Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology

Third year of Bachelor of Engineering (EE)

With effect from: Academic Year 2019-20

Subject Code: EE601-N	Subject Title: Switchgear
Pre-requisite	

Course Objective:

- To present a problem oriented introductory knowledge of protection of Electrical Engineering systems.
- To understand basic concepts of Electrical protection of any system.

Teaching scheme				Total Credit	Evaluation Scheme					Total Marks
L	T	P	Total		Theory		IE Marks	CIA Marks	Pract. Marks	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks				
03	00	00	03	03	03	70	30	20	00	120

Outline of the Course:

Sr. No	Title of the Unit	Minimum Hours
1	**Theory of Circuit Interruption:**	08
2	**Circuit Constants in Relation to Circuit**	10
3	**Theory and Practice of Conventional Circuit Breakers**	10
4	**Recent Developments in Circuit Breakers:**	08
5	**Testing of Circuit Breakers:**	09

Total Hours (Theory): 45
Total Hours (Lab): 00
Total Hours: 45

Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology

Third year of Bachelor of Engineering (EE)

With effect from: Academic Year 2019-20

Detailed Syllabus

Sr. N	Topic	Lecture Hours	Weightage(%)
1	**Theory of Circuit Interruption:** Introduction, Physics of arc phenomena , Maintenance of the arc, Losses from plasma, Essential properties of arc, Arc interruption theories	08	**20**
2	**Circuit Constants in Relation to Circuit Breaking:** Introduction, Circuit breaker rating, Circuit constants and circuit conditions Restriking voltage transient Characteristics of restriking voltage, Interaction between the breaker and circuit, Current chopping, The duties of switchgear.	10	**20**
3	**Theory and Practice of Conventional Circuit Breakers:** Automatic switch, Air-break circuit breakers, Oil circuit breakers, Single and multi-break construction, Air-blast circuit breaker, Performance of circuit breakers and system\ requirements, Modification of circuit breaker duty by shunt resistors, Power factor correction by series resistance, Comparative merits of different types of conventional circuit breakers.	10	**20**
4	**Recent Developments in Circuit Breakers:** Modern trends, Vacuum circuit breakers, Sulphur hexafluoride (SF6) circuit breakers D.C. circuit breaker.	08	**20**
5	**Testing of Circuit Breakers:** Introduction, Classification, Description of a simple testing station, Equipment used in the station, Testing procedure, Direct testing, Test report, Indirect testing.	09	**20**
	Total	**45**	**100**

Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures, which may carries five marks in overall evaluation.
- One internal exam of 30 marks is conducted as a part of mid semester evaluation.
- Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carries a weight age of five marks in the overall internal evaluation.
- Surprise tests/Quizzes/Seminar /Tutorial may be conducted and having share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology

Third year of Bachelor of Engineering (EE)

With effect from: Academic Year 2019-20

Learning Outcome

On successful completion of the course

- The student can be acquired the basic knowledge of protection of electrical Engineering systems.
- The students will be able to effectively employ electrical systems and lead the exploration of new applications and techniques for their use**.**

Text Book & Reference Books:

- Switchgear and Protection: Sunil S Rao, Khanna Publishers.
- Power System Protection and Switchgear by B Ravindranath and M Chander, New Age International.
- Power System Protection and Switchgear by Bhuvanesh Oza, Nirmal Nair, Rashesh Mehta and Vijay Makwana, Tata McGraw Hill .
- High Voltage Circuit Breakers: Design and Applications by Ruben D. Garzon, CRC Press.