



VEL TECH MULTI TECH
Dr RANGARAJAN Dr.SAKUNTHALA
ENGINEERING COLLEGE

(An ISO 9001: 2008 Certified Institution)

(Owned by Vel Trust)

(Approved by Govt. of Tamil Nadu and affiliated to Anna University and Accredited by
NBA, New Delhi)



SYLLABUS

WEEKLY SCHEDULE

VII SEMESTER 2015 - 2016

**DEPARTMENT OF ELECTRONICS AND
COMMUNICATION ENGINEERING**

IV YEAR DEGREE COURSE

42, Avadi – Alamathi Road,

Chennai – 600062

Telefax – 044-26841061

E-mail: emailto@veltechmultitech.org

Website : www.veltechmultitech.org



WEEK DETAILS

SL.NO.	WEEK	FROM	TO
1	WEEK1	24.06.2015	26.06.2015
2	WEEK2	29.06.2015	03.07.2015
3	WEEK3	06.07.2015	10.07.2015
4	WEEK4	13.07.2015	17.07.2015
5	WEEK5	20.07.2015	24.07.2015
6	WEEK6	27.07.2015	28.07.2015
7	WEEK7	03.08.2015	07.08.2015
8	WEEK8	10.08.2015	14.08.2015
9	WEEK9	17.08.2015	21.08.2015
10	WEEK10	24.08.2015	28.08.2015
11	WEEK11	31.08.2015	04.09.2015
12	WEEK12	07.09.2015	11.09.2015
13	WEEK13	14.09.2015	18.09.2015
14	WEEK14	21.09.2015	25.09.2015
15	WEEK15	28.09.2015	30.09.2015
16	WEEK16	05.10.2015	09.10.2015
17	WEEK17	12.10.2015	16.10.2015
18	WEEK18	19.10.2015	20.10.2015
19	WEEK19	27.10.2015	30.10.2015

SUBJECT CONTENTS

SL.NO	SUBJECT CODE	SUBJECT NAME
THEORY		
1	EC2401	Wireless Communication
2	EC2402	Optical Communication and Networking
3	EC2403	RF and Microwave Engineering
4	CS2060	High Speed Networks
5	EC2029	Digital Image Processing
6	GE2022	Total Quality Management
PRACTICAL		
7.	EC2404	Electronics System Design Lab
8.	EC2405	Optical & Microwave Lab

TEST / EXAM SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	Pre Model Exam	UNIT TEST IV
1	EC2401	Wireless Communication	13.07.2015	03.08.2015	21.08.2015	14.09.2015
2	EC2402	Optical Communication and Networking	14.07.2015	04.08.2015	22.08.2015	15.09.2015
3	EC2403	RF and Microwave Engineering	15.07.2015	05.08.2015	24.08.2015	16.09.2015
4	CS2060	High Speed Networks	16.07.2015	06.08.2015	25.08.2015	18.09.2015
5	EC2029	Digital Image Processing	17.07.2015	07.08.2015	26.08.2015	21.09.2015
6	GE2022	Total Quality Management	20.07.2015	10.08.2015	27.08.2015	22.09.2015

SL.NO	SUBJECT CODE	SUBJECT NAME	MODEL EXAM
1	EC2401	Wireless Communication	05.10.2015
2	EC2402	Optical Communication and Networking	06.10.2015
3	EC2403	RF and Microwave Engineering	07.10.2015
4	CS2060	High Speed Networks	08.10.2015
5	EC2029	Digital Image Processing	09.10.2015
6	GE2022	Total Quality Management	12.10.2015

EC2401 WIRELESS COMMUNICATION

UNIT I SERVICES AND TECHNICAL CHALLENGES

WEEK-1 Types of Services, Requirements for the services, Multipath propagation.

WEEK-2 – Spectrum Limitations, Noise and Interference limited systems

WEEK-3 - Principles of Cellular networks, Multiple Access Schemes

UNIT II WIRELESS PROPAGATION CHANNELS

WEEK-4- UNIT TEST-I

Propagation Mechanisms (Qualitative treatment), Propagation effects with mobile radio

WEEK-5 Channel Classification, Link calculations

WEEK-6 Narrowband and Wideband models

WEEK- 7 – UNIT TEST-II

UNIT III WIRELESS TRANSCEIVERS

WEEK-8

Structure of a wireless communication link, Modulation and demodulation – Quadrature Phase Shift Keying, $\lambda/4$ -Differential Quadrature Phase Shift Keying

WEEK-9 - Offset-Quadrature Phase Shift Keying, Binary Frequency Shift Keying, Minimum Shift Keying, Gaussian

Minimum Shift Keying, Power spectrum and Error performance in fading channels

UNIT IV SIGNAL PROCESSING IN WIRELESS SYSTEMS

WEEK-10 UNIT TEST-III

Principle of Diversity, Macro diversity, Micro diversity, Signal Combining Techniques,

Transmit diversity, Equalizers

WEEK-11 Linear and Decision Feedback equalizers, Review of Channel coding and Speech coding techniques.

