

**VELTECH MULTI TECH Dr. RANGARAJAN Dr. SAKUNTHALA ENGINEERING
COLLEGE**

Accredited by NBA, New Delhi

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**SYLLABUS
WEEKLY SCHEDULE**

SEMESTER VIII

2015-16

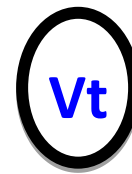
**DEPARTMENT OF EEE
4 YEAR COURSE**

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VELTECH MULTITECH Dr.RANGARAJAN Dr.SAKUNTHALA ENGG. COLLEGE
DEPARTMENT OF EEE
WEEKLY SCHEDULE
SEM : VIII YEAR : IV
ACADEMIC YEAR: 2015-16

S.No	WEEKS	DATE	
		FROM	TO
1	WEEK1	18.01.16	23.01.16
2	WEEK2	25.01.16	30.01.16
3	WEEK3	01.02.16	06.02.16
4	WEEK4	08.02.16	13.02.16
5	WEEK5	15.02.16	20.02.16
6	WEEK6	22.02.16	27.02.16
7	WEEK7	29.02.16	05.03.16
8	WEEK8	07.03.16	12.03.16
9	WEEK9	16.03.16	20.03.16
10	WEEK10	22.03.16	26.03.16
11	WEEK11	27.03.16	02.04.16
12	WEEK12	03.04.16	09.04.16
13	WEEK13	11.04.16	16.04.16
14	WEEK14	18.04.16	23.04.16
15	WEEK15	25.04.16	30.04.16

CONTENTS

THEORY

S.NO	SUB. CODE	SUBJECT
1.	EE 2451	ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION
2.	EE 2028	POWER QUALITY
3.	EE 2036	FLEXIBLE AC TRANSMISSION SYSTEMS

PRACTICAL

S.NO	SUB. CODE	SUBJECT
1.	EE 2452	PROJECT WORK

TEST SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	PRE MODEL EXAM	MODEL EXAM
1	EE 2451	ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION	01.02.16	15.02.16	29.02.06	01.04.16
2	EE 2028	POWER QUALITY	02.02.16	16.02.16	01.03.16	04.04.16
3	EE 2036	FLEXIBLE AC TRANSMISSION SYSTEMS	03.02.16	17.02.16	02.03.16	06.04.16

EE2451 ELECTRIC ENERGY GENERATION UTILISATION AND CONSERVATION

UNIT I POWER GENERATION

WEEK 1: Review of conventional methods – thermal, hydro and nuclear based power generation. Non-conventional methods of power generation – fuel cells - tidal waves.

WEEK 2: Wind – geothermal – solar - bio-mass - municipal waste.

WEEK 3: Cogeneration. Effect of distributed generation on power system operation.

UNIT TEST-I

UNIT II ECONOMIC ASPECTS OF GENERATION

WEEK 4: Economic aspects of power generation – load and load duration curves. number and size of units – cost of electrical energy

WEEK 5: tariff. Economics of power factor improvement – power capacitors – power quality.

WEEK 6: Importance of electrical energy conservation – methods – energy efficient equipments. Introduction to energy auditing.

UNIT TEST-II

UNIT III ILLUMINATION

WEEK 7: Importance of lighting – properties of good lighting scheme

WEEK 8: laws of illumination – photometry - types of lamps – lighting calculations

WEEK 9: basic design of illumination schemes for residential, commercial, street lighting, and sports ground – energy efficiency lamps.

UNIT TEST-III

UNIT IV INDUSTRIAL HEATING AND WELDING

WEEK 10: Role electric heating for industrial applications – resistance heating – induction heating

WEEK 11: dielectric heating - electric arc furnaces.

WEEK 12: Brief introduction to electric welding, welding generator, welding transformer and the characteristics

UNIT TEST-IV

UNIT V ELECTRIC TRACTION

WEEK 13: Merits of electric traction – requirements of electric traction system – supply systems

WEEK 14: mechanics of train movement – traction motors and control

WEEK 15: braking recent trends in electric traction.

UNIT TEST-V

WEEK 16: MODEL PRACTICAL EXAM

WEEK 17: MODEL EXAM

TEXT BOOKS

1. C.L. Wadhwa, 'Generation, Distribution and Utilization of Electrical Energy', New Age International Pvt. Ltd, 2003.
2. B.R. Gupta, 'Generation of Electrical Energy', Eurasia Publishing House (P) Ltd, New Delhi, 2003.

REFERENCES

1. H. Partab, 'Art and Science of Utilisation of Electrical Energy', Dhanpat Rai and Co, New Delhi, 2004.
2. E. Openshaw Taylor, 'Utilization of Electrical Energy in SI Units', Orient Longman Pvt. Ltd, 2003.
3. J.B. Gupta, 'Utilization of Electric Power and Electric Traction', S.K.Kataria and Sons, 2002.

EE2028 POWER QUALITY

UNIT I INTRODUCTION TO POWER QUALITY

WEEK 1: Terms and definitions: Overloading - under voltage - over voltage. Concepts of transients - short duration variations such as interruption - long duration variation such as sustained interruption.

WEEK 2: Sags and swells - voltage sag - voltage swell – voltage imbalance - voltage fluctuation - power frequency variations.

WEEK 3: International standards of power quality. Computer Business Equipment Manufacturers Associations (CBEMA) curve.

