) few ms to 1 s	(b) 1 s to 2 s (c) 2 s	to 3 s. (d) gre	ater than 3 s.	
10. Circuit breakers	usually operate under			
(a) Steady short-circuit (c) Transient state of sl		(b) Sub-transie (d) None of the	nt state of short- se	circuit current.
11. The restriking vol	ltage is measured in			
(a) RMS value.	(b) Peak value.	(c) Instantaneou	us value.	(d) Average value.
12. The making and b	oreaking currents of 3-p	hase ac circuit l	oreakers in pow	ver system are
respectively in what f	orm?			
(a) rms value, rms value (c) rms value.		us value, rms val us value, instanta		
13. The making to bre	eaking current ratio for	an EHV circuit	breaker is	
(a) More than 1.	(b) Equal to 1.	(c) Less than 1.	(d) A n	egative number.
14. The making capac	ity of a circuit breaker i	is		
(b) Greater than the asy (c) Equal to the symme	netrical breaking capacity mmetrical breaking capacity trical breaking capacity o etrical breaking capacity.	city of the breaker.		alakrishnan, M.E., Ph.D







### 15. Which of the following statements is not correct?

- (a) Arc chutes are used in air break circuit breakers.
- (b) Air-blast circuit breakers are employed for high voltage traction system.
- (c) Resistance switching is employed for overcoming current chopping.
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17. The probable cause(s) for fall in insulation resistance between phase terminal and earthed frame could be

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- (b) Ingress of moisture.
- (c) licking of carbon or copper particles to the internal surface.
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Dr. G. Balakrishnan, M.E., Ph.D.,

**Principal** Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

20. Current rating is not necessary in case of

Isolators.

(b) Circuit breakers.

C Load break switches.

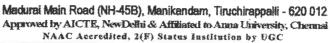
(d) Circuit breakers and load break switches.



(a) SF6

(b) distilled water.

### COLLEGE OF ENGINEERING





21. An isolator is meant fo	or	
(a) Breaking abnormal cu	rrent.	(b) Making under fault condition.
(c) Breaking the circuit u	nder no-load condition.	(d) None of the above.
22. Isolators used in trans	mission lines are capable of	f breaking:
(a) Fault current.	No current.	
(c) Charging current.	(d) All the above	
23. For a fault at the term	inals of synchronous genera	ator, the fault current is maximum for a
(a) 3-phase fault. (c) ine-to-ground fault.	(b) 3-phase to ground fa (d) line-to-line fault.	ault.
24. If all the sequence volt	ages at the fault point in a p	power system are equal, then the fault is a
(a) three-phase fault. (c) line-to-line fault.	(b) line-to ground fault. (d) louble-line-to groun	nd fault.
25. The material used in li	quid fuses is	

(c) Carbon tetra chloride.

Dr. G. Balakrishnan, M.E., Ph.D., Principal Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.

(d) Transformer oil.



# Indra Ganesan COLLEGE OF ENGINEERING Merkursi Mela Rosel (NH-45R) Menikandam Tinuchiyangalik - 620 012

Madurai Main Road (Nii-45B), Manikandam, Tiruchirappalii - 620 012 Apparwed by AICTE, NewDelhi & Affiliand to Anna University, Chemosi NAAC Accredited, 2(F) Status Institution by UGC

### **Department of Electrical and Electronics Engineering**

### Academic Year 2022-2023 - Odd Semester

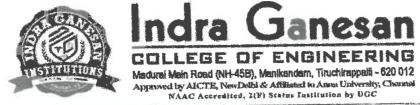
### VALUE ADDED COURSE ASSESMENT SHEET

"Power Grid Protection"

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal

Indra Ganesan College of Engineering
IG Valley, Madurai Main Road
ER A Manikandam, Trichy-620 012.

