GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

Course Title: Power System Analysis Lab (GR20A3096)
Following documents are available in Course File.

S.No.	Points	Yes	No
1	Institute and Department Vision and Mission Statements	√	
2	PEO & PO Mapping	√	
3	Academic Calendar	√	
4	Subject Allocation Sheet	√	
5	Class Time Table, Individual Timetable (Single Sheet)	√	
6	Syllabus Copy	√	
7	Course Handout	√	
8	CO-PO Mapping	√	
9	CO-Cognitive Level Mapping	√	
10	Lecture Notes	√	
11	Tutorial Sheets With Solution		√
12	Soft Copy of Notes/Ppt/Slides		√
13	Sessional Question Papers and Scheme of Evaluation		√
14	Best, Average and Weak Answer Scripts for Each Sessional Exam. (Photocopies)	√	
15	Assignment Questions and Solutions		√
16	Previous Question Papers		√
17	Result Analysis	√	
18	Feedback From Students	√	
19	CO Attainment for All Mids.	√	
20	Remedial Action.		√

G Sandhyarani
Assistant Professor
EEE Department

Course Instructor / Course Coordinator **HOD EEE**

Vision of the Institute

To be among the best of the institutions for engineers and technologists with attitudes, skills and knowledge and to become an epicentre of creative solutions.

Mission of the Institute

To achieve and impart quality education with an emphasis on practical skills and social relevance

Vision of the Department

To impart technical knowledge and skills required to succeed in life, career and help society to achieve self sufficiency.

Mission of the Department

1. To become an internationally leading department for higher learning.
2. To build upon the culture and values of universal science and contemporary education.
3. To be a center of research and education generating knowledge and technologies which lay groundwork in shaping the future in the fields of electrical and electronics engineering.
4. To develop partnership with industrial, R&D and government agencies and actively participate in conferences, technical and community activities.

Department of Electrical and Electronics Engineering

This Programme is meant to prepare our students to professionally thrive and to lead.During their progression:

Graduates will be able to

PEO 1: Graduates will have a successful technical or professional careers, including supportive and leadership roles on multidisciplinary teams.

PEO 2: Graduates will be able to acquire, use and develop skills as required for effective professional practices.

PEO 3: Graduates will be able to attain holistic education that is an essential prerequisite for being a responsible member of society.

PEO 4: Graduates will be engaged in life-long learning, to remain abreast in their profession and be leaders in our technologically vibrant society.

Programme Outcomes (B.Tech. – EEE)

At the end of the Programme, a graduate will have the ability to

PO-1: Ability to apply knowledge of mathematics, science, and engineering.

PO-2: Ability to identify, formulate, analyze engineering problems using engineering sciences.

PO-3: Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety..

PO-4: Ability to design and conduct experiments, as well as to analyze and interpret data with valid conclusions.

PO-5: Ability to utilize experimental, statistical and computational methods and tools necessary for modelling engineering activities.

PO-6: Ability to apply reasoning informed by the relative knowledge to evaluate societal, health, safety, legal and cultural issues and tasks applicable to the professional engineering practice.

PO-7: Ability to adapt broad education necessary to understand the impact of engineering solutions and obtain sustainability in a global, economic, environmental, and societal context.

PO-8: Ability to discover ethical principles and bind to professional and ethical responsibility.

PO-9: Ability to function as an individual and in multi-disciplinary teams.

PO-10: Ability to communicate effectively on complex activities in engineering community and society.

PO-11: Ability to develop Project management principles and apply in various disciplinary environments.

PO-12: Recognition of the need for, and an ability to engage in life-long learning

Program Specific Outcomes(PSOs):

PSO-1: Graduates will interpret data and able to analyze digital and analog systems related to electrical and programming them.

PSO-2: Graduates will able to demonstrate, design and model electrical, electronic circuits, power electronics, power systems and electrical machines.

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090, India

GRIET/DAA/1H/G/22-23 19 July 2022

Academic Calendar
Academic Year 2022-23

III B.Tech. – First Semester

S. No.	EVENT	PERIOD	DURATION
1	Commencement of First Semester class work	08-08-2022	
2	I Spell of Instructions	08-08-2022 to 08-10-2022	9 Weeks
3	I Mid-term Examinations	10-10-2022 to 13-10-2022	3 Days
4	II Spell of Instructions	14-10-2022 to 12-12-2022	9 Weeks
5	II Mid-term Examinations	13-12-2022 to 15-12-2022	3 Days
6	Preparation	16-12-2022 to 22-12-2022	1 Week
7	End Semester Examinations (Theory/ Practical) Regular/ Supplementary	23-12-2022 to 13-01-2023	3 Weeks
8	Commencement of Second Semester, AY 2022-23	16-01-2023	

III B.Tech. – Second Semester

S. No.	EVENT	PERIOD	DURATION
1	Commencement of Second Semester class work	16-01-2023	
2	I Spell of Instructions	16-01-2023 to 16-03-2023	9 Weeks
3	I Mid-term Examinations	17-03-2023 to 20-03-2023	3 Days
4	II Spell of Instructions	21-03-2023 to 29-04-2023	6 Weeks
5	Summer Vacation	01-05-2023 to 20-05-2023	3 Weeks
6	II Spell of Instructions Contd	22-05-2023 to 12-06-2023	3 Weeks
7	II Mid-term Examinations	13-06-2023 to 15-06-2023	3 Days
8	Preparation	16-06-2023 to 22-06-2023	1 Week
9	End Semester Examinations (Theory/ Practical) Regular / Supplementary	23-06-2023 to 15-07-2023	3 Weeks
10	Commencement of IV B.Tech First Semester, AY 2023-24	17-07-2023	

Dean Academic Affairs

Copy to Principal, All HoDs, CoE

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Electrical and Electronics Engineering

2022 -23 II sem Subject Allocation Sheet

II YEAR(GR20)	Section-A	
Probability and Statistics	Mr. S Bhagat Kumar	
AC Machines	Dr Phaneendra Babu B / G Sandhya Rani	
Control Systems	V Usha Rani	
Principles of Digital Electronics	Dr T Suresh Kumar	
Power Distribution and Protection	Dr V Vijaya Rama Raju	
Environmental Science	Dr K Kalpana	
Data Base for Engineers	G Satish	
Principles of Digital Electronics Lab	R Anil Kumar/ MNSandhya Rani	
AC Machines Lab	Dr V Vijaya Rama Raju / M Rekha	
Control Systems Lab	D Karuna Kumar /V Usha Rani	
III YEAR (GR20)	Section-A	
Programmab le Logic Controllers	P Prashanth Kumar	
Sensors Measuremen ts and Instrumentat ion	Dr P Srividyadevi	
Economics and Accounting for Engineers	K Sunil Kumar	
Modern Power Electronics (EEE) (PE-II)	Dr Pakkiraiah	
HVDC Transmission Systems (EEE) (PE-II)	Dr J Sridevi	
NPTEL (OE-II)	D Srinivasa Rao	
Power System Analysis Lab	GSR/MNSR	
Sensors Measuremen ts and Instrumentat ion Lab	Dr P Srividyadevi/ Dr DG Padhan /U Vijaya Lakshmi	
Mini Project with Seminar	Dr Phaneendra Babu B / D Srinvasa Rao	
IV YEAR (GR18)	Section-A	Section-B
Programmable Logic Controllers	Dr Pakkiraiah B	Dr Pakkiraiah B
Power Quality and FACTS (PE-V)	DKK	DKK
Electric Smart Grid (PE-VI)	Dr J Sridevi	Dr J Sridevi
Open Elective III	Complete	
Project work (Phase- II)	AVK/MNSR/GSR	AVK/MNSR/GSR
M.Tech (POWER ELECTRONICS) I-II SEM		
Electric Drives System	Dr A Vinay Kumar	
Modern and Digital Controlof Power Electronic and Drive Systems	Dr.D G Padhan	
Advanced Power Electronic Converters (PE-III)	Dr T Suresh Kumar	

AI and Machine LearningTechniques for Power Electronic Applications (PE-IV)	Dr B Phaneendra Babu
Electrical Drives Lab	Syed Sarfaraz Nawaz
DSP and MicrocontrollerLab	Dr A Vinay Kumar
Mini Project	G Sandhya Rani
(Audit Course II) Indian Constitution	Syed Sarfaraz Nawaz
M.Tech (POWER ELECTRONICS) II-II SEM	
Disseration Phase -II	Dr T Suresh Kumar

2022-23 I Year II sem BEE

Staff Name	Theory	Labs
K Sudha	2	1
P Praveen Kumar	2	1
Dr D S N M Rao	2	1
P Prashanth Kumar	_____	2
P Ravikanth	1	2
R Anil Kumar	1	_____
M Rekha	_____	3
U Vijaya Lakshmi	_____	4
M Prashanth	_____	3
Dr D G Padhan	1	_____
V Usha Rani	_____	1
CIVIL B.Tech II Year BEEE		
BEEE (CIVIL)	M Prashanth	

Dr Phaneendra Babu B
HOD,EEE

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Electrical and Electronics Engineering