WEEK-12 – UNIT TEST-IV

UNIT V ADVANCED TRANSCEIVER SCHEMES

WEEK-13 Spread Spectrum Systems- Cellular Code Division Multiple Access Systems- Principle, Power control, Effects of multipath propagation on Code Division Multiple Access, Orthogonal Frequency

WEEK-14 Division Multiplexing – Principle, Cyclic Prefix, Transceiver implementation, Second Generation (GSM, IS-95) and Third Generation Wireless Networks and Standards

WEEK-16- UNIT TEST-V

WEEK-17 -MODEL EXAMINATION (5 UNITS)

TEXT BOOKS

1. Andreas.F. Molisch, “Wireless Communications”, John Wiley – India, 2006.
2. Simon Haykin & Michael Moher, “Modern Wireless Communications”, Pearson Education, 2007.

REFERENCE BOOKS

1. Rappaport. T.S., “Wireless communications”, Pearson Education, 2003.
2. Gordon L. Stuber, “Principles of Mobile Communication”, Springer International Ltd.,2001.
3. Andrea Goldsmith, Wireless Communications, Cambridge University Press, 2007.

EC2402 OPTICAL COMMUNICATION AND NETWORKING

UNIT I INTRODUCTION

WEEK1 Introduction, Ray theory transmission- Total internal reflection- Acceptance angle –Numerical aperture

WEEK2 Skew rays – Electromagnetic mode theory of optical propagation – EM waves – modes in Planar guide

WEEK3 – phase and group velocity – cylindrical fibers – SM fibers.

UNIT II TRANSMISSION CHARACTERISTICS OF OPTICAL FIBERS

WEEK-4 UNIT TEST-I

Attenuation – Material absorption losses in silica glass fibers – Linear and Non linear Scattering losses - Fiber Bend losses – Midband and far band infra red transmission

WEEK-5 Intra and inter Modal Dispersion – Over all Fiber Dispersion – Polarization- non linear Phenomena. Optical fiber connectors,

WEEK-6 Fiber alignment and Joint Losses – Fiber Splices – Fiber connectors – Expanded Beam Connectors – Fiber Couplers

WEEK 7 - UNIT TEST-II

UNIT III SOURCES AND DETECTORS

WEEK-8 - Optical sources: Light Emitting Diodes - LED structures - surface and edge emitters, mono and hetero structures - internal - quantum efficiency, injection laser diode structures - comparison of LED and ILD

WEEK-9 Optical Detectors: PIN Photo detectors, Avalanche photo diodes, construction, characteristics and properties, Comparison of performance, Photo detector noise –Noise sources , Signal to Noise ratio , Detector response time

UNIT IV FIBER OPTIC RECEIVER AND MEASUREMENTS

WEEK-10 UNIT TEST-III

Fundamental receiver operation, Pre amplifiers, Error sources – Receiver Configuration

– Probability of Error – Quantum limit Fiber Attenuation measurements- Dispersion measurements

WEEK-11 Fiber Refractive index profile measurements – Fiber cut- off Wave length Measurements – Fiber Numerical Aperture Measurements – Fiber diameter measurements.

WEEK-12 UNIT TEST-IV

UNIT V OPTICAL NETWORKS

WEEK-13 Basic Networks – SONET / SDH – Broadcast – and –select WDM Networks – Wavelength Routed Networks – Non linear effects on Network performance

WEEK-14 Performance of WDM + EDFA system – Solitons – Optical CDMA – Ultra High Capacity Networks.

WEEK-15– Revision class

WEEK-16- UNIT TEST-V

WEEK-17 -MODEL EXAMINATION (5 UNITS)

TEXT BOOKS

1. Optical Fiber Communication – John M. Senior – Pearson Education – Second Edition. **2007**
2. Optical Fiber Communication – Gerd Keiser – Mc Graw Hill – Third Edition. **2000**

REFERENCE BOOKS

1. 1.J.Gower, “Optical Communication System”, Prentice Hall of India, 2001
2. Rajiv Ramaswami, “Optical Networks “ , Second Edition, Elsevier , 2004.
3. Govind P. Agrawal, “ Fiber-optic communication systems”, third edition, John Wiley &sons, 2004.
4. R.P. Khare, “Fiber Optics and Optoelectronics”, Oxford University Press, 2007.