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S.NO Register Number	Name	YEAR/ BRANCH	No. of Hours Attended	Attendance Mark(100) (A)	No of Correct Answers	MCQ Mark(100) (B)	(50% of A + 50% of B)		
1	811219105002	M.BARATH	IV/EEE	30	100	20	80	90	
2	811219105003	A.MANIKANDAN	IV/EEE	30	100	20	80	90	
3	811219105005	C.PONNALAGU	IV/EEE	27	90	21	84	87	
4	811219105006	A.SALAMON	IV/EEE	27	90	21	84	87	
5	811219105007	M.SARAVANAKUMAR	IV/EEE	27	90	22	88	89	
6	811219105008	K.SOLAIMATHI	IV/EEE	27	90	19	76	83	
7	813919105001	P.DHEVENTHIRAN	IV/EEE	30	100	20	80	90	
8	811219105301	A. VENKATRAMAN	IV/EEE	27	90	23	92	91	
9	811220105001	ABINESH T	III/EEE	27	90	19	76	83	
10	811220105002	ALEX IMMANVEL S	III/EEE	27	90	19	76	83	
11	811220105006	BALAMURUGAN A	III/EEE	30	100	21	84	92	



## Indra Ganesan COLLEGE OF ENGINEERING

Dr. G. Balakrishnan, M.E., Ph.D., Principal

Indra Ganesan College of Engineering IG Valley, Madurai Main Road

Manikandam, Trichy-620 012.

S.NO Register Number	Name	YEAR/ BRANCH	Attendance Details		VAC-MCQ TEST		OVERALL MARK (100)	
			No. of Hours Attended	Attendance Mark(100) (A)	No of Correct Answers	MCQ Mark(100) (B)	(50% of A + 50% of B)	
12	811220105011	DIVYA B	III/EEE	27	90	20	80	85
13	811220105013	GAYATHRI M	III/EEE	30	100	21	84	92
14	811220105017	KARTHIK D	III/EEE	30	100	20	80	90
15	811220105019	LATCHIYA K	III/EEE	27	90	19	76	83
16	811220105022	MANIKANDAN K	III/EEE	24	80	20	80	80
17	811220105023	MOHANDOSS S	III/EEE	24	80	21	84	82
18	811220105024	NAVEEN R	III/EÉE	27	90	22	88	89
19	811220105031	SANDURU K	III/EEE	30	100	20	80	90
20	811220105032	SANTHIYA A	III/EEE	. 27	90	21	. 84	87
21	811220105035	SHANMUGAM S	III/EEE	24	80	20	80	80
22	811220105037	SNEKA T	III/EEE	27	90	21	84	87
23	811220105038	SOPHIYA K	III/EEE	30	100	20	80	90
24	811220105301	AARTHI S	III/EEE	30	100	20	80	90
25	811220105303	THIRUNAVUKARASU M	III/EEE	30	100	21	84	92
26	811220105305	VENKATESHWARAN.A	III/EEE	30	100	21	84	92



## Indra Ganesan COLLEGE OF ENGINEERING



Madurai Main Road (NH-45B), Manikandam, Tituchirappalii - 620 012 Appawed by AICTE, NewDelhi & Affiliated to Anna University, Chemosi NAAC Accredited, 2(E) Status Institution by UGC

S.NO Register Number	Name	YEAR/ BRANCH	Attendance Details		VAC-MCQ TEST		OVERALL MARK (100)	
			No. of Hours Attended	Attendance Mark(100) (A)	No of Correct Answers	MCQ Mark(100) (B)	(50% of A + 50% of B)	
27	811220105306	DIVYA BHARATHI	III/EEE	27	90	22	88	89
28	811220105307	SATHEESH KUMAR	III/EEE	27	90	20	80	85
29	811221105012	HARIHARAN E	II/EEE	27	90	19	76	83
30	811221105018	LINGESWARAN R	II/EEE	27	90	21	84	87
31	811221105027	SANGILI S	II/EEE	30	100	22	88	94
32	811221105039	SRIKANTH M	II/EEE	27	90	20	80	85

VAC Coordinator

Dr. G. Balakrishnan, M.E., Ph.D.,

**Principal** 

Indra Ganesan College of Engineering IG Valley, Madurai Main Road

Montandan Trichy-620 012.