GRIET/PRIN/06/G/01/22-23 **Wef : 16th Jan 2023**

BTech - EEE - A **III Year - II Semester**

DAY/ HOUR	9:00 - 9:55	9:55- 10:50	10:50 - 11:45	11:45 -12:25	12:25-1:15	1:15 - 2:05	2:05 -2:55
MONDAY	EAE	SMI		BREAK	Mentoring	IoT	
TUESDAY	SMI		PLC		SMI Lab (A1)/ PSA Lab (A2)		
WEDNESDAY	MPE/HVDCT		SMI		SMI Lab (A2)/ PSA Lab (A1)		
THURSDAY	MPE/HVDCT	PLC			Mentoring	EAE	
FRIDAY	MP Lab				IoT	MPE/HVDCT	
SATURDAY	PLC		Library		MP Lab/Mentoring/Student Techincal Activites		

ROOM NO	
Theory/Tutorial	**4402**
Lab	**PSA Lab (4504)** **SMI Lab (4507)** **MP Lab (4402)**
Class Incharge:	**G. Sandhya Rani**

Subject Code	Subject Name	Faculty Code	Faculty Name	Almanac	
G20A3081	Programmable Logic Controllers (PLC)	PK	P. Prasanth Kumar	1st Spell of Instructions	16-01-2023 to 16-03-2023
G20A3092	Sensors Measurements and Instrumentation (SMI)	Dr. PSVD	Dr. P. Srividya Devi	1st Mid-term Examinations	17-03-2023 to 20-03-2023
G20A2004	Economics and Accounting for Engineers (EAE)	KKSK	K. K. Sunil Kumar	2nd Spell of Instructions	21-03-2023 to 29-04-2023
G20A3093	Modern Power Electronics (MPE)	Dr. PB	Dr. B. Pakkiraiah	Summer Vacation	01-05-2023 to 20-05-2023
G20A3094	HVDC Transmission Systems (HVDCTS)	Dr.JS	Dr. J. Sridevi	2nd Spell of Instructions Contd.	22-05-2023 to 12-06-2023
G20A	Internet of Things (Open Elective - II)	DSR	D. Srinivasa Rao	2nd Mid-term Examinations	13-06-2023 to 15-06-2023
G20A3096	Power Systems Analysis Lab (PSA Lab)	GSR/MNSR	G. Sandhya Rani/ M. N. Sandhya Rani	Preparation	16-06-2023 to 22-06-2023
G20A3097	Sensors Measurements and Instrumentation Lab (SMI Lab)	Dr PSVD/ Dr. DGP/ UVL	Dr. P. Srividya Devi/ Dr. D. G. Padhan/ U. Vijaya Laxmi	End Semester Examinations (Theory/ Practicals) Regular / Supplementary	23-06-2023 to 15-07-2023
G20A3141	Mini Project With Seminar (MP Lab)	Dr. PBB/DSR	Dr. B. Phaneendra Babu/ D. Srinivasa Rao	Commencement ofIV B. Tech I Sem A.Y 2023-24	17/07/2023

Time Table Coordinator **HOD** **DAA**

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

Individual time table

Day/Hour	9:00 - 9:45	9:45 - 10:30	10:30 - 11:15	11:15- 12:00	12:00- 12:30	12:30 - 1:20	1:20 - 2:10	2:10 -3:00
					BREAK			
TUESDAY						PSSLAb(A2)		
WEDNESDAY						PSSLAb(A1)		
THURSDAY								
FRIDAY								
SATURDAY								

Room No.4504	
Theory	
Lab	PSSLAB
Class Incharge:	G Sandhyarani

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

POWER SYSTEM ANALYSIS LAB

1. Computation of line parameters
2. Formation of bus Admittance matrix
3. a) Load Flow solution using Newton Raphson method in polar coordinates
   b)Load Flow solution using Newton Raphson method in Rectangular coordinates
4. Unsymmetrical fault Analysis: LG, LL, LLG Fault
5. Z–Bus Building Algorithm
6. a)Obtain Symmetrical Components of a set of Unbalanced currents.
   b)Obtain the original Unbalanced phase voltages from Symmetrical Components
7. Zones Protection
8. Short circuit analysis
9. Tripping sequence of protective devices
10. Transient Stability analysis
11. Power flow solution of power system model

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
Department of Electrical and Electronics Engineering

Course Schedule

Academic **Y**ear : **2022-23**

Semester : **II**

Name of the Program: **B.Tech** Year: **III** Section: **A**

Course/Subject: **Power system Analysis Lab** Course Code: **GR20A2023**

Name of the Faculty: **G Sandhyarani**

Designation: **Assistant Professor**

Department: **Electrical and Electronics Engineering**

The Schedule for the whole Course / Subject is:

Sl.No	Topics	No of periods
1	Computation of line parameters	3
2	Formation of bus Admittance matrix	3
3	Load Flow solution using Newton Raphson method in polar coordinates	3
4	Unsymmetrical fault Analysis: LG, LL, LLG Fault	3
5	Z–Bus Building Algorithm	3
6	a)Obtain Symmetrical Components of a set of Unbalanced currents. b)Obtain the original Unbalanced phase voltages from Symmetrical Components	3
7	Zones Protection	3

8	Short circuit analysis	3
9	Tripping sequence of protective devices	3
10	Transient Stability analysis	3
11	Power flow solution of power system model	3

Total No. of Instructional periods available for the course: ……48……. Periods

-

Power System analysis Lab (GR20A3096)

CO – PO Mapping

COs	a	b	c	d	e	f	g	h	i	j	k	l	PSO1	PSO2
1. Mathematically model various parameters in power system	M	H	M		M		H		M	M	M		M	
2.To solve different load flow problems		M	H	H		M	M		M	M			H	H
3. Summarise different protection scheme for the faults	M	M			M	H		M			H		M	
4. Formulate the different algorithms for load flows and stability problems.		M	H	M		M		M		M				M
5. To develop and design solutions for power system problems	M	H		H			H	M		M		H	M	H

Power System Analysis Lab (GR20A3096)

CO – Cognitive Level Mapping

C	1	2	3	4	5	6
CO – 1	X	X				
CO – 2		X		X		
CO - 3	X	X				
CO - 4			X	X		X
CO - 5			X		X	X

1-REMEMBER

2-UNDERSTAND

3-APPLY

4-ANALYSE

5-EVALUATE

6-CREATE

Circular mils
= 0·001 inches

EXERCISE

1.A 500kv 3 ϕ transposed line is composed of one ACSR 1,272,000-cmil, 45/7 bittern conductor per phase with horizontal conductor configuration as show in fig.1. The conductors have a diameter of 1.345in and a GMR of 0.5328in. Find the inductance and capacitance per phase per kilometer of the line and justify the result using MAT LAB.

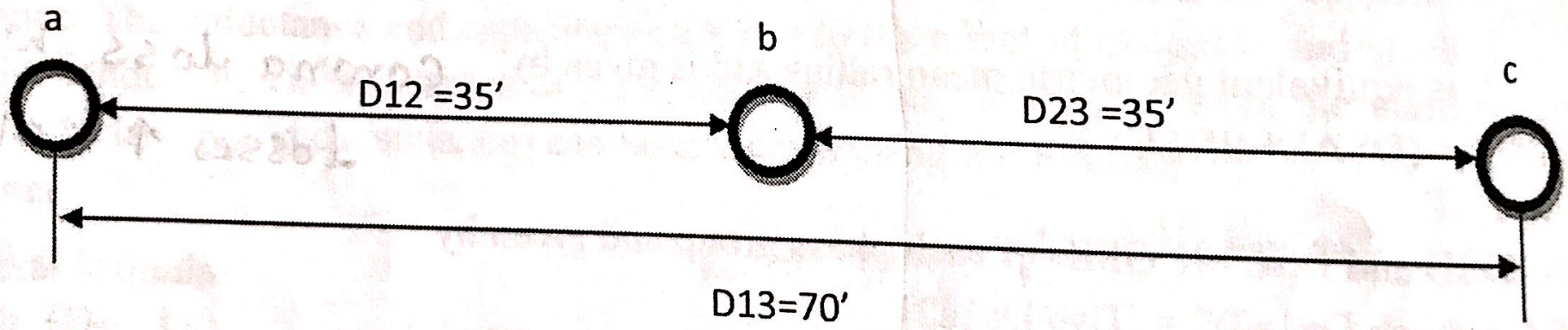


Fig.1

Exp 2: Computation of line Parameters

Problem 1: $r' = 0.7788\, r$

$$r = \frac{d}{2} = \frac{1.345}{2} = 0.6725 \text{ inches}$$

$= 0.6725 \times 0.0254$ (1 inch = 2.54cm $= 2.54 \times 10^{-2}$ m $= 0.0254$ m)

$= 0.017$ m

$r' = 0.7788 \times 0.017$

$= 0.013$

$$D_{eq} = \sqrt[3]{D_{12} D_{23} D_{31}} = 1.12$$

$D_{12} = 35' = 35 \times 0.0254 = 0.889$

Ily $D_{23} = 0.0889$, $D_{31} = 1.778$

$$L = 2 \times 10^{-7} \ln\left(\frac{D_{eq}}{r'}\right) \text{H/m} \quad ; \quad C = \frac{0.02412}{\log\left(\frac{D_{eq}}{r}\right)} \ \mu\text{F/km}$$