EC2403 RF AND MICROWAVE ENGINEERING

UNIT I TWO PORT RF NETWORKS-CIRCUIT REPRESENTATION

WEEK-1 Low frequency parameters-impedance, admittance, hybrid and ABCD High frequency parameters-Formulation of S parameters

WEEK-2 properties of S parameters-Reciprocal and lossless networks, transmission matrix

WEEK-3 – Introduction to component basics, wire, resistor, capacitor and inductor, applications of RF

UNIT II RF TRANSISTOR AMPLIFIER DESIGN AND MATCHING NETWORKS

WEEK-4 UNIT TEST-I

Amplifier power relation, stability considerations, gain considerations noise figure

WEEK-5 impedance matching networks, frequency response,

WEEK 6 T and II matching networks, microstripline matching networks

WEEK-7 UNIT TEST-II

UNIT III MICROWAVE PASSIVE COMPONENTS

WEEK-8 Microwave frequency range, significance of microwave frequency range - applications of microwaves. Scattering matrix -Concept of N port scattering matrix representation- Properties of S matrix- S matrix formulation of two-port junction. Microwave junctions - Tee junctions - Magic Tee - Rat race

WEEK-9- Corners - bends and twists - Directional couplers - two hole directional couplers- Ferrites - important microwave properties and applications – Termination - Gyrator- Isolator-Circulator - Attenuator -

Phase changer – S Matrix for microwave components – Cylindrical cavity resonators.

UNIT IV MICROWAVE SEMICONDUCTOR DEVICES

WEEK-10 UNIT TEST-III

Microwave semiconductor devices- operation - characteristics and application of BJTs and FETs -Principles of tunnel diodes - Varactor and Step recovery diodes – Transferred Electron Devices -Gunn diode-Avalanche Transit time devices

WEEK-11 IMPATT and TRAPATT devices. Parametric devices -Principles of operation - applications of parametric amplifier .Microwave monolithic integrated circuit (MMIC) - Materials and fabrication techniques

WEEK-12 UNIT TEST-IV

UNIT V MICROWAVE TUBES AND MEASUREMENTS

WEEK-13 Microwave tubes- High frequency limitations - Principle of operation of Multicavity Klystron, Reflex Klystron

WEEK-14 – Traveling Wave Tube, Magnetron. Microwave measurements: Measurement of power, wavelength, impedance, SWR, attenuation, Q and Phase shift

WEEK-15– Revision Class

WEEK-16- UNIT TEST-V

WEEK-17 -MODEL EXAMINATION (5 UNITS)

TEXT BOOKS

1. Samuel Y Liao, “Microwave Devices & Circuits” , Prentice Hall of India, 2006.
2. Reinhold.Ludwig and Pavel Bretshko ‘RF Circuit Design”, Pearson Education, Inc.,2006

REFERENCE BOOKS

1. Robert. E.Collin-Foundation of Microwave Engg –Mc Graw Hill.
2. Annapurna Das and Sisir K Das, “Microwave Engineering”, Tata Mc Graw Hill Inc., 2004.

3. M.M.Radmanesh , RF & Microwave Electronics Illustrated, Pearson Education, 2007.
4. Robert E.Colin, 2ed “Foundations for Microwave Engineering”, McGraw Hill, 2001
5. D.M.Pozar, “Microwave Engineering.”, John Wiley & sons, Inc., 2006.

CS2060 HIGH SPEED NETWORKS

UNIT I HIGH SPEED NETWORKS

WEEK-1 Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture,
ATM logical Connection, ATM Cell – ATM Service Categories

WEEK-2 AAL, High Speed LANs: Fast Ethernet, Gigabit Ethernet, Fiber Channel

WEEK-3 - Wireless LANs: applications, requirements – Architecture of 802.11.