GT. Ma lathi HOD/EEE



VAC Coordinator

## ndra Ganesan



Madural Main Road (NH-45B), Manikandam, Tiruchirappalli - 620 012
Approved by AICTE, NewDelhi & Affiliated to Anna University, Chemsis NAAC Accredited, 2(F) Status Institution by UGC

Title:	«Down	Grid Dr	otection"		-		
Title:	LOWE	CHULL	O(CCIO1)			and a support of the	processors \$5000-00. Supplications
Resource I	ersons:	Mr.M Train	Elangovan, ier.				
		Start	us Electric,				
Date of co	nduct fron		30.01.2023	To:	03.02.2023	Duration:	30 Hours
Organized	Departme	ent:	Electrical and	Electronics	Engineering		
Participant	Year:	2,3,4	" Westerniëren		No. of S	tudents Register	ed: 32
Venue:	EEE III y	r Class	room				
O	utcome o	f Value	Added Cours	e (VAC): At	the end of the Co	ourse, Students	can able to
<ul><li>Desig</li><li>Learn</li></ul>	n the relev the theory	ant pro of arci	ng phenomenoi	for the main n.	elements of a pov		
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Dr. G. Balakrishnan, M.E., Ph.D.,
Principal
Indra Ganesan College of Engineering

IG Valley, Madurai Main Road Manikandam, Trichy-620 012.



### COLLEGE OF ENGINEERING

Medurai Main Road (NH-45B), Manikandam, Tiruchirappali - 620 012 Approved by AICTE, NewDelhi & Affiliated to Arma University, Chemisi NAAC Accredited, 2(F) Status Institution by UGC



### SAMPLE PHOTOS OF VALUE ADDED COURSE "Power Grid Protection" Title: Mr.M.Elangovan, Resource Persons: Trainer. Startus Electric, Trichy. 30 Hours To: 03.02.2023 Duration: 30.01.2023 Date of conduct from: **Electrical and Electronics Engineering** Organized Department: 32 Participant Year: No. of Students Registered: 2,3,4 Venue: EEE III yr Classroom SAMPLE PHOTOS

Delay Juie

Google

GT. Ma Cather HOD/EEE

Manikandam, Tamil Nadu, India PJRQ+H4F, Trichy - Melur Rd, Manikandam, Panjappur, Tamil Nadu 620012, India Lat 10.741419° Long 78.6378° 30/01/23 09:48 AM GMT +05:30

Principal





This is to certify that Mr. A.MANIKANDAN, IV Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

Startus Electric

Mr.L.Ramesh

Chief Executive Officer.

Dr. G. Balakrishnan, M.E., Ph.D., Principal

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012. lastri.

Principal

IGCE





This is to certify that Ms. C.PONNALAGU, IV Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

Startus Electric

Mr.L.Ramesh

Chief Executive Officer.

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012. Joseph .



This is to certify that Mr. A.SALAMON, IV Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

Startus Electric

Mr.L.Ramesh

Chief Executive Officer.

Dr. G. Balakfishnan, M.E., Ph.D., Principal

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012. looker.





This is to certify that Mr. M.SARAVANAKUMAR, IV Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

Startus Electric

Mr.L..Ramesh

Chief Executive Officer.

Dr. G. Balakrishnan, M.E., Ph.D.,

Indra Ganesan College of Engineering
IG Valley, Madural Main Road
Mentionders This Seasons

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# ndra Ganesan Cipule Be Cif Engine ERING Madural Mein Road (NH-45B), Manikandam, Trichy-1:2. Approved by Aicte, NewDollit & Affiliated to Anna University, Chennai

## CERTIFICATE OF PARTICIPATION

This is to certify that Ms. K.SOLAIMATHI, IV Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

Startus Electric

Mr.L.Ramesh

Chief Executive Officer.

