Lesson Plan

Back

Subject	POWER SYSTEM ANALYSIS – 2 [18EE71] Syllabus Scheme: 2018 UG
Faculty Name	Kubera U EEE SEMESTER VII A
Academic Session	
Number of class/lecture hours for this subject	50
Number of Lecture Hours per week	
Credits	
Internal Assessment Marks	
External Exam Marks	
First class/lecture starts from date	01/10/2021

✔ DRAFT
Kubera U
09/10/2021 14:44

Submit For Approval

APPROVAL 1
Dr. Chandrashekar M. J.
ASSOCIATE PROFESSOR

APPROVAL 2
Dr. Babu N. V.
PROFESSOR & HOD

Course Aim / Objective

- To explain formulation of network models and bus admittance matrix for solving load flow problems.
- To discuss optimal operation of generators on a bus bar and optimum generation scheduling.
- To explain symmetrical fault analysis and algorithm for short circuit studies.
- To explain formulation of bus impedance matrix for the use in short circuit studies on power systems.
- To explain numerical solution of swing equation for multi-machine stability

Course Outcome

#	Course Objective

#	Course Objective
CO1	Formulate network matrices and models for solving load flow problems
CO2	Perform power flow studies of power systems using iterative techniques
CO3	Solve issues of economic load dispatch and unit commitment problems
CO4	Analyze short circuit faults in power system networks using bus impedance matrix
CO5	Apply numerical techniques to solve swing equation for stability analysis

Methodology

The students will be taught by classroom teaching, presentations, Videos, animations etc..

Evaluation Criteria

Evaluation is done based on

1. CIE and SEE
2. Assignments
3. Class room presentations
4. Quiz questions
5. MCQ's in class

Lesson Plan Details   (Modify lecture dates in lesson plan)

Date	Lesson	Plan Details	Expected Outcome	Marks	Submissions / Deliverables	Faculty
Lecture 1 01-10-2021 (Period 1)	Class students Registration Chapter/Unit No:	Students registration	--	-	-	Kubera U
Lecture 2 04-10-2021 (Period 1)	Network Topology Chapter/Unit No: 1	Introduction to Power systems analysis-2	CO1		1	Kubera U
Lecture 3 05-10-2021 (Period 3)	Network Topology Chapter/Unit No: 1	Basic definitions of Elementary graph theory	CO1	6	1	Kubera U

Date	Lesson	Plan Details	Expected Outcome	Marks	Submissions / Deliverables	Faculty
Lecture 4 07-10-2021 (Period 3)	Network Topology Chapter/Unit No: 1	Formation of Incidence Matrices A^ and A	CO1	4	1	Kubera U
Lecture 5 08-10-2021 (Period 1)	Network Topology Chapter/Unit No: 1	Formation of Incidence Matrices B^, B, C^ &C	CO1	8	1	Kubera U
Lecture 6 11-10-2021 (Period 1)	Network Topology Chapter/Unit No: 1	Formation of Incidence Matrices K, Examples	CO1	6	1	Kubera U
Lecture 7 12-10-2021 (Period 3)	Network Topology Chapter/Unit No: 1	Primitive network	CO1	6	1	Kubera U
Lecture 8 21-10-2021 (Period 3)	Network Topology Chapter/Unit No: 1	Formation of Y Bus by Singular Transformation	CO1	8	1	Kubera U
Lecture 9 22-10-2021 (Period 1)	Network Topology Chapter/Unit No: 1	Formation of Y bus by Inspection Method	CO1	8	1	Kubera U
Lecture 10 25-10-2021 (Period 1)	Network Topology Chapter/Unit No: 1	Illustrative examples	CO1	8	1	Kubera U
Lecture 11 26-10-2021 (Period 3)	Load Flow Studies Chapter/Unit No: 2	Introduction LFA	CO2		1	Kubera U

Date	Lesson	Plan Details	Expected Outcome	Marks	Submissions / Deliverables	Faculty
Lecture 12 28-10-2021 (Period 3)	Load Flow Studies Chapter/Unit No: 2	Classification of buses	CO2	4	1	Kubera U
Lecture 13 29-10-2021 (Period 1)	Load Flow Studies Chapter/Unit No: 1	Power flow problem and equation	CO2	8	1	Kubera U
Lecture 14 02-11-2021 (Period 3)	Load Flow Studies Chapter/Unit No: 2	Operating Constraints	CO2	6	1	Kubera U
Lecture 15 04-11-2021 (Period 3)	Load Flow Studies Chapter/Unit No: 2	Data for Load flow	CO2	6	1	Kubera U
Lecture 16 08-11-2021 (Period 1)	Load Flow Studies Chapter/Unit No: 2	Gauss Seidal iterative method	CO2	8	1	Kubera U
Lecture 17 09-11-2021 (Period 3)	Load Flow Studies Chapter/Unit No: 2	Gauss Seidal iterative method Examples	CO2	8	1	Kubera U
Lecture 18 29-11-2021 (Period 1)	Load Flow Studies Chapter/Unit No: 1	Illustrative examples ON GS METHOD	CO2	10	1	Kubera U
Lecture 19 02-12-2021 (Period 1)	Load Flow Studies Chapter/Unit No: 2	Illustrative examples	CO2	10	1	Kubera U