UNIT TEST-I

UNIT II VOLTAGE SAGS AND INTERRUPTIONS

WEEK 4: Sources of sags and interruptions - estimating voltage sag performance.

Thevenin's equivalent source - analysis and calculation of various faulted condition

WEEK 5: Voltage sag due to induction motor starting. Estimation of the sag severity

WEEK 6: mitigation of voltage sags, active series compensators. Static transfer switches and fast transfer switches.

UNIT TEST-II

UNIT III OVER VOLTAGES

WEEK 7: Sources of over voltages - Capacitor switching

WEEK 8: – lightning - ferro resonance. Mitigation of voltage swells - surge arresters - low pass filters- power conditioners.

WEEK 9: Lightning protection – shielding - line arresters - protection of transformers and cables. An introduction to computer analysis tools for transients, PSCAD and EMTP

UNIT TEST-III

UNIT IV HARMONICS

WEEK 10: Harmonic sources from commercial and industrial loads, locating harmonic sources
Power system response characteristics - Harmonics Vs transients..

WEEK 11: Effect of harmonics - harmonic distortion - voltage and current distortion - harmonic indices - inter harmonics – resonance.

WEEK 12: Harmonic distortion evaluation - devices for controlling harmonic distortion - passive and active filters. IEEE and IEC standards.

UNIT TEST-IV

UNIT V POWER QUALITY MONITORING

WEEK 13: Monitoring considerations - monitoring and diagnostic techniques for various power quality problems

WEEK 14: modeling of power quality (harmonics and voltage sag) problems by mathematical simulation tools - power line disturbance analyzer Quality measurement equipment

WEEK 15: harmonic / spectrum analyzer - flicker meters - disturbance analyzer. Applications of expert systems for power quality monitoring. Recent trends in electric traction.

UNIT TEST-V

WEEK 16: MODEL PRACTICAL EXAM

WEEK 17: MODEL EXAM

TEXT BOOKS

1. Roger. C. Dugan, Mark. F. McGranaghram, Surya Santoso, H.Wayne Beaty,
'Electrical Power Systems Quality' McGraw Hill,2003.(For Chapters1,2,3, 4 and 5)

REFERENCES

1. G.T. Heydt, 'Electric Power Quality', 2nd Edition. (West Lafayette, IN, Stars in a Circle Publications, 1994). (For Chapter 1, 2, 3 and 5)
2. M.H.J Bollen, 'Understanding Power Quality Problems: Voltage Sags and Interruptions', (New York: IEEE Press, 1999). (For Chapters 1, 2, 3 and 5)
3. J. Arrillaga, N.R. Watson, S. Chen, 'Power System Quality Assessment', (New York: Wiley, 1999). (For Chapters 1, 2, 3, 4 and 5)
4. PSCAD User Manual

EE2036 FLEXIBLE AC TRANSMISSION SYSTEMS

UNIT I INTRODUCTION

WEEK 1: The concept of flexible AC transmission - reactive power control in electrical power Transmission lines -uncompensated transmission line – series and shunt compensation.

Overview of FACTS devices

WEEK 2: Static Var Compensator (SVC) – Thyristor Switched Series capacitor (TCSC)

WEEK3: Unified Power Flow controller (UPFC) - Integrated Power Flow Controller (IPFC).

UNIT TEST-I

UNIT II STATIC VAR COMPENSATOR (SVC) AND APPLICATIONS

WEEK 4: Voltage control by SVC – advantages of slope in dynamic characteristics

WEEK 5: influence of SVC on system voltage. Applications

WEEK 6: enhancement of transient stability – steady state power transfer.enhancement of power system damping – prevention of voltage instability.

UNIT TEST-II

UNIT III THYRISTOR CONTROLLED SERIES CAPACITOR(TCSC) AND APPLICATIONS

WEEK 7: Operation of the TCSC - different modes of operation

WEEK 8: modeling of TCSC – variable reactance model – modeling for stability studies

WEEK 9: Applications - improvement of the system stability limit – enhancement of system damping – voltage collapse prevention

UNIT TEST-III

UNIT IV EMERGING FACTS CONTROLLERS

WEEK 10: Static Synchronous Compensator (STATCOM) – operating principle

WEEK 11: V-I characteristics– Unified Power Flow Controller (UPFC).

WEEK 12: Principle of operation modes of operation –applications – modeling of UPFC for power flow studies.

UNIT TEST-IV

UNIT V CO-ORDINATION OF FACTS CONTROLLERS

WEEK 13: FACTs Controller interactions.SVC–SVC interaction

WEEK 14: co-ordination of multiple controllers using linear control techniques

WEEK 15: Quantitative treatment of control coordination.

UNIT TEST-V

WEEK 16: MODEL PRACTICAL EXAM

WEEK 17: MODEL EXAM

TEXT BOOKS

1. Mohan Mathur, R., Rajiv. K. Varma, “Thyristor – Based Facts Controllers for Electrical Transmission Systems”, IEEE press and John Wiley & Sons, Inc.

REFERENCES:

1. A.T.John, “Flexible AC Transmission System”, Institution of Electrical and Electronic Engineers (IEEE), 1999.

2. Narain G.Hingorani, Laszlo Gyugyi, “Understanding FACTS Concepts and Technology of Flexible AC Transmission System”, Standard Publishers, Delhi 2001.3. J.B. Gupta, ‘Utilization of Electric Power and Electric Traction’, S.K.Kataria and Sons, 2002.