VELTECH MULTI TECH Dr. RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE

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SYLLABUS

WEEKLY SCHEDULE

SEMESTER VI **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 : VI YEAR : III

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

TEST SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	PRE MODEL EXAM	MODEL EXAM
1	EC6651	Communication Engineering	01.02.16	15.02.16	29.02.06	01.04.16
2	EE6601	Solid State Drives	02.02.16	16.02.16	01.03.16	04.04.16
3	EE6602	Embedded Systems	03.02.16	17.02.16	02.03.16	06.04.16
4	EE6603	Power System Operation and Control	04.02.16	18.02.16	03.03.16	08.04.16
5	EE6604	Design of Electrical Machines	05.02.16	19.02.16	04.03.16	11.04.16
6	EE6002	Power System Transients	06.02.15	20.02.16	05.03.16	13.04.16

EC6651 COMMUNICATION ENGINEERING

UNIT I ANALOG COMMUNICATION

WEEK 1:

AM – Frequency spectrum – vector representation – power relations – generation of AM

WEEK 2:

DSB, DSB/SC, SSB, VSB AM Transmitter & Receiver; FM and PM – frequency spectrum – power relations: NBFM & WBFM

WEEK 3:

Generation of FM and DM, Amstrong method & Reactance modulations: FM & PM frequency

UNIT II DIGITAL COMMUNICATION

WEEK 4: UNIT TEST-1

Pulse modulations – concepts of sampling and sampling theormes, PAM, PWM, PPM, PTM, quantization and coding :

WEEK 5:

DCM, DM, slope overload error. ADM, DPCM, OOK systems – ASK, FSK, PSK, BSK, QPSK, QAM, MSK, GMSK, applications of Data communication

UNIT III SOURCE CODES, LINE CODES & ERROR CONTROL (Qualitative only)

WEEK 6:

Primary communication – entropy, properties, BSC, BEC, source coding : Shaum, Fao, Huffman

Coding

WEEK 7: UNIT TEST-2

Noiseless coding theorum, BW – SNR trade off codes: NRZ, RZ, AMI, HDBP, ABQ,

MBnBcodes

WEEK 8:

Efficiency of transmissions, error control codes and applications: convolutions & block
codes.

UNIT IV MULTIPLE ACCESS TECHNIQUES
WEEK 9: UNIT TEST-3
SS&MA techniques: FDMA, TDMA
WEEK 10:
CDMA, SDMA application in wire
WEEK 11:
Wireless communication: Advantages (merits)
WEEK 12: UNIT TEST-4

UNIT V SATELLITE, OPTICAL FIBER – POWERLINE, SCADAWEEK 12:
Orbits: types of satellites : frequency used link establishment, MA techniques used in satellite communication, earth station; aperture actuators used in satellite

WEEK 13:
Intelsat and Insat: fibers – types: sources, detectors used, digital filters, optical link: power line carrier communications: SCADA

WEEK 14: UNIT TEST-5 REVISION FOR FIVE UNITS
WEEK 15: MODEL THEORY
WEEK 16: MODEL PRACTICAL EXAMS

TEXT BOOKS

1. Taub & Schiling "Principles of Communication Systems" Tata McGraw Hill 2007.
2. J.Das "Principles of Digital Communication" New Age International, 1986

REFERENCES

1. Kennedy and Davis "Electronic Communication Systems" Tata McGraw hill, 4th Edition, 1993.

2. Sklar “Digital Communication Fundamentals and Applications“ Pearson Education, 2001.
3. Bary le, Memuschmidt, Digital Communication, Kluwer Publication, 2004.
4. B.P.Lathi “Modern Digital and Analog Communication Systems” Oxford University Press, 1998.