$= 0.4605 \log\left(\frac{D_{eq}}{r'}\right)$ mH/km

$= 0.891$ mH/km

$= 0.013\ \mu$F/km

Problem (2): $D_{ab} = \sqrt[4]{d(d+b) \times d(d-b)}$

(d = distance between a and b

b = bundled conductors (bundled Spacing)

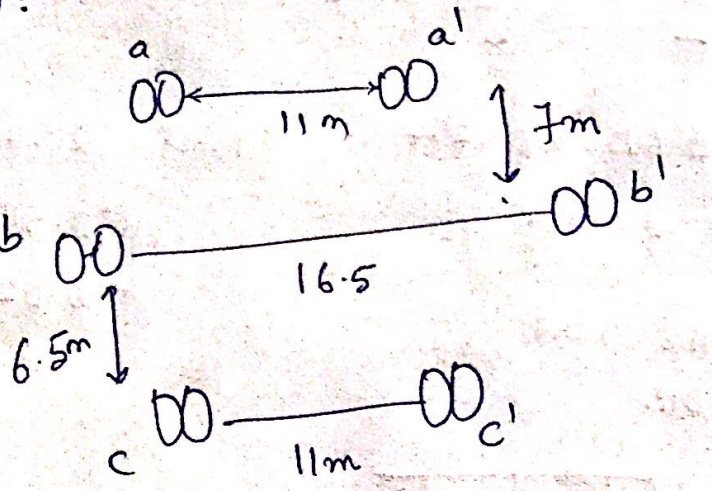
$$L = 0.4605 \log\left(\frac{D_{eq}}{r'}\right)$$

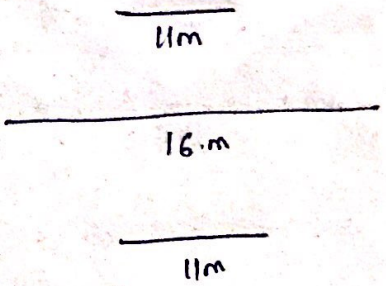
$$C = \frac{0.02412}{\log\left(\frac{D_{eq}}{\sqrt{rb}}\right)}$$

Note : Cmile : Circular miles represents area of Conductor

Transposed : giving all phases equal distribution

Problem ③ :





$$L = 2\times10^{-7} \ln\left(\frac{D_{eq}}{D_s}\right)$$

$$D_{eq} = \sqrt[3]{GMD_{ab}\ GMD_{bc}\ GMD_{ca}}$$

$$GMD_{ab} = \sqrt[4]{(D_{ab} \times D_{ab'})^{4}} \quad \text{if Symmetrical}$$

$$= \sqrt[4]{(D_{ab} \times D_{ab'} \times D_{ba} \times D_{ba'})} \quad \text{if not Symmetrical}$$

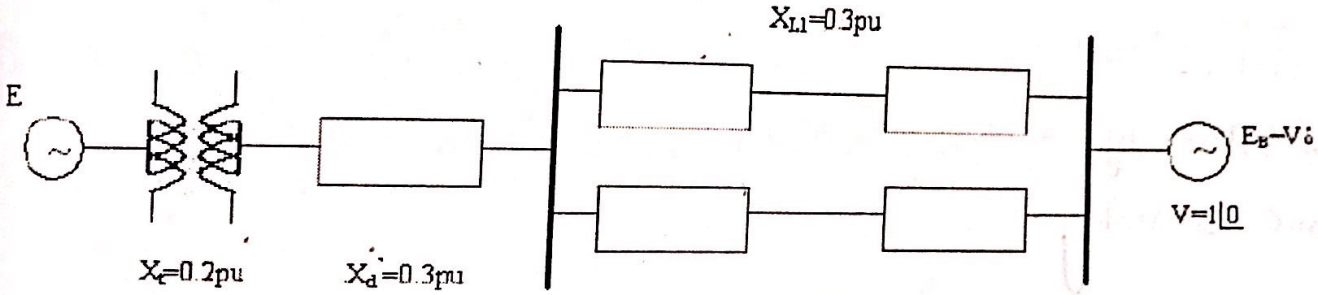
lly GMD_{bc} and GMD_{ca}

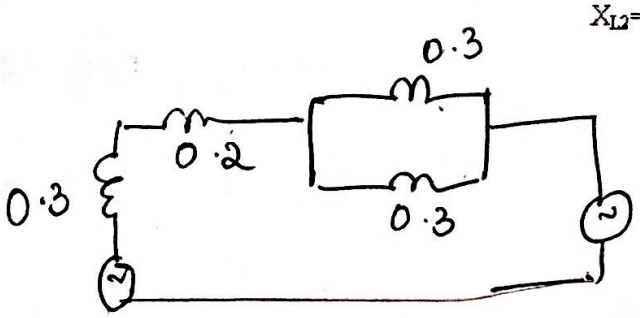
$$GMR_a = \sqrt{r' D_{aa'}}, \quad GMR_b = \sqrt{r' D_{bb'}}, \quad GMR_c = \sqrt{r' D_{cc'}}$$

$$C = \frac{0.04824}{\log \frac{\sqrt{3}\, D_{eq}}{2r}} \quad F/ph/km$$

EXERCISE:

A 60Hz synchronous generator having inertia constant H = 9.94 MJ/MVA and a direct axis transient reactance X_d'= 0.3 per unit is connected to an infinite bus through a purely resistive circuit as shown in fig.1. Reactances are marked on the diagram on a common system base. The generator is delivering real power of 0.6% unit, 0.8 pf lagging and the infinite bus at a voltage of 1 per unit. Assume the p.u damping power coefficient d=0.138. Consider a small disturbance change in delta=10^0 . Obtain the equation describes the motion of the rotor angle and generation frequency





$$X_d = 0.3 + 0.2 + \frac{0.3}{2}$$

$$= 0.65 \text{ p.u}$$

Exp 8: Transient Stability Analysis of Single machine Infinite Bus system.

→ What is Stability?

It is the ability of a dynamic System to Remain same Operating state even after a disturbance that occurs in a system.

- Steady state stability
- Transient stability
- Dynamic stability.

Prb: Given data: $H = 9.94$ MJ/MVA
(Inertia Const)

Transient Reactance $X_d' = 0.3$ P.U

Generator delivering $P = 0.6$ PU, 0.8 P.F lagging

$V = 1$ P.U

from the figure $X_d' = 0.5 + 0.2 + \frac{0.3}{2}$

$= 0.65$ P.U

$P = VI\cos\phi$

$VI = \frac{0.6}{0.8}$

$= 0.75$

damping Power Coeff $d = 0.138$

$\delta = 10^\circ$

$S = VI = 0.75 \angle 36.87$

$I = 0.75 \angle -36.8 \quad (\because V = 1 P.U)$

$E = V + jIX_d$

$= 1 + j\,(0.75 \angle -36.87)\,(0.65)$

$= 1.179 + j0.135$

$\simeq 1.35 \angle 16.79^\circ$

$\delta_0 = 16.79^\circ = 0.293$ radians

Syn Power Coeff $P_r = P_m \cos\delta_0 = \dfrac{|E||V|\cos\delta_0}{X}$

$= \dfrac{1.357}{0.6} \cos(16.79^\circ) \simeq \dfrac{1.35}{0.6} \times 0.95$

$= 2.2$

$\omega_n = \sqrt{\dfrac{P_r}{M}}$

$= \sqrt{\dfrac{2.2}{9.9/\pi(60)}}$

$= \sqrt{41.8}$

$= 6.46$

(where $M = \dfrac{H}{\pi f}$ in P.U

$= \dfrac{SH}{\pi f}$ in MW) M is angular momentum

$\xi = \dfrac{d}{2}\sqrt{\dfrac{1}{MP_r}}$

$= 0.06\sqrt{\dfrac{\pi \times 60}{9.9 \times 2.2}} = 0.17$

$\omega_d = \omega_n\sqrt{1-\xi^2}$

$= 6.4\sqrt{1-(0.17)^2}$

$= 6.27$ rad/sec $= 0.99$ Hz

(1 Hz = 2π rad/sec)

Result:

