



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

V SEMESTER 2014 - 2015

**DEPARTMENT OF ELECTRONICS AND
COMMUNICATION ENGINEERING**

IV YEAR DEGREE COURSE

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WEEK DETAILS

SL.NO.	WEEK	FROM	TO
1	WEEK1	24-06-2014	27-06-2014
2	WEEK2	30-06-2014	04-07-2014
3	WEEK3	07-07-2014	11-07-2014
4	WEEK4	14-07-2014	18-07-2014
5	WEEK5	21-07-2014	25-07-2014
6	WEEK6	28-07-2014	01-08-2014
7	WEEK7	04-08-2014	08-08-2014
8	WEEK8	11-08-2014	14-08-2014
9	WEEK9	18-08-2014	22-08-2014
10	WEEK10	25-08-2014	28-08-2014
11	WEEK11	01-09-2014	05-09-2014
12	WEEK12	08-09-2014	12-09-2014
13	WEEK13	15-09-2014	19-09-2014
14	WEEK14	22-09-2014	26-09-2014
15	WEEK15	29-09-2014	01-10-2014
16	WEEK16	06-10-2014	10-10-2014
17	WEEK17	13-10-2014	17-10-2014
18	WEEK18	20-10-2014	24-10-2014
19	WEEK19	27-10-2014	31-10-2014

SUBJECT CONTENTS

SL.NO	SUBJECT CODE	SUBJECT NAME
THEORY		
1	EC2301	Digital Communication
2	EC2302	Digital Signal Processing
3	EC2303	Computer Architecture And Organization
4	EC2305	Transmission Lines And Wave Guides
5	GE2021	Environmental Science And Engineering
6	EC2304	Microprocessors And Microcontrollers
PRACTICAL		
7.	EC2306	Digital Signal Processing Lab
8.	EC2307	Communication System Lab
9.	EC2308	Microprocessors and Microcontrollers Lab

TEST / EXAM SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	UNIT TEST III	UNIT TEST IV	UNIT TEST V
1	EC2301	Digital Communication	08/07/14 FN	30/07/14 FN	20/08/14 FN	09/09/14 FN	29/09/14 FN
2	EC2302	Digital Signal Processing	08/07/14 AN	30/07/14 AN	20/08/14 AN	09/09/14 AN	29/09/14 AN
3	EC2303	Computer Architecture And Organization	09/07/14 FN	31/07/14 FN	21/08/14 FN	10/09/14 FN	30/09/14 FN
4	EC2305	Transmission Lines And Wave Guides	09/07/14 AN	31/07/14 AN	21/08/14 AN	10/09/14 AN	30/09/14 AN
5	GE2021	Environmental Science And Engineering	10/07/14 FN	01/08/14 FN	22/08/14 FN	11/09/14 FN	01/10/14 FN
6	EC2304	Microprocessors And Microcontrollers	10/07/14 AN	01/08/14 AN	22/08/14 AN	11/09/14 AN	01/10/14 AN

SL.NO	SUBJECT CODE	SUBJECT NAME	MODEL EXAM
1	EC2301	Digital Communication	13-10-2014
2	EC2302	Digital Signal Processing	14-10-2014
3	EC2303	Computer Architecture And Organization	15-10-2014
4	EC2305	Transmission Lines And Wave Guides	16-10-2014
5	GE2021	Environmental Science And Engineering	17-10-2014
6	EC2304	Microprocessors And Microcontrollers	20-10-2014

EC2301 DIGITAL COMMUNICATION

UNIT I DIGITAL COMMUNICATION SYSTEM

WEEK-1 Introduction to Analog Pulse Communication Systems - Digital Communication Systems

WEEK-2 – Functional description, Channel classification, Performance Measure

WEEK-3 - Geometric representation of Signals, Bandwidth, Mathematical Models of Communication Channel.

UNIT II BASEBAND FORMATTING TECHNIQUES

WEEK-4- UNIT TEST-I

Sampling - Impulse sampling, Natural Sampling, Sampler Implementation; Quantisation

WEEK-5 Uniform and Non-uniform; Encoding Techniques for Analog Sources- Temporal waveform encoding

WEEK-6 Spectral waveform encoding, Model-based encoding, Comparison of speech encoding methods

WEEK- 7 –UNIT TEST-II

UNIT III BASEBAND CODING TECHNIQUES

WEEK-8 Error Control Codes - Block Codes , Convolutional Codes, Concept of Error Free Communication;

WEEK-9 - Classification of line codes, desirable characteristics and power spectra of line codes.

UNIT IV BASEBAND RECEPTION TECHNIQUES

WEEK-10 UNIT TEST-III

Noise in Communication Systems; Receiving Filter - Correlator type, Matched Filter type; Equalising Filter - Signal and system design for ISI elimination, Implementation, Eye Pattern analysis

WEEK-11 Synchronisation; Detector - Maximum Likelihood Detector, Error Probability, Figure-of-Merit for Digital Detection.

WEEK-12 –UNIT TEST-IV

UNIT V BANDPASS SIGNAL TRANSMISSION AND RECEPTION

WEEK-13 Memory less modulation methods - Representation and Spectral characteristics, ASK, PSK, QAM, QPSK

WEEK-, FSK; Bandpass receiving