EE6601 SOLID STATE DRIVES

UNIT I DRIVE CHARACTERISTICS

WEEK 1:

Electric drive – Equations governing motor load dynamics – steady state stability – multi quadrant,

WEEK 2

Dynamics: acceleration, deceleration, starting & stopping – typical load torque characteristics –
Selection of motor

UNIT II CONVERTER / CHOPPER FED DC MOTOR DRIVE

WEEK 3: UNIT TEST-1

Steady state analysis of the single and three phase converter fed separately excited DC motor
Drive

WEEK 4:

Continuous and discontinuous conduction– Time ratio and current limit control

WEEK 5:

4 quadrant operation of converter / chopper fed drive

UNIT III INDUCTION MOTOR DRIVES

WEEK 6:

Stator voltage control–energy efficient drive–v/f control

WEEK 7: UNIT TEST-2

constant airgap flux–field weakening mode

WEEK 8:

– Voltage / current fed inverter – closed loop control

UNIT IV SYNCHRONOUS MOTOR DRIVES

WEEK 9: UNIT TEST-3

V/f control and self control of synchronous motor

WEEK 10:

Margin angle control and power factor control

WEEK 11:

Permanent magnet synchronous motor

WEEK 12: UNIT TEST-4

UNIT V DESIGN OF CONTROLLERS FOR DRIVES

WEEK 13:

Transfer function for DC motor / load and converter – closed loop control with Current and speed feedback–armature voltage control and field weakening mode

WEEK 14:

Design of controllers; current controller and speed controller- converter selection and characteristics

WEEK 15: UNIT TEST-5

WEEK 16: MODEL THEORY

TEXT BOOKS

1. Gopal K.Dubey, Fundamentals of Electrical Drives, Narosa Publishing House, 1992.
2. Bimal K.Bose. Modern Power Electronics and AC Drives, Pearson Education, 2002.
3. R.Krishnan, Electric Motor & Drives: Modeling, Analysis and Control, Prentice Hall of India, 2001

REFERENCES

1. John Hindmarsh and Alasdain Renfrew, “Electrical Machines and Drives System,” Elsevier 2012.
2. Shaahin Felizadeh, “Electric Machines and Drives”, CRC Press(Taylor and Francis Group), 2013.

3. S.K.Pillai, A First course on Electrical Drives, Wiley Eastern Limited, 1993.
4. S. Sivanagaraju, M. Balasubba Reddy, A. Mallikarjuna Prasad "Power semiconductor drives" PHI, 5th printing, 2013.
4. N.K.De., P.K.SEN"Electric drives" PHI, 2012.
5. Vedam Subramanyam, "Thyristor Control of Electric Drives", Tata McGraw Hill, 2007

EE6602 EMBEDDED SYSTEMS

WEEK: 1 - UNIT I INTRODUCTION TO EMBEDDED SYSTEMS

Introduction to Embedded Systems – The build process for embedded systems- Structural units in Embedded processor, selection of processor & memory devices- DMA – Memory management Methods

WEEK: 2 Timer and Counting devices, Watchdog Timer, Real Time Clock, In circuit emulator, Target Hardware Debugging

WEEK: 3 – UNIT TEST I

UNIT II EMBEDDED NETWORKING

Embedded Networking: Introduction, I/O Device Ports & Buses– Serial Bus communication protocols –

WEEK: 4

RS232 standard – RS422 – RS485 - CAN Bus -Serial Peripheral Interface (SPI)

WEEK: 5

Inter Integrated Circuits (I^2C) –need for device drivers

WEEK: 6 UNIT TEST II

WEEK: 6 – UNIT III EMBEDDED FIRMWARE DEVELOPMENT ENVIRONMENT

Embedded Product Development Life Cycle- objectives, different phases of EDLC–

WEEK: 7

Modelling of EDLC; issues in Hardware-software Co-design, Data Flow Graph, state machine model,

WEEK: 8

Sequential Program Model, concurrent Model, object oriented Model

WEEK: 9 UNIT TEST III

WEEK: 10 - UNIT IV RTOS BASED EMBEDDED SYSTEM DESIGN

Introduction to basic concepts of RTOS- Task, process & threads, interrupt routines in RTOS,
Multiprocessing and Multitasking, Preemptive and non-preemptive scheduling, Task communication shared memory, message passing

WEEK: 11

Inter process Communication – synchronization between processes-semaphores, Mailbox, pipes, priority inversion, priority inheritance, comparison of Real time Operating systems: Vx Works, µC/OS-II, RT Linux