$\delta = \delta_0 + \Delta\delta_0$

$= 16.79^\circ + 10^\circ$

$= 26.79^\circ$

$\omega = 60^\circ + \omega_n \Delta\delta_0$

$= 60 \times \dfrac{\pi}{180} + \omega_n\left(10 \times \dfrac{\pi}{180}\right)$

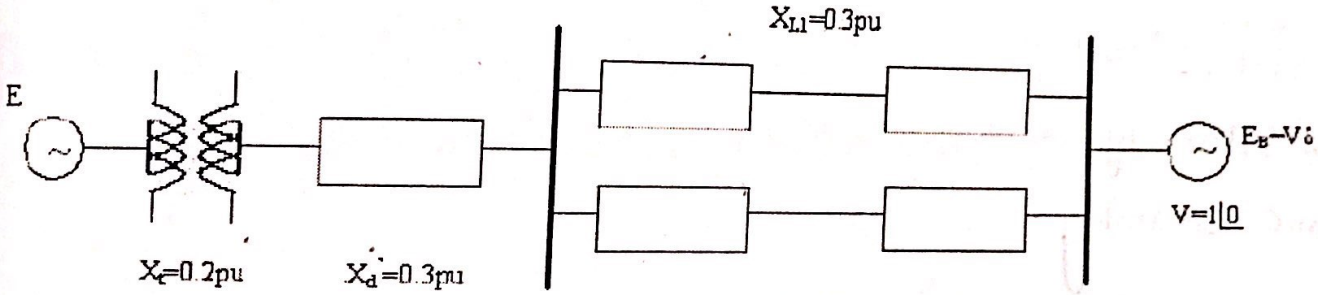
$\simeq 2.16$ radians

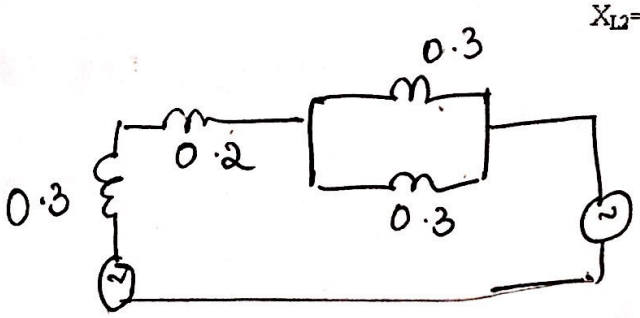
Exp 8

```
H = 9.94;
Pi = 3.14;
f = 60;
d = 0.138;
V = 1;
Xd = 0.65;
Cosx = 0.8;
P = 0.4;
I = 0.59 - j0.45;
E = V + j * I * Xd;
E1 = abs(E);
DEL = angle(E);
del = cos(DEL);
Pr = (E1 * V * del) / Xd;
M = H / (Pi * f)
Wn = sqrt(Pr / M)
zee = (d/2) * sqrt(1/(M * Pr))
Wd = Wn * sqrt(1 - (zee x zee))
W = (60 x (Pi/180)) + (4.10 * 10 * (Pi/180))
```

EXERCISE:

A 60Hz synchronous generator having inertia constant H = 9.94 MJ/MVA and a direct axis transient reactance X_d'= 0.3 per unit is connected to an infinite bus through a purely resistive circuit as shown in fig.1. Reactances are marked on the diagram on a common system base. The generator is delivering real power of 0.6% unit, 0.8 pf lagging and the infinite bus at a voltage of 1 per unit. Assume the p.u damping power coefficient d=0.138. Consider a small disturbance change in delta=10^0 . Obtain the equation describes the motion of the rotor angle and generation frequency





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$= 1.179 + j0.135$

$\simeq 1.35 \angle 16.79^\circ$

$\delta_0 = 16.79^\circ = 0.293$ radians

Syn Power Coeff $P_r = P_m \cos\delta_0 = \dfrac{|E||V|\cos\delta_0}{X}$

$= \dfrac{1.357}{0.6} \cos(16.79^\circ) \simeq \dfrac{1.35}{0.6} \times 0.95$

$= 2.2$

$\omega_n = \sqrt{\dfrac{P_r}{M}}$

$= \sqrt{\dfrac{2.2}{9.9/\pi(60)}}$

$= \sqrt{41.8}$

$= 6.46$

(where $M = \dfrac{H}{\pi f}$ in P.U

$= \dfrac{SH}{\pi f}$ in MW) M is angular momentum

$\xi = \dfrac{d}{2}\sqrt{\dfrac{1}{MP_r}}$

$= 0.06\sqrt{\dfrac{\pi \times 60}{9.9 \times 2.2}} = 0.17$

$\omega_d = \omega_n\sqrt{1-\xi^2}$

$= 6.4\sqrt{1-(0.17)^2}$

$= 6.27$ rad/sec $= 0.99$ Hz

(1 Hz = 2π rad/sec)

Result:

$\delta = \delta_0 + \Delta\delta_0$

$= 16.79^\circ + 10^\circ$

$= 26.79^\circ$

$\omega = 60^\circ + \omega_n \Delta\delta_0$

$= 60 \times \dfrac{\pi}{180} + \omega_n\left(10 \times \dfrac{\pi}{180}\right)$

$\simeq 2.16$ radians

Exp 8

```
H = 9.94;
Pi = 3.14;
f = 60;
d = 0.138;
V = 1;
Xd = 0.65;
Cosx = 0.8;
P = 0.4;
I = 0.59 - j0.45;
E = V + j * I * Xd;
E1 = abs(E);
DEL = angle(E);
del = cos(DEL);
Pr = (E1 * V * del) / Xd;
M = H / (Pi * f)
Wn = sqrt(Pr / M)
zee = (d/2) * sqrt(1/(M * Pr))
Wd = Wn * sqrt(1 - (zee x zee))
W = (60 x (Pi/180)) + (4.10 * 10 * (Pi/180))
```

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(8 Pages)

PRACTICAL EXAMINATION ANSWER BOOK INTERNAL

No. 59779

H.T. No. 2 0 2 4 1 A 0 2 3 5

Name of the Examination III Btech II semister Lab Internal Examination

Course PSA Lab internal. Branch EEE Date 07/06/23

Signature of the Invigilator

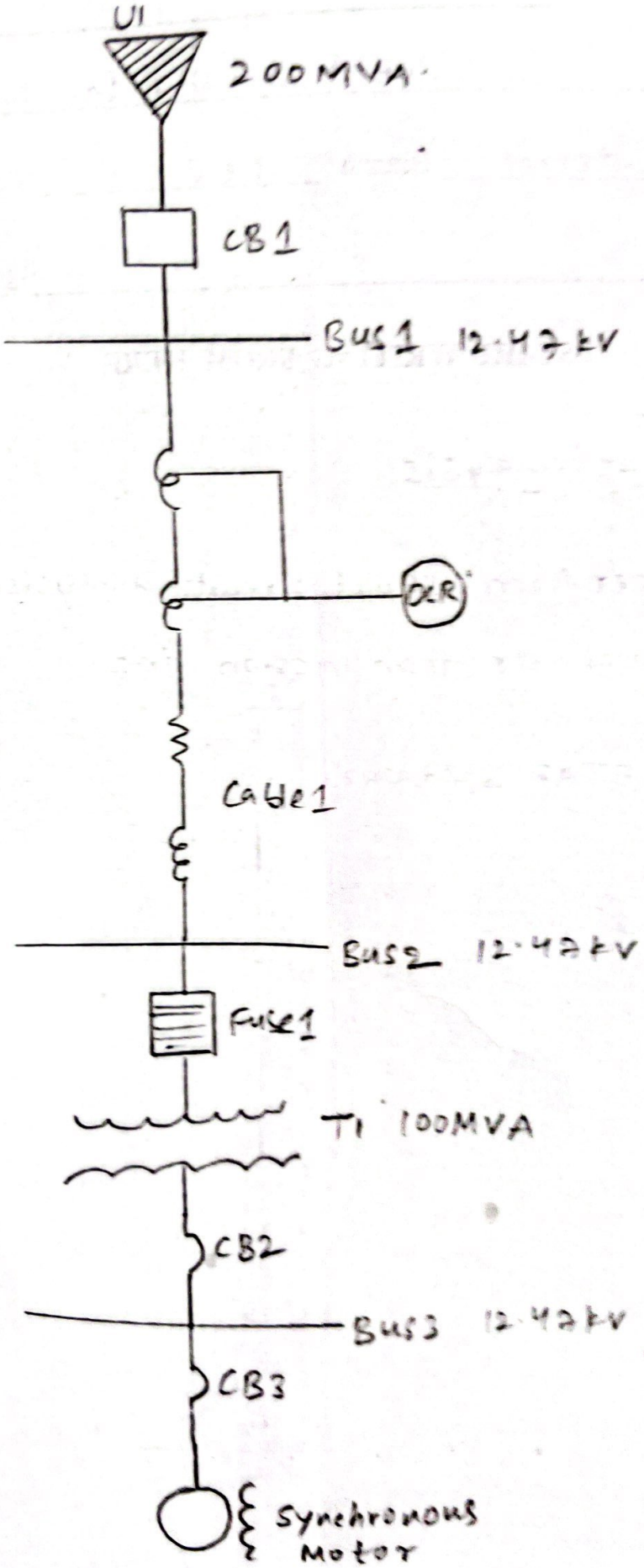
START WRITING FROM HERE

9

6. Short circuit analysis

Aim: To perform short circuit analysis on the given network or transmission line.