Date	Lesson	Plan Details	Expected Outcome	Marks	Submissions / Deliverables	Faculty
Lecture 20 02-12-2021 (Period 3)	Load Flow Studies Chapter/Unit No: 2	Illustrative examples	CO2	8	1	Kubera U
Lecture 21 03-12-2021 (Period 1)	Load Flow Studies(continued) Chapter/Unit No: 3	Newton-Raphson method introduction	CO2		1	Kubera U
Lecture 22 06-12-2021 (Period 1)	Load Flow Studies(continued) Chapter/Unit No: 3	N-R method Derivation in Polar form	CO2	8	1	Kubera U
Lecture 23 07-12-2021 (Period 3)	Load Flow Studies(continued) Chapter/Unit No: 3	Fast decoupled load flow method	CO2	8	1	Kubera U
Lecture 24 09-12-2021 (Period 3)	Load Flow Studies(continued) Chapter/Unit No: 3	Illustrative examples	CO2	8	1	Kubera U
Lecture 25 10-12-2021 (Period 1)	Load Flow Studies(continued) Chapter/Unit No: 3	Illustrative examples	CO2	8	1	Kubera U
Lecture 26 13-12-2021 (Period 1)	Load Flow Studies(continued) Chapter/Unit No: 3	Illustrative examples	CO2	8	1	Kubera U
Lecture 27 14-12-2021 (Period 3)	Load Flow Studies(continued) Chapter/Unit No: 3	Illustrative examples	CO2	8	1	Kubera U

Date	Lesson	Plan Details	Expected Outcome	Marks	Submissions / Deliverables	Faculty
Lecture 28 16-12-2021 (Period 3)	Load Flow Studies(continued) Chapter/Unit No: 3	Flow charts of LFS methods	CO2	8	1	Kubera U
Lecture 29 17-12-2021 (Period 1)	Flow charts of LFS methods Chapter/Unit No: 3	Flow charts of LFS methods	CO2	6	1	Kubera U
Lecture 30 20-12-2021 (Period 1)	Flow charts of LFS methods Chapter/Unit No: 3	Comparison of Load Flow Methods	CO2	8	1	Kubera U
Lecture 31 21-12-2021 (Period 3)	Economic Operation of Power System and Unit Commitment Chapter/Unit No: 4	Introduction and Performance curves	CO3	6	1	Kubera U
Lecture 32 23-12-2021 (Period 3)	Economic Operation of Power System and Unit Commitment Chapter/Unit No: 4	Economic generation scheduling neglecting generator limits	CO3	7	1	Kubera U
Lecture 33 24-12-2021 (Period 1)	Economic Operation of Power System and Unit Commitment Chapter/Unit No: 4	Economic generation scheduling including generator limits	CO3	7	1	Kubera U
Lecture 34 27-12-2021 (Period 1)	Economic Operation of Power System and Unit Commitment Chapter/Unit No: 4	Economic dispatch including transmission losses	CO3	8	1	Kubera U
Lecture 35 28-12-2021 (Period 3)	Economic Operation of Power System and Unit Commitment Chapter/Unit No: 4	Derivation of transmission loss formula	CO3	8	1	Kubera U