WEEK: 12 UNIT TEST IV

WEEK: 13 - UNIT V EMBEDDED SYSTEM APPLICATION DEVELOPMENT

Case Study of Washing Machine

WEEK: 14

Automotive Application- Smart card System Application

WEEK: 15 UNIT TEST V

WEEK: 16 MODEL EXAMS

WEEK: 17 MODEL EXAMS

TEXT BOOKS:

1. Rajkamal, 'Embedded System-Architecture, Programming, Design', Mc Graw Hill, 2013.
2. Peckol, "Embedded system Design", John Wiley & Sons,2010
3. Lyla B Das," Embedded Systems-An Integrated Approach", Pearson, 2013

REFERENCES:

1. Shibu. K.V, "Introduction to Embedded Systems", Tata Mcgraw Hill,2009.
2. Elicia White," Making Embedded Systems", O' Reilly Series,SPD,2011.
3. Tammy Noergaard, "Embedded Systems Architecture", Elsevier, 2006.
4. Han-Way Huang, "Embedded system Design Using C8051", Cengage Learning,2009.
5. Rajib Mall "Real-Time systems Theory and Practice" Pearson Education, 2007

EE6603 POWER SYSTEM OPERATION AND CONTROL

WEEK 1 UNIT I INTRODUCTION

An overview of power system operation and control - system load variation - load characteristics -load curves and load-duration curve - load factor - diversity factor

WEEK-2 Importance of load forecasting and quadratic and exponential curve fitting techniques of forecasting – plant level and system level controls

WEEK-3

UNIT TEST-1

WEEK-4 UNIT II REAL POWER - FREQUENCY CONTROL

Basics of speed governing mechanism and modeling - speed-load characteristics – load sharing between two synchronous machines in parallel - control area concept

WEEK-5

LFC control of a single-area system - static and dynamic analysis of uncontrolled and controlled cases - two-area system –modeling - static analysis of uncontrolled case - tie line with frequency bias control - state variable model - integration of economic dispatch control with LFC

WEEK-6

UNIT TEST-2

UNIT III REACTIVE POWER–VOLTAGE CONTROL

WEEK-7

Generation and absorption of reactive power - basics of reactive power control - excitation systems –modeling - static and dynamic analysis

WEEK-8

Stability compensation - methods of voltage control: tap changing transformer, SVC (TCR + TSC) and STATCOM – secondary voltage control

WEEK-9

UNIT TEST-3

UNIT IV UNIT COMMITMENT AND ECONOMIC DISPATCH

WEEK-10

Formulation of economic dispatch problem – I/O cost characterization – incremental cost curve – coordination equations without and with loss (No derivation of loss coefficients)

WEEK-11

Solution by direct method and λ-iteration method - statement of unit commitment problem – priority-list method – forward dynamic programming

WEEK-12

UNIT TEST-4

UNIT V COMPUTER CONTROL OF POWER SYSTEMS

WEEK-13

Need for computer control of power systems - concept of energy control centre - functions – system monitoring - data acquisition and control - system hardware configuration – SCADA and EMS functions - network topology - state estimation

WEEK-14

WLSE - Contingency Analysis - state transition diagram showing various state transitions and control strategies

WEEK-15

UNIT TEST 5

WEEK-16

MODEL EXAMINATION-I (5 UNITS)

WEEK-17

MODEL PRACTICAL EXAMINATION

TEXT BOOKS

1. Olle.I.Elgerd, 'Electric Energy Systems theory - An introduction', Tata McGraw Hill Education Pvt. Ltd., New Delhi, 34th reprint, 2010.

2. Allen. J. Wood and Bruce F. Wollenberg, 'Power Generation, Operation and Control', John Wiley & Sons, Inc., 2003.
3. Abhijit Chakrabarti, Sunita Halder, 'Power System Analysis Operation and Control', PHI learning Pvt. Ltd., New Delhi, Third Edition, 2010.