Software: ETAP Software



Parameters :

S-No	Components	Manufacturer	Ratings	Other parameters
1-	Power Grid	-	300 MVA	X/R = 2
2-	Buses:			-
	Bus 1	-	11-415 kV	
	Bus 2	-	11-415 kV	
	Bus 3	-	11-415 kV	
3-	CT1	ABB	300:5	
	CT2	ABB	300:5	
4-	OCR	GE-Multilin (735/737)		1. As per circuit breaker 2- Length = 100 Tolerance = 20
5	Cable 1	Lib-120 (ICEA)		
6.	Fuse	Siemens (3ED0-2 kV)		
7.	CB		Siemens 8HS-63kA	
8	Synchronous Motor	Lib-1HP 0.415kV	2HP 0.415kV	

Procedure :

1. Open ETAP Software in computer
2. Save the file first and use.
3. Open in Edit mode and connect the equipments as shown in the circuit diagram.
4. Give the ratings for the equipments as shown in parameters tabular column above.
5. Click on "Star - protective device".
6. On right Hand side, in the tool box, select red ~~highlight~~ colour fault and connect at the desired location.
7. Check for the short circuit currents flowing in the simulation diagram.

Result : Hence performed short circuit analysis on the given network or transmission line.

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PRACTICAL EXAMINATION ANSWER BOOK INTERNAL

No. 59804

H.T. No.	2	0	2	4	1	A	0	2	0	7

Name of the Examination III^rd B-TECh II^nd Sem LAB INTERNAL
(Power System Analysis)

Course PSA LAB Branch EEE Date 7-6-23

Signature of the Invigilator

6

START WRITING FROM HERE

5½

Tripping sequence of protective devices.

Aim:- To obtain the tripping sequence of protective devices.

Apparatus:-

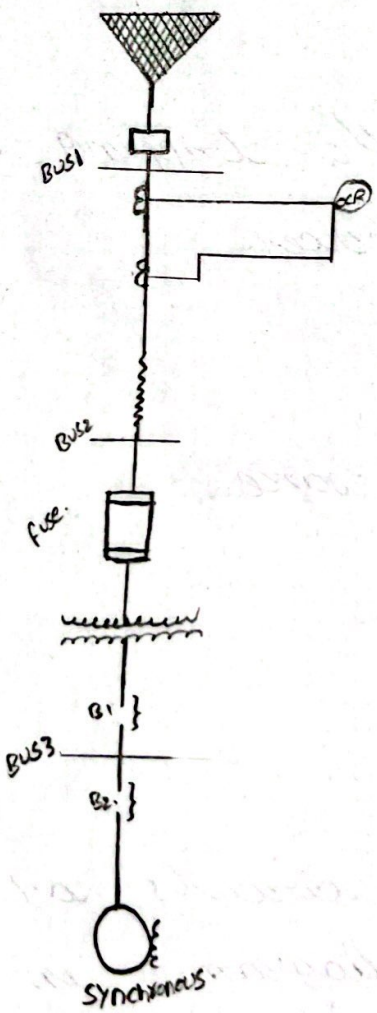
ETAP software.

Procedure:-

* connect the circuits as shown in the circuit diagram in ETAP software.

* add the values to the devices what we connected.
* check either the values are added properly or not.
* run the circuit what we are connected in soft ware.
* Observe the values and note down in the parametric table.

Circuit diagram:-



Parameters :-

S.NO	Components	manufacture	rating	other parameters to be specified

Result :- Hence we conclude that the tripping sequence of an protective device by using an ETAP software.

DM

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PRACTICAL EXAMINATION ANSWER BOOK INTERNAL

No. 59768

H.T. No. 2 0 2 4 1 A 0 2 0 1

Name of the Examination III 2nd Btech II Sem Lab Internal Examination

Course Power system Lab Branch EEE Date 07/06/2023

Signature of the Invigilator

3 0

START WRITING FROM HERE

(3) Load flow solution using Newton Raphson method in polar or rectangular coordinates.

Aim:- To carry out load flow analysis of given network using Newton Raphson method

Apparatus:- Power world.

Procedure:-

→ Create a new file in edit mode by selecting file → newfile

→ Browse the components required in the components section

→ Build the circuit using the browsed components [(or) Bus System]

→ Execute the program in run-mode by selecting Power flow by newton Raphson method.

→ View the results in case bus information.

→ Tabulate the ~~cals~~ results.

Newton Raphson method

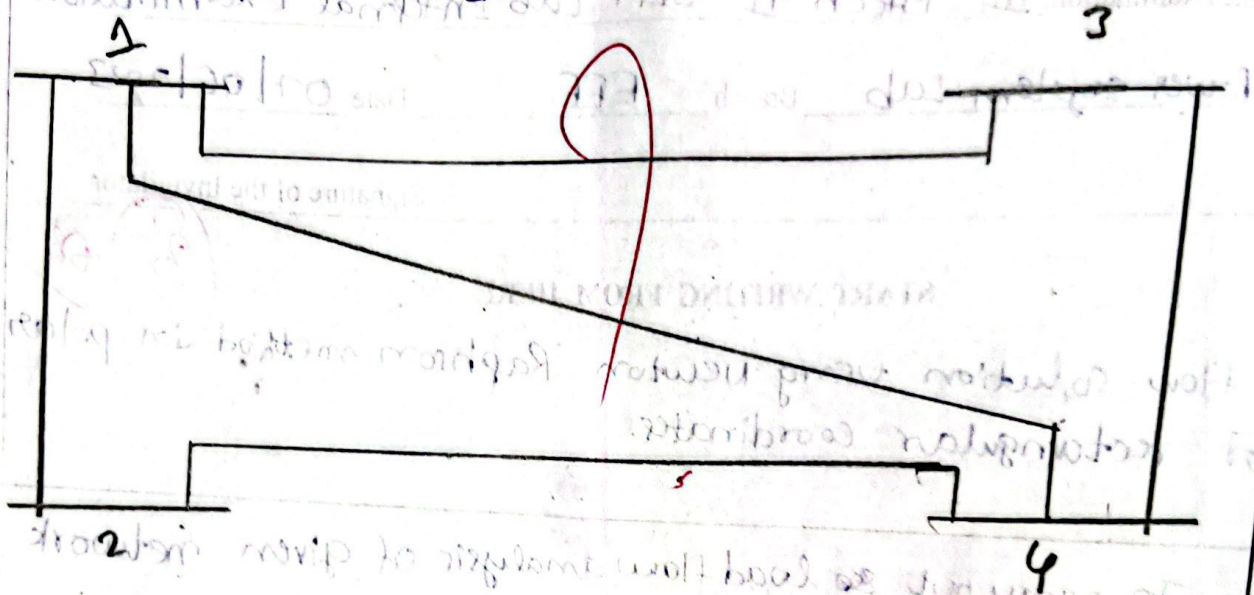

Table:

Buses	Pp PU	Qp PU	Vp PU	Remarks
1				Slack Bus
2				PQ Bus
3				PQ Bus
4				PQ Bus

Gokaraju Rangaraju Institute of Engineering & Technology

III B.Tech II Sem (EEE) Result Analysis

Academic Year: 2022-23 Total No. of Students Registered: 64

Course	Total No. of Students appeared	Total No. of Students Passed	No. of Students Failed	Count of Students with Grade Point					
				GP (10)	GP (9)	GP (8)	GP (7)	GP (6)	GP (5)
EAE	64	58	06	00	11	13	7	10	07
PLC	64	60	04	09	16	14	09	06	06
SMI	64	51	13	00	07	12	17	08	07
MPE	40	63	01	02	15	05	08	06	03
HVDCT	24	61	03	00	02	07	08	02	02
PSA Lab	64	58	06	02	14	16	11	11	04
SMI Lab	64	59	05	08	05	20	13	11	02
MINI Proj.	64	58	06	08	24	13	08	04	01
Cloud Computing (MOOCs)	64	52	12	00	10	23	16	13	00
DV	01	01	00	00	00	00	00	01	00
DV Lab	01	01	00	00	00	01	00	00	00

Arrears Position – III year / I Semester

No.of students	All Pass	One Arrear	Two Arrears	Three Arrears	More than three arrears	Over all % of pass
64	46	07	04	01	06	72%

Performance overall Class Three Toppers

ROLL NO.	NAME	SGPA
21245A0201	JAKINAPALLI CHANDHANA	9.48
20241A0257	SUSANI NEHA	9.30
20241A0223 20241A0233	M GAYATHRI PISINI SATHVIKA	9.18

Class coordinator

HOD, EEE

III B.Tech - I Sem (EEE)

SECTION	Course s	EAE	PLC	SMI	MPE	HVDCT	PSA Lab	SMI Lab	MINI Proj.	CC	DV	DV Lab
	Course codes	GR20A2004	GR20A3091	GR20A3092	GR20A3093	GR20A3094	GR20A3096	GR20A3097	GR20A3141	GR20A6007	GR20A3065	GR20A3068
A	TOTAL	64	64	64	40	24	64	64	64	64	01	01
	PASS	58	60	51	39	21	58	59	58	52	01	01
	PASS(%)	90.62%	93.75%	79.68%	97.5%	87.5%	90.62%	92.18%	90.62%	81.25%	100	100
	FACULTY NAME	K Sunil Kumar	P Prashanth Kumar	Dr P Srividya devi	Dr Pakkiraiah	Dr J Sridevi	G Sandhya Rani/M N Sandhya Rani	Dr P Srividya Devi/ Dr DG Padhan/ U Vijaya Lakshmi	Dr Phaneendra Babu / D Srinivasa Rao	P Ravikanth	Dr V Srilakshmi	N Krishna Chaitanya
	FACULTY ID	176	1055	931	1593	516	888/882	931/1283/692	1563/1540	1178	923	1397