Dr. G. Halakishnan, M.E., Ph.D.,

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012. lasky.

Principal

**IGCE** 





This is to certify that Mr. P.DHEVENTHIRAN, IV Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

Startus Electric

Mr.L.Ramesh

Chief Executive Officer.

Dr. G. Balakr Shnan, M.E., Ph.D

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012. looky.





This is to certify that Mr. NAVEEN R, III Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30th January 2023 to 3rd January 2023 (5days) during the Academic year 2022-2023.

Startus Electric

Mr.L.Ramesh

Chief Executive Officer.

Principal

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 Q1





This is to certify that Mr. BALAMURUGAN A, III Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

Startus Electric

Mr.L.Ramesh

Chief Executive Officer.

Dr. G. Balakrichnan, M. F., Fu.

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012. looky.





This is to certify that Mr. KARTHIK D, III Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30th January 2023 to 3rd January 2023 (5days) during the Academic year 2022-2023.

Startus Electric

Mr.L.Ramesh

Chief Executive Officer.

Dr. G. Balakrishnan, M.E., r'ii...

Principal
Indra Ganesan College (5)

Indra Ganesan College of Engineering IG Valley, Madural Main Road Manikandam, Trichy-620 012 looker.





This is to certify that Mr. MANIKANDAN K, III Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

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Mr.L.Ramesh

Chief Executive Officer.

Joseph .

Principal





This is to certify that Ms. SANTHIYA A, III Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30th January 2023 to 3rd January 2023 (5days) during the Academic year 2022-2023.

Startus Electric

Mr.L.Ramesh

Chief Executive Officer.

Dr. G. Balakushani, N.E., r

Indra Ganesan College of Engineering
IG Valley, Madurai Main Road
Manikandam, Trichy-620 012.

last .





This is to certify that Mr. THIRUNAVUKARASU M, III Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

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Mr.L.Ramesh

Chief Executive Officer.

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Principal IGCE

r. G. Balakrishnan, M.E., Ph.D.

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012.





This is to certify that Mr. SHANMUGAM S, II Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

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Mr.L.Ramesh

Chief Executive Officer.

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Principal

IGCE

Principal
Indra Ganesan College of Engineering
IG Valley, Madurai Main Road
Manikandam, Trichy-620 012.





This is to certify that Ms. LATCHIYA K, III Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30th January 2023 to 3rd January 2023 (5days) during the Academic year 2022-2023.

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Mr.L.Ramesh

Chief Executive Officer.

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal

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IG Valley, Madurai Main Road
Manikandam, Trichy-620 012.

looker.

Principal





This is to certify that Mr. HARIHARAN E, II Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

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Mr.L.Ramesh

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Dr. G. Balakrishnan, M.E., Ph.D.

Principal

Indra Ganesar G. III

Indra Ganesan College of Engineering IG Valley, Madurai Main Road Manikandam, Trichy-620 012. looker.

Principal





This is to certify that Mr. LINGESWARAN R, II Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

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Mr.L.Ramesh

Chief Executive Officer.

Dr. G. Balakrishnan, M.E., Ph.D.,

Principal

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This is to certify that Mr.SANGILI S, III Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30<sup>th</sup> January 2023 to 3<sup>rd</sup> January 2023 (5days) during the Academic year 2022-2023.

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Mr.L.Ramesh

Chief Executive Officer.

Dr. G. Balak Dinan, M.E., Ph.D..
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This is to certify that Mr. SRIKANTH M, III Year, EEE has successfully completed the Value Added Course on "Power Grid Protection" organized by Department of Electrical & Electronics Engineering and IQAC of our Institution in Association with Startus Electric from 30th January 2023 to 3rd January 2023 (5days) during the Academic year 2022-2023.

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