REFERENCE BOOKS

1. Nagrath I.J. and Kothari D.P., 'Modern Power System Analysis', Tata McGraw-Hill, Fourth Edition, 2011.
2. Kundur P., 'Power System Stability and Control, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 10th reprint, 2010.
3. Hadi Saadat, 'Power System Analysis', Tata McGraw Hill Education Pvt. Ltd., New Delhi, 21st reprint, 2010.
4. N.V.Ramana, "Power System Operation and Control," Pearson, 2011.
5. C.A.Gross, "Power System Analysis," Wiley India, 2011.

EE6604 DESIGN OF ELECTRICAL MACHINES

WEEK-1 UNIT I INTRODUCTION

Major considerations in Electrical Machine Design - Electrical Engineering Materials – Space factor

WEEK-2

Choice of Specific Electrical and Magnetic loadings - Thermal considerations - Heat flow –Temperature rise and Insulating Materials - Rating of machines – Standard specifications

WEEK-3

UNIT TEST-1

UNIT II DC MACHINES

Output Equations – Main Dimensions – Choice of Specific Electric and Magnetic Loading – Maganetic Circuits Calculations - Carter's Coefficient

WEEK 5

Net length of Iron –Real & Apparent flux densities –Selection of number of poles – Design of Armature – Design of commutator and brushes performance prediction using design values

WEEK-6

UNIT TEST-2

UNIT III TRANSFORMERS

WEEK-7

Output Equations – Main Dimensions - kVA output for single and three phase transformers – Window space factor – Design of core and winding

WEEK-8

Overall dimensions – Operating characteristics – No load current – Temperature rise in Transformers – Design of Tank - Methods of cooling of Transformers

WEEK-9

UNIT TEST-3

UNIT IV INDUCTION MOTORS

WEEK-10

Output equation of Induction motor – Main dimensions – Choice of Average flux density – Length of air gap- Rules for selecting rotor slots of squirrel cage machines – Design of rotor bars & slots – Design of end rings

WEEK-11

Magnetic leakage calculations – Leakage reactance of polyphase machines- Magnetizing current - Short circuit current – Operating characteristics- Losses and Efficiency

WEEK-12

UNIT TEST-4

UNIT V SYNCHRONOUS MACHINES

WEEK-13

Output equations – choice of Electrical and Magnetic Loading – Design of salient pole machines – Short circuit ratio – shape of pole face

WEEK-14

Armature design – Armature parameters – Estimation of air gap length – Design of rotor –Design of damper winding – Determination of full load field MMF – Design of field winding – Design of turbo alternators – Rotor design.

WEEK-15

UNIT TEST 5

WEEK-16

MODEL EXAMINATION-I (5 UNITS)

WEEK-17

MODEL PRACTICAL EXAMINATION

TEXT BOOKS

1. Sawhney, A.K., 'A Course in Electrical Machine Design', Dhanpat Rai & Sons, New Delhi, 1984.
2. M.V.Deshpande "Design and Testing of Electrical Machine Design" Wheeler Publications, 2010

REFERENCE BOOKS

1. A.Shanmuga Sundaram, G.Gangadharan, R.Palani 'Electrical Machine Design Data Book', New Age International Pvt. Ltd., Reprint, 2007.
2. R.K.Agarwal " Principles of Electrical Machine Design" Esskay Publications, Delhi, 2002.
3. Sen, S.K., 'Principles of Electrical Machine Designs with Computer Programmes', Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 1987

EE6002 POWER SYSTEM TRANSIENTS

UNIT I INTRODUCTION AND SURVEY

WEEK-1

Review and importance of the study of transients - causes for transients RL circuit transient with sine wave excitation - double frequency transients - basic transforms of the RLC circuit transients

WEEK-2

Different types of power system transients - effect of transients on power systems – role of the study of transients in system planning

WEEK-3
UNIT TEST-1

UNIT II SWITCHING TRANSIENTS
WEEK-4
Over voltages due to switching transients - resistance switching and the equivalent circuit for interrupting the resistor current - load switching and equivalent circuit - waveforms for transient voltage across the load and the switch - normal and abnormal switching transients
WEEK 5
Current suppression - current chopping - effective equivalent circuit Capacitance switching - effect of source regulation - capacitance switching with a restrike, with multiple restrikes. Illustration for multiple restriking transients - ferro resonance