Dr Phaneendra Babu B

Class coordinator **HOD,EEE**

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

FEEDBACK OF FACULTY CONDUCTING BTECH CLASS WORK

FACULTY WISE

EEE- B.Tech- III Year SEMESTER - II ACADEMIC YEAR : 2022-2023 FEEDBACK NO:1 DATE: 21-02-2023

S.NO	FACULTY ID	FACULTY NAME	SUBJECT NAME	SECTION	DEPT	NO. OF SECTIONS	FEEDBACK 1 (4 POINTS) (AVG OF ALL SECTIONS)
1	1055	P. Prasanth Kumar	Programmable Logic Controllers (PLC)	A	EEE	1	3.04
2	931	Dr. P. Srividya Devi	Sensors Measurements and Instrumentation (SMI)	A	EEE	1	3.2
3	1604	K. K. Sunil Kumar	Economics and Accounting for Engineers (EAE)	A	EEE	1	3.08
4	1283	Dr D. G. Padhan	Modern Power Electronics (MPE)	A	EEE	1	3.24
5	516	Dr. J. Sridevi	HVDC Transmission Systems (HVDCTS)	A	EEE	1	2.8
6	1540	D. Srinivasa Rao	Internet of Things (Open Elective - II)	A	EEE	1	3.12
7	888	G. Sandhya Rani	Power Systems Analysis Lab (PSA Lab)	A	EEE	1	3.12
8	882	M. N. Sandhya Rani	Power Systems Analysis Lab (PSA Lab)	A	EEE	1	3.16
9	931	Dr. P. Srividya Devi	Sensors Measurements and Instrumentation Lab (SMI Lab)	A	EEE	1	3.16
10	1283	Dr. D. G. Padhan	Sensors Measurements and Instrumentation Lab (SMI Lab)	A	EEE	1	3.12
11	692	U. Vijaya Laxmi	Sensors Measurements and Instrumentation Lab (SMI Lab)	A	EEE	1	3.12
12	1563	Dr. B. Phaneendra Babu	Mini Project With Seminar (MP Lab)	A	EEE	1	3.12
13	1540	D. Srinivasa Rao	Mini Project With Seminar (MP Lab)	A	EEE	1	3.12

HOD Signature

...KARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Approved By AICTE, Affiliated to JNTUH, Autonomous Under UGC
Nizampet Road, Bachupally, Kukatpally, Hyderabad - 500090, Telangana, India
Tel: [illegible], Email:info@griet.ac.in, www.griet.ac.in

STUDENT FEEDBACK

: GURRAM SANDHYA RANI

: Power System Analysis Lab (B.Tech, III/IV B.Tech II Semester, EEE Sec-A)

: 2022 - 2023

: Phase-I

	Excellent	Good	Average	Poor	Q.Wise Total	Q.Wise %
...y of the lessons by the teacher	9	25	2	0	115	80.00
	8	25	2	1	112	78.00
...er	8	24	4	0	112	78.00
...g Aids of ICT	7	27	2	0	113	78.00
...[illegible] in the class	10	23	2	1	114	79.00
...n the class	8	25	3	0	113	78.00
...ing doubts in the class	7	25	4	0	111	77.00
	9	23	3	1	112	78.00
...ther	8	26	2	0	114	79.00
...teacher	6	29	1	0	113	78.00
Total	80	252	25	3		
Total Points	**320**	**756**	**50**	**3**	**1129**	**78.00**

	36
...e Faculty	78.00
	Good

...ellent (4) : >=90 %   *Good (3) : >=75 & <90%
...rage (2) : >=60 & <75 % *Poor (1) : Below 60 %
...s/(Max Points(i.,Excellent-4) * No.Of.Students * NoOfQuestions)

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Approved By AICTE, Affiliated to JNTUH, Autonomous Under UGC
Nizampet Road, Bachupally, Kukatpally, Hyderabad - 500090, Telangana, India
Tel: 7207344440, Email:Info@griet.ac.in, www.griet.ac.in

STUDENT FEEDBACK

Faculty : GURRAM. SANDHYA RANI
Subject : Power System Analysis Lab (B.Tech, III/IV B.Tech II Semester, EEE Sec-A)
Academic Year : 2022 - 2023
Phase : Phase-1

Sl.No	Question	Excellent	Good	Average	Poor	Q.Wise Total	Q.Wise %
1	Preparation and delivery of the lessons by the teacher	9	25	2	0	115	80.00
2	Subject Knowledge	8	25	2	1	112	78.00
3	Clarity in Communication	8	24	4	0	112	78.00
4	Using Modern Teaching Aids of ICT	7	27	2	0	113	78.00
5	Creating interest on the course in the class	10	23	2	1	114	79.00
6	Maintaining discipline in the class	8	25	3	0	113	78.00
7	Encouraging and clearing doubts in the class	7	25	4	0	111	77.00
8	Punctuality	9	23	3	1	112	78.00
9	Accessibility of the teacher	8	26	2	0	114	79.00
10	Overall grading of the teacher	6	29	1	0	113	78.00
	Total	80	252	25	3		
	Total Points	**320**	**756**	**50**	**3**	**1129**	**78.00**

No.Of Students Posted	**36**
Total Percentage Awarded to The Faculty	**78.00**
Grade of Faculty	**Good**

***Excellent (4) : >=90 %** ***Good (3) : >=75 & <90%**
***Average (2) : >=60 & <75 %** ***Poor (1) : Below 60 %**

Formula: Total Obtained Points/(Max Points(i.Excellent-4) * No.Of.Students * NoOfQuestions)

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

FEEDBACK OF FACULTY BY STUDENTS

FACULTY WISE

DEPT: EEE B.TECH :III SEMESTER : II ACADEMIC YEAR: 2022-23

FB-2 Dt: 22-03-2023

S.NO	FACULTY ID	FACULTY NAME	SUBJECT NAME	DEPT	NO. OF SECTIONS	FEEDBACK (4 POINTS) (AVG OF ALL SECTIONS)
1	1055	P.Prasanth Kumar	Programmable Logic Controllers(PLC)	EEE	1	2.86
2	931	Dr.P.Srividya Devi	Sensors and Measurements and Instrumentation(SMI)	EEE	1	3.29
3	176	K.K.SunilKumar	Economics and Accounting for Engineers(EAE)	EEE	1	3.07
4	1593	Dr.B.Pakkiraiah	Modern Power Electronics(MPE)	EEE	1	2.82
5	516	Dr.J.Sridevi	HVDC Transmission Systems(HVDCTS)	EEE	1	2.19
6	1540	D.SrinivasRao	Internet Of Things(Open Elective-II)(IOT)	EEE	1	3.02
7	888	G.SandhyaRani	PowerSystemsAnalysis Lab(PSA Lab)	EEE	1	3.19
8	882	M.N.SandhyaRani	PowerSystemsAnalysis Lab(PSA Lab)	EEE	1	3.20
9	931	Dr.P.Srividya Devi	SensorsMeasurements and Instrumentation Lab(SMI Lab)	EEE	1	3.16
10	1283	Dr.D.G.Padhan	SensorsMeasurements and Instrumentation Lab(SMI Lab)	EEE	1	3.21
11	692	U.VijyaLaxmi	SensorsMeasurements and Instrumentation Lab(SMI Lab)	EEE	1	3.11
12	1563	Dr.PB.Phaneendra Babu	Mini Projects and Instrumentation Lab(MP Lab)	EEE	1	3.09
13	1540	D.SrinivasRao	Mini Projects and Instrumentation Lab(MP Lab)	EEE	1	3.01

HOD Signature

FEEDBACK OF FACULTY CONDUCTING II BTECH CLASS WORK

Dept: EEE A.Y. 2022-23 Semester - 2 Feedback:2 Date: 22/03/2023

SECTION	SUBJECTS (THEORY)	FACULTY ID	FACULTY NAME	DEPT	FEEDBACK OF STUDENTES	RELATIVE FEEDBACK (AVG OF ALL SUBJECTS)
III	PLC	1055	P.Prasanth Kumar	EEE	2.86	3.02
	SMI	931	Dr.P.Srividya Devi		3.29	
	EAE	176	K.K.SunilKumar		3.07	
	MPE	1593	Dr.B.Pakkiraiah		2.82	
	HVDCTS	516	Dr.J.Sridevi		2.19	
	IOT	1540	D.SrinivasRao		3.02	
	PSA LAB	888	G.SandhyaRani		3.19	
	PSA LAB	882	M.N.SandhyaRani		3.20	
	SMI LAB	931	Dr.P.Srividya Devi		3.16	
	SMI LAB	1283	Dr.D.G.Padhan		3.21	
	SMI LAB	692	U.VijyaLaxmi		3.11	
	MP LAB	1563	Dr.PB.Phaneendra Babu		3.09	
	MP LAB	1540	D.SrinivasRao		3.01	

Signature of HOD

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Summation of Teacher's Appraisal by Students