UNIT II CONGESTION AND TRAFFIC MANAGEMENT

WEEK-4 UNIT TEST-I

Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control

WEEK-5 Traffic Management – Congestion Control in Packet Switching Networks,

WEEK 6 Frame Relay Congestion Control

WEEK 7 UNIT TEST-II

UNIT III TCP AND ATM CONGESTION CONTROL

WEEK 8 TCP Flow control – TCP Congestion Control – Retransmission – Timer Management –Exponential RTO backoff – KARN’s Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM

WEEK-9 Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats, ABR Capacity allocations – GFR traffic management

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES

WEEK-10 UNIT TEST-III

Integrated Services Architecture – Approach, Components, Services-Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ

WEEK-11 Random Early Detection, Differentiated Services

WEEK-12 UNIT TEST-IV

UNIT V PROTOCOLS FOR QOS SUPPORT

WEEK-13 RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms –Multiprotocol Label Switching,

WEEK-14 Operations, Label Stacking, Protocol details – RTP – Protocol Architecture, Data Transfer Protocol, RTCP.

WEEK-15– Revision class

WEEK-16- UNIT TEST-V

WEEK-17 MODEL EXAMINATION (5 UNITS)

TEXT BOOKS

1William Stallings, “HIGH SPEED NETWORKS AND INTERNET”, Pearson Education, Second Edition, 2002

REFERENCE BOOKS

1. Warland, Pravin Varaiya, “High performance communication networks”, Second Edition , Jean Harcourt Asia Pvt. Ltd., , 2001.
2. Irvan Pepelnjk, Jim Guichard, Jeff Aparcar, “MPLS and VPN architecture”, Cisco Press, Volume 1 and 2, 2003.
4. Abhijit S. Pandya, Ercan Sea, “ATM Technology for Broad BandTelecommunication Networks”, CRC Press, New York, 2004.

EC2029 DIGITAL IMAGE PROCESSING

UNIT I DIGITAL IMAGE FUNDAMENTALS

WEEK-1 Elements of digital image processing systems, Vidicon and Digital Camera working principles, Elements of visual perception, brightness, contrast, hue, saturation

WEEK-2 Mach band effect, Color image fundamentals - RGB, HSI models, Image sampling, Quantization, dither, Two-dimensional mathematical preliminaries,

WEEK-3 2D transforms -DFT, DCT, KLT, SVD

UNIT II IMAGE ENHANCEMENT

WEEK-4 UNIT TEST-I

Histogram equalization and specification techniques, Noise distributions, Spatial averaging, Directional Smoothing

WEEK 5 Median, Geometric mean, Harmonic mean, Contraharmonic mean filters

WEEK-6 Homomorphic filtering, Color image enhancement

WEEK 7 UNIT TEST-II

UNIT III IMAGE RESTORATION

WEEK-8 UNIT TEST-III

Image Restoration - degradation model, unconstrained restoration - Lagrange multiplier and Constrained restoration,

WEEK-9 Inverse filtering-removal of blur caused by uniform linear motion, Wiener filtering, Geometric transformations-spatial transformations

UNIT IV IMAGE SEGMENTATION

WEEK-10 Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and Merging

WEEK-11 - Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm

WEEK 12 UNIT TEST-IV

UNIT V IMAGE COMPRESSION

WEEK-13 Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding

WEEK-14 - Vector Quantization, Transform coding, JPEG standard, MPEG

WEEK-15– Revision Class

WEEK-16- UNIT TEST-V

WEEK-17 -MODEL EXAMINATION (5 UNITS)

TEXTBOOKS:

1. Rafael C. Gonzalez, Richard E. Woods, , Digital Image Processing', Pearson , Second Edition, 2004.
2. Anil K. Jain, , Fundamentals of Digital Image Processing', Pearson 2002.

REFERENCES:

1. Kenneth R. Castleman, Digital Image Processing, Pearson, 2006.
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins,' Digital Image Processing using MATLAB', Pearson Education, Inc., 2004.

3. D.E. Dudgeon and RM. Mersereau, , 'Multidimensional Digital Signal Processing', Prentice Hall Professional Technical Reference, 1990.
4. William K. Pratt, , 'Digital Image Processing' , John Wiley, New York, 2002
5. Milan Sonka et al, 'IMAGE PROCESSING, ANALYSIS AND MACHINE VISION', Brookes/Cole, Vikas Publishing House, 2nd edition, 1999

GE2022 TOTAL QUALITY MANAGEMENT

UNIT I INTRODUCTION

WEEK-1 Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of manufacturing and service quality.

WEEK-2 Basic concepts of TQM - Definition of TQM – TQM Framework

WEEK-3 Contributions of Deming, Juran and Crosby – Barriers to TQM.