Date	Lesson	Plan Details	Expected Outcome	Marks	Submissions / Deliverables	Faculty
Lecture 36 30-12-2021 (Period 3)	Economic Operation of Power System and Unit Commitment Chapter/Unit No: 4	Illustrative examples	CO3	8	1	Kubera U
Lecture 37 31-12-2021 (Period 1)	Economic Operation of Power System and Unit Commitment Chapter/Unit No: 4	Unit Commitment Introduction	CO3		1	Kubera U
Lecture 38 03-01-2022 (Period 1)	Economic Operation of Power System and Unit Commitment Chapter/Unit No: 4	Constraints	CO3	6	1	Kubera U
Lecture 39 04-01-2022 (Period 3)	Economic Operation of Power System and Unit Commitment Chapter/Unit No: 4	Unit commitment solution by prior list method	CO3	7	1	Kubera U
Lecture 40 06-01-2022 (Period 3)	Economic Operation of Power System and Unit Commitment Chapter/Unit No: 4	Unit commitment solution by dynamic forward DP approach	CO3	8	1	Kubera U
Lecture 41 07-01-2022 (Period 1)	Symmetrical Fault Analysis and Power System Stability Chapter/Unit No: 5	Introduction to SFA	CO4		1	Kubera U
Lecture 42 10-01-2022 (Period 1)	Symmetrical Fault Analysis and Power System Stability Chapter/Unit No: 5	Z Bus Formulation by Step by step building algorithm	CO4	10	1	Kubera U
Lecture 43 11-01-2022 (Period 3)	Symmetrical Fault Analysis and Power System Stability Chapter/Unit No: 5	Illustrative examples	CO4	7	1	Kubera U

Date	Lesson	Plan Details	Expected Outcome	Marks	Submissions / Deliverables	Faculty
Lecture 44 13-01-2022 (Period 3)	Symmetrical Fault Analysis and Power System Stability Chapter/Unit No: 5	Illustrative examples	CO4	7	1	Kubera U
Lecture 45 14-01-2022 (Period 1)	Symmetrical Fault Analysis and Power System Stability Chapter/Unit No: 5	Z-bus Algorithm for Short Circuit Studies	CO4	8	1	Kubera U
Lecture 46 17-01-2022 (Period 1)	Symmetrical Fault Analysis and Power System Stability Chapter/Unit No: 5	Power System Stability basics	CO5		1	Kubera U
Lecture 47 18-01-2022 (Period 3)	Symmetrical Fault Analysis and Power System Stability Chapter/Unit No: 5	Numerical Solution of Swing Equation by Point by Point method	CO5	8	1	Kubera U
Lecture 48 20-01-2022 (Period 3)	Symmetrical Fault Analysis and Power System Stability Chapter/Unit No: 5	Numerical Solution of Swing Equation by Runge Kutta Method	CO5	8	1	Kubera U
Lecture 49 21-01-2022 (Period 1)	Symmetrical Fault Analysis and Power System Stability Chapter/Unit No: 5	Illustrative examples	CO5	7	1	Kubera U
Lecture 50 24-01-2022 (Period 1)	Symmetrical Fault Analysis and Power System Stability Chapter/Unit No: 5	Illustrative examples	CO5	7	1	Kubera U
Lecture 25-01-2022 (Period 3)	REVISION Chapter/Unit No: 1	REVISION				Kubera U

Date	Lesson	Plan Details	Expected Outcome	Marks	Submissions / Deliverables	Faculty
Lecture 27-01-2022 (Period 3)	REVISION Chapter/Unit No: 2	REVISION				Kubera U

General Instructions

- All Students should posses min of 85% of attendance
- All 3 internals are compulsory

References

- Modern Power System by D. P. Kothari McGraw Hill 4 th Edition, 2011

- Power System Analysis and Design by J.Duncan Glover et al Cengage 4 th Edition, 2008

- Power System Analysis by Hadi Sadat McGraw Hill 1 st Edition, 2002

- Computer Techniques and Models in Power System Analysis, K. Uma Rao, IK International, 2013

‖ Jai Sri Gurudev ‖
Sri Adichunchanagiri Shikshana Trust (R)

SJB Institute of Technology

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Affiliated to
Visvesvaraya Technological University, Belagavi
& Approved by AICTE, New Delhi

Accredited by NAAC, Bengaluru with 'A' Grade.
Recognized by UGC, New Delhi with 2(f) and 12(B).
Certified by ISO 9001-2015

Department of Electrical & Electronics Engineering

Subject: **Power System Analysis-2**

Subject Code: **18EE71**

Class: **VII Sem (2018 Scheme)**

Faculty: **Mr. Kubera U**

CO-PO-PSO Mapping
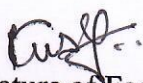
Course outcomes:

At the end of the course, the student will have the ability to

CO-1	Formulate network matrices and models for solving load flow problems.
CO-2	Perform load flow studies of power system using iterative techniques.
CO-3	Solve issues of economic load dispatch and unit commitment problems
CO-4	Analyze short circuit faults in power system using bus impedance matrix
CO-5	Apply numerical techniques to solve swing equation for stability studies.

CO PO-PSO Mapping Table:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3			2								3	2	
CO2	3	3			2								3	2	
CO3	3	3			2		2						3	2	
CO4	3	3			2	2							3	2	
CO5	3	2			2								3	2	
Avg.	3	2.4			2	2	2						3	2	

Signature of Faculty

Domain Expert

HOD