Name of the Instructor	G.SandhyaRani
Faculty ID	888
Branch	EEE
Class and Semester	III/II SEM
Academic Year	2022-23
Subject Title	PowerSystemsAnalysis Lab(PSA Lab)
Total No. of Responses/class strength	62/64

Average rating on a scale of 4 for the responses considered: 3.19

S.No.	Questions	Average
1	How do the teacher explain the subject?	3.10
2	The teacher pays attention to	3.35
3	The Language and communication skills of the teacher is	3.26
4	Is the session Interactive ?	3.10
5	Rate your teachers explanation in clearing the doubts	3.06
6	Rate your teachers commitment in completing the syllabus	3.15
7	Rate your teachers punctuality	3.26
8	Rate your teachers use of teaching aids	3.26
9	Rate your teachers guidance in other activities like NPTEL,Moodle,Swayam,Projects.	3.18
10	What is your overall opinion about the teacher ?	3.19

3.19

Net Feedback on a Scale of 1 to 4 3.19

Remarks by HOD:

Remarks by Principal:

Remarks by Director:

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Direct Internal CO Attainments

Academic Year	2022-23	Department	EEE	Name of the Programme	B.Tech		
Year - Semester	III-II	Course Name :	Power Systems Analysis lab	Course Code	GR20A3096	Section	A

	Lab Internal Examination																Record		Assessment
	Q.No 1	Q.No 2	Q.No 3	Q.No 4	Q.No 5	Q.No 6	Q.No 7	Q.No 8	Q.No 9	Q.No 10							Iteration 1	Iteration 2	Marks
Enter CO Number → 1,2,3,4,5,6,7	1	1	2	2	3	3	4	4	5	5							1,2,3	4,5	1,2,3,4,5
Marks →	10	10	10	10	10	10	10	10	10	10							5	5	10
S.No/Roll No.	ote : Enter Marks Between Two Green rows. Another Note : Additional Columns if Required should be inserted after column H and appropriately rename the Q. N																		
20241A0201	3																5	3	8
20241A0202		9															5	4	8
20241A0203			7														5	3	7
20241A0204		8															5	4	8
20241A0205					9												5	4	8
20241A0206							6										3	3	6
20241A0207						6											5	3	6
20241A0208				6													5	3	6
20241A0209							5										1	2	4
20241A0210									5								3	3	6
20241A0211								7									3	3	7
20241A0212					8												5	4	8
20241A0214			3														1	3	6
20241A0215	8																5	4	8
20241A0216		8															5	4	8
20241A0217				7													3	3	7
20241A0218						7											5	3	7
20241A0219							6										5	3	6
20241A0220								8									3	4	8
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20241A0226						6											3	2	2
20241A0227	5																3	3	3
20241A0228			5														2	3	5
20241A0229		9															5	4	9
20241A0230					9												5	4	8
20241A0231							5										1	3	4
20241A0233								9									5	4	8

20241A0234				3													1	3	5
20241A0235		5															5	3	5
20241A0236						7											3	3	7
20241A0237				7													5	3	7
20241A0238							6										5	4	7
20241A0239					5												5	4	6
20241A0240		8															5	4	9
20241A0241				8													5	4	8
20241A0242									9								5	4	9
20241A0243								9									5	4	9
20241A0244										5							1	3	4
20241A0245							8										5	4	8
20241A0246						8											5	4	8
20241A0247				8													5	4	8
20241A0248		8															5	4	8
20241A0249	8																3	4	8
20241A0250			4														5	3	4
20241A0251				4													5	3	4
20241A0252						5											3	3	4
20241A0253								4									1	4	6
20241A0254			9														5	4	9
20241A0255																	1	2	4
20241A0256				7													5	3	7
20241A0257						9											5	4	9
21245A0201								9									5	4	9
21245A0202			6														5	3	7
21245A0203	7																3	3	6
21245A0204		8															5	4	8
21245A0205					8												5	4	8
21245A0206								8									5	4	8
21245A0207										8							3	4	8
21245A0208							6										5	3	7
21245A0209				6													5	3	7

if your class strength is > 60 then *insert rows above the green row Last record* , Similarly *delete the empty rows above green row* if the class strenght is < 60)

Total number of students appeared for the examination (NST)	5	8	7	10	5	7	8	7	3	3							64	64	64
Total number of students attempted the question (NSA)	5	8	7	10	5	7	8	7	3	3							64	64	64
Attempt % (TAP) = (NSA/NST)*100	100.00	100.00	100.00	100.00	100.00	#####	100.00	100.00	100.00	100.00							100.00	100.00	100.00
Total number of Students who got more than 60% marks (NSM)	3	7	4	8	4	6	5	6	1	2							56	61	50
Attainment % (TMP) = (NSM/NSA)*100	60.00	87.50	57.14	80.00	80.00	85.71	62.50	85.71	33.33	66.67							87.50	95.31	78.13
Score(S)	3	3	2	3	3	3	3	3	1	3							3	3	3

Note : CO attainment is considered to be zero if the attempt % is less than 30%																				
CO Validation	1	1	2	2	3	3	4	4	5	5								1,2,3	4,5	1,2,3,4,5
Course Outcome	CO1	CO1	CO2	CO2	CO3	CO3	CO4	CO4	CO5	CO5								CO1,CO2, CO3	CO4,CO5	CO1,CO2,CO3,CO4,CO5
Marks (Y)	10	10	10	10	10	10	10	10	10	10								5	5	10
No. of COs Shared (Z)	1	1	1	1	1	1	1	1	1	1								3	2	5
Y/Z	10	10	10	10	10	10	10	10	10	10								1.66667	2.5	2
S*Y/Z	30	30	20	30	30	30	30	30	10	30								5	7.5	6
CO1	1	1	0	0	0	0	0	0	0	0								1	0	1
CO2	0	0	1	1	0	0	0	0	0	0								1	0	1
CO3	0	0	0	0	1	1	0	0	0	0								1	0	1
CO4	0	0	0	0	0	0	1	1	0	0								0	1	1
CO5	0	0	0	0	0	0	0	0	1	1								0	1	1
CO6	0	0	0	0	0	0	0	0	0	0								0	0	0
CO7	0	0	0	0	0	0	0	0	0	0								0	0	0

Weighted Average for Attainment relevance (Internal CODn)	CO1	CO2	CO3	CO4	CO5		
	3.00	2.58	3.00	3.00	2.50		

!! Caution !! For CO Values < 2.1 should be justified with Remidial Action Report.

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Indirect CO Attainments

Academic Year	2022-23		Department	EEE	Name of the Programme	B.Tech	
Year - Semester	III-II		Course Name :	Power Systems Analysis lab	Course Code	GR20A3096	Section A

Course Outcomes survey on Scale 1 (Low) to 5 (High)

Course Outcome→	Mathematically model various parameters in power system	To solve different load flow problems	Summarise different protection scheme for the faults	Formulate the different algorithms for load flows and stability problems	To develop and design solutions for power system problems
CO Number 1,2,3,4,5,6,7	1	2	3	4	5
Marks	5	5	5	5	5
S.No/Roll No.	Note : Enter Marks Between Two Green rows.				
First record/1	4	4	4	4	4
2	4	4	4	4	4
3	3	3	3	3	3
4	4	4	4	4	4
5	3	3	3	3	3
6	4	4	4	4	4
7	3	3	3	3	3
8	4	4	4	4	4
9	3	3	3	3	3
10	5	5	5	5	5
11	4	4	4	4	4
12	3	3	3	3	3
13	4	4	4	4	4
14	3	3	3	3	3
15	4	4	4	4	4
16	3	3	3	3	3
17	4	4	4	4	4
18	3	3	3	3	3
19	5	5	5	5	5
20	4	4	4	4	4
21	3	3	3	3	3
22	4	4	4	4	4
23	3	3	3	3	3
24	4	4	4	4	4
25	3	3	3	3	3
26	4	4	4	4	4
27	3	3	3	3	3
28	5	5	5	5	5
29	4	4	4	4	4
30	3	3	3	3	3
31	4	4	4	4	4
32	3	3	3	3	3
33	4	4	4	4	4
34	3	3	3	3	3
35	4	4	4	4	4
36	3	3	3	3	3
37	5	5	5	5	5
38	4	4	4	4	4
39	3	3	3	3	3
40	4	4	4	4	4
41	3	3	3	3	3
42	4	4	4	4	4
43	3	3	3	3	3
44	4	4	4	4	4
45	3	3	3	3	3
46	5	5	5	5	5
47	4	4	4	4	4
48	3	3	3	3	3
49	4	4	4	4	4
50	3	3	3	3	3
51	4	4	4	4	4
52	3	3	3	3	3
53	4	4	4	4	4
54	3	3	3	3	3
55	5	5	5	5	5
56	3	3	3	3	3
57	4	4	4	4	4
58	3	3	3	3	3
59	5	5	5	5	5
60	3	3	3	3	3
61	5	5	5	5	5

62	4	4	4	4	4
63	3	3	3	3	3
64	4	4	4	4	4
65	3	3	3	3	3
66	4	4	4	4	4
if your class strength is > 60 then *insert rows* *above the green row Last record* , Similarly *delete the* *empty rows above green row* if the class strenght is < 60)					
Total number of students appeared for the examination (NST)	66	66	66	66	66
Total number of students attempted the question (NSA)	66	66	66	66	66
Attempt % (TAP) = (NSA/NST)*100	100.00	100.00	100.00	100.00	100.00
Total number of Students who got more than 60% marks (NSM)	66	66	66	66	66
Attainment % (TMP) = (NSM/NSA)*100	100.00	100.00	100.00	100.00	100.00
Score(S)	3	3	3	3	3

CO attainment is considered zero if the attempt % is less than 30%

Indirect CO (COIn)	CO1	CO2	CO3	CO4	CO5
	3	3	3	3	3

!! Caution !! For CO Values < 2.1 should be justified with Remidial Action Report.

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Direct External CO Attainment

Academic Year	2022-23		Department	EEE		Name of the Programme	B.Tech		
Year - Semester	III-II		Course Name :	Power Systems Analysis lab		Course Code	GR20A3096	Section	A

	Part A										Part B					
	Q.No 1	Q.No 2	Q.No 3	Q.No 4	Q.No 5	Q.No 6	Q.No 7	Q.No 8	Q.No 9	Q.No 10	Q.No 11	Q.No 12	Q.No 13	Q.No 14	Q.No 15	Viva
Enter CO Number → 1,2,3,4,5,6,7	1	1	2	2	3	3	4	4	5	5						1,2,3,4,5
Marks →	50	50	50	50	50	50	50	50	50	50						20
S.No/Roll No.	***Note :*** Enter Marks Between Two Green rows. ***Another Note :*** Additional Columns if Required should be inserted after column H and appropriately rename the Q. Nos.															
First record / 1	15															15
2			36													14
3					20											15
4	49															16
5							44									14
6		29														16
7									27							15
8										23						15
9		17														15
10					32											16
11		30														15
12							46									14
14									15							3
15			30													16
16					46											14
17			34													16
18		40														17
19							26									14
20			22													16
21						25										15
22								23								15
23				35												15
24	30															12
25						12										6
26					10											10
27				17												15
28										22						15
29							49									15
30		40														14
31									12							7
33					44											15
34									12							8
35				46												15
36							25									16
37						38										15
38									25							15
39										29						17
40						42										15
41				36												16
42	37															15
43			44													16
44										30						15
45									46							16
46								43								15
47										41						15
48							46									16
49					37											16
50							25									10
51				25												7
52										27						16
53			27													15
54							48									16
55					10											7
56							46									17
57								49								15
58	46															14
59				27												15
60			25													15
61								46								15
62										44						16
63					36											15
64								37								15
65	38															16
66			26													16
if your class strength is > 60 then ***insert*** ***rows above the green row Last record*** , Similarly ***delete the empty rows above green row*** if the class strenght is < 60)																
Total number of students appeared for the examination (NST)	6	5	8	6	8	4	9	5	6	7						64
Total number of students attempted the question (NSA)	6	5	8	6	8	4	9	5	6	7						64
Attempt % (TAP) = (NSA/NST)*100	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00						100.00
Total number of Students who got more than 60% marks (NSM)	5	3	4	3	5	2	6	4	1	3						56
Attainment % (TMP) = (NSM/NSA)*100	83.33	60.00	50.00	50.00	62.50	50.00	66.67	80.00	16.67	42.86						87.50
Score(S)	3	3	2	2	3	2	3	3	0	1						3
CO attainment is considered zero if the attempt % is less than 30%																
CO Validation	1	1	2	2	3	3	4	4	5	5						1,2,3,4,5
Course Outcome	CO1	CO1	CO2	CO2	CO3	CO3	CO4	CO4	CO5	CO5						CO1,CO2,CO3,CO4,CO5
Marks (Y)	50	50	50	50	50	50	50	50	50	50						20
No. of COs Shared (Z)	1	1	1	1	1	1	1	1	1	1						5
Y/Z	50	50	50	50	50	50	50	50	50	50						4
S*Y/Z	150	150	100	100	150	100	150	150	0	50						12
CO1	1	1	0	0	0	0	0	0	0	0						1
CO2	0	0	1	1	0	0	0	0	0	0						1
CO3	0	0	0	0	1	1	0	0	0	0						1
CO4	0	0	0	0	0	0	1	1	0	0						1
CO5	0	0	0	0	0	0	0	0	1	1						1
CO6	0	0	0	0	0	0	0	0	0	0						0
CO7	0	0	0	0	0	0	0	0	0	0						0

Weighted Average for Attainment relevance (Internal CODn)	CO1	CO2	CO3	CO4	CO5		
	3.00	2.04	2.52	3.00	2.50		

!! Caution !! For CO Values < 2.1 should be justified with Remidial Action Report.

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Summary Sheet CO Attainments

Academic Year:	2022-23
Course/Subject:	Power Systems Analysis lab
Department:	EEE
Section	A

Name of the Program:	B.Tech
Course Code:	GR20A3096
Year - Semester :	III-II

Attainment/CO	CO1	CO2	CO3	CO4	CO5
Attainment for Direct Internal CO (Mid I & II, Assignments, Tutorials, Assessments, etc.)	3.00	2.58	3.00	3.00	2.50
Attainment for Direct External CO (End Semester Exam)	3.00	2.04	2.52	3.00	2.50
Direct CO (0.3*Internal + 0.7*External)	3.00	2.20	2.66	3.00	2.50
Indirect CO	3.00	3.00	3.00	3.00	3.00
Final CO (COFn) = (0.9 x Direct CO + 0.1 x Indirect CO)	**3.00**	**2.28**	**2.70**	**3.00**	**2.55**

CO	Course Outcome	Remedial Action for COs Less than 70% (2.10)
CO1	**Mathematically model various parameters in power system**	NA
CO2	**To solve different load flow problems**	NA
CO3	**Summarise different protection scheme for the faults**	NA
CO4	**Formulate the different algorithms for load flows and stability problems**	NA
CO5	**To develop and design solutions for power system problems**	NA

ID No.	Name of the Faculty	Department	Signature
888/882	GSR/MNSR	EEE	G Sandhyarani

HOD

Copy to: IQAC

Gokaraju Rangaraju Institute of Engineering and Technology

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Direct Internal CO Attainments

Academic Year	2022-23
Year - Semester	III-II

Department	EEE
Course Name :	Power Systems Analysis lab

Name of the Programme	B.Tech
Course Code	GR20A3096

P-Outcomes / C-Outcomes	A	B	C	D	E	F	G	H	I	J	K	L	PSO1	PSO2
1	M	H	M		M		H		M	M	M		M	
2		M	H	H		M	M		M	M			H	H
3	M	M			M	H		M			H		M	
4		M	H	M		M			M		M			M
5	M	H		H			H	M		M		H	M	H

Convert above mappings to scale 1-3

Enter H,M, L values of CO-PO Mapping Matrix in blue shaded rows 12 - 18 for seven CO s automatically PO Attainments are Calculated

P-Outcomes / C-Outcomes	A	B	C	D	E	F	G	H	I	J	K	L	PSO1	PSO2
CO1	2	3	2		2		3		2	2	2		2	
CO2		2	3	3		2	2		2	2			3	3
CO3	2	2			2	3		2			3		2	
CO4		2	3	2		2			2		2			2
CO5	2	3		3			3	2		2		3	2	3
Expected Attainment	2.00	2.40	2.67	2.67	2.00	2.33	2.67	2.00	2.00	2.00	2.33	3.00	2.25	2.67

	CO1	CO2	CO3	CO4	CO5		
Final Cos CoF	3.00	2.28	2.70	3.00	2.55		

	Attained PO A	Attained PO B	Attained PO C	Attained PO D	Attained PO E	Attained PO F	Attained PO G	Attained PO H	Attained PO I	Attained PO J	Attained PO K	Attained PO L	PSO1	PSO2
CO1	2.00	3.00	2.00		2.00		3.00		2.00	2.00	2.00		2.00	
CO2		1.52	2.28	2.28		1.52	1.52		1.52	1.52			2.28	2.28
CO3	1.80	1.80			1.80	2.70		1.80			2.70		1.80	
CO4		2.00	3.00	2.00		2.00			2.00		2.00			2.00
CO5	1.70	2.55		2.55			2.55	1.70		1.70		2.55	1.70	2.55
Attained	1.83	2.17	2.43	2.28	1.90	2.07	2.36	1.75	1.84	1.74	2.23	2.55	1.94	2.28

	A	B	C	D	E	F	G	H	I	J	K	L		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
Expected	2.00	2.40	2.67	2.67	2.00	2.33	2.67	2.00	2.00	2.00	2.33	3.00	2.25	2.67
Attained	1.83	2.17	2.43	2.28	1.90	2.07	2.36	1.75	1.84	1.74	2.23	2.55	1.94	2.28
	91.63	90.57	91.00	85.38	94.95	88.82	88.38	87.45	92.00	87.00	95.67	85.00	86.42	85.38

Note : PO is Satisfied if attained PO > 70, U indicates PO Unsatisfied

Faculty Co-Ordinator

HOD