UNIT II TQM PRINCIPLES

WEEK-4- UNIT TEST-I

Leadership – Strategic quality planning, Quality statements - Customer focus –Customer orientation, Customer satisfaction, Customer complaints, Customer retention -Employee involvement – Motivation, Empowerment

WEEK-5 Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement

WEEK-6 PDCA cycle,5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

WEEK- 7 – UNIT TEST-II

UNIT III TQM TOOLS & TECHNIQUES I

WEEK-8 The seven traditional tools of quality – New management tools – Six-sigma: Concepts, methodology,

WEEK-9 applications to manufacturing, service sector including IT – Bench marking – Reason to bench mark, Bench marking process – FMEA – Stages, Types

UNIT IV TQM TOOLS & TECHNIQUES II

WEEK-10 UNIT TEST-III

Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function –TPM

WEEK-11 - Concepts, improvement needs – Cost of Quality – Performance measures

WEEK- 12 – UNIT TEST-IV

UNIT V QUALITY SYSTEMS

WEEK-13 Need for ISO 9000- ISO 9000-2000 Quality System – Elements, Documentation, Quality auditing- QS 9000 – ISO 14000

WEEK-14 - Concepts, Requirements and Benefits – Case studies of TQM implementation in manufacturing and service sectors including IT

WEEK-15– Revision Class

WEEK-16- UNIT TEST-V

WEEK-17 -MODEL EXAMINATION (5 UNITS)

TEXT BOOK

1. Dale H.Besterfield, et al., “Total Quality Management”, Pearson Education Asia, 3rd Edition, Indian Reprint (2006).

REFERENCES

1. James R. Evans and William M. Lindsay, “The Management and Control of Quality”, 6th Edition, South-Western (Thomson Learning), 2005.
2. Oakland, J.S., “TQM – Text with Cases”, Butterworth – Heinemann Ltd., Oxford, 3rd Edition, 2003.
3. Suganthi,L and Anand Samuel, “Total Quality Management”, Prentice Hall (India) Pvt. Ltd.,2006.
4. Janakiraman, B and Gopal, R.K, “Total Quality Management – Text and Cases”, Prentice Hall (India) Pvt. Ltd., 2006.

EC2405 OPTICAL & MICROWAVE LAB

Microwave Experiments:

1. Reflex Klystron – Mode characteristics
2. Gunn Diode – Characteristics
3. VSWR, Frequency and Wave Length Measurement

4. Directional Coupler – Directivity and Coupling Coefficient – S – parameter measurement
5. Isolator and Circulator – S - parameter measurement
6. Attenuation and Power measurement
7. S - matrix Characterization of E-Plane T, H-Plane T and Magic T.
8. Radiation Pattern of Antennas.
9. Antenna Gain Measurement

Optical Experiments:

1. DC characteristics of LED and PIN Photo Diode.
2. Mode Characteristics of Fibers
3. Measurement of Connector and Bending Losses.
4. Fiber Optic Analog and Digital Link
5. Numerical Aperture Determination for Fibers
6. Attenuation Measurement in Fibers

EC2404 ELECTRONICS SYSTEM DESIGN LAB

1. Design of a 4-20mA transmitter for a bridge type transducer.
Design the Instrumentation amplifier with the bridge type transducer (Thermistor or any resistance variation transducers) and convert the amplified voltage from the instrumentation amplifier to 4 – 20 mA current using op-amp. Plot the variation of the temperature Vs output current.
2. Design of AC/DC voltage regulator using SCR
Design a phase controlled voltage regulator using full wave rectifier and SCR, vary the conduction angle and plot the output voltage.
3. Design of process control timer Design a sequential timer to switch on & off at least 3 relays in a particular sequence using timer IC.
4. Design of AM / FM modulator / demodulator
 - i. Design AM signal using multiplier IC for the given carrier frequency and modulation index and demodulate the AM signal using envelope detector.
 - ii. Design FM signal using VCO IC NE566 for the given carrier frequency and demodulate the same using PLL NE 565.
5. Design of Wireless data modem.
Design a FSK modulator using 555/XR 2206 and convert it to sine wave using filter and transmit the same using IR LED and demodulate the same PLL NE 565/XR 2212.
6. PCB layout design using CAD

Drawing the schematic of simple electronic circuit and design of PCB layout using CAD

7. Microcontroller based systems design

Design of microcontroller based system for simple applications like security systems combination lock.

8. DSP based system design

Design a DSP based system for echo cancellation, using TMS/ADSP DSP kit.

9. Psuedo-random Sequence Generator

10. Arithmetic Logic Unit Design