WEEK-6
UNIT TEST-2

UNIT III LIGHTNING TRANSIENTS
WEEK-7
Review of the theories in the formation of clouds and charge formation - rate of charging of thunder clouds – mechanism of lightning discharges and characteristics of lightning strokes –
WEEK-8
Model for lightning stroke - factors contributing to good line design - protection using ground wires – tower footing resistance - Interaction between lightning and power system
WEEK-9
UNIT TEST-3

UNIT IV TRAVELING WAVES ON TRANSMISSION LINE COMPUTATION OF TRANSIENTS

WEEK-10

Computation of transients - transient response of systems with series and shunt lumped parameters and distributed lines

WEEK-11

Traveling wave concept - step response - Bewely's lattice diagram – standing waves and natural frequencies - reflection and refraction of travelling waves

WEEK-12

UNIT TEST-4

UNIT V TRANSIENTS IN INTEGRATED POWER SYSTEM

WEEK-13

The short line and kilometric fault - distribution of voltages in a power system - Line dropping and load rejection - voltage transients on closing and reclosing lines

WEEK-14

Over voltage induced by faults –switching surges on integrated system Qualitative application of EMTP for transient computation

WEEK-15

UNIT TEST-5

WEEK-16

MODEL EXAMINATION-I (5 UNITS)

WEEK-17

MODEL PRACTICAL EXAMINATION

TEXT BOOKS

1. Allan Greenwood, 'Electrical Transients in Power Systems', Wiley Inter Science, New York, 2nd Edition, 1991.
2. Pritindra Chowdhari, "Electromagnetic transients in Power System", John Wiley and Sons Inc., Second Edition, 2009.
3. C.S. Indulkar, D.P.Kothari, K. Ramalingam, 'Power System Transients – A statistical approach', PHI Learning Private Limited, Second Edition, 2010.

REFERENCE BOOKS

1. M.S.Naidu and V.Kamaraju, 'High Voltage Engineering', Tata McGraw Hill, Fifth Edition, 2013.

2. R.D. Begamudre, 'Extra High Voltage AC Transmission Engineering', Wiley Eastern Limited, 1986.
3. Y.Hase, Handbook of Power System Engineering," Wiley India, 2012.
4. J.L.Kirtley, "Electric Power Principles, Sources, Conversion, Distribution and use," Wiley, 2012.

EE6611 POWER ELECTRONICS AND DRIVES LABORATORY

LIST OF EXPERIMENTS:

1. Gate Pulse Generation using R, RC and UJT.
2. Characteristics of SCR and TRIAC
3. Characteristics of MOSFET and IGBT
4. AC to DC half controlled converter
5. AC to DC fully controlled Converter
6. Step down and step up MOSFET based choppers
7. IGBT based single phase PWM inverter
8. IGBT based three phase PWM inverter
9. AC Voltage controller
10. Switched mode power converter.
11. Simulation of PE

Circuits (1Φ&3Φsemiconverter, 1Φ&3Φfullconverter, dc-dc converters, ac voltage controllers)

EE6612 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

LIST OF EXPERIMENTS

1. Simple arithmetic operations: addition / subtraction / multiplication / division.
2. Programming with control instructions:

(i). Ascending / Descending order, Maximum / Minimum of numbers

(ii). Programs using Rotate instructions

(iii). Hex / ASCII / BCD code conversions.

3. Interface Experiments: with 8085

(i). A/D Interfacing. & D/A Interfacing.

4. Traffic light controller.
5. I/O Port / Serial communication
6. Programming Practices with Simulators/Emulators/open source
7. Read a key ,interface display
8. Demonstration of basic instructions with 8051 Micro controller execution, including:

(i). Conditional jumps, looping

(ii). Calling subroutines.

9. Programming I/O Port 8051

(i) Study on interface with A/D & D/A

(ii) Study on interface with DC & AC motor.

10. Mini project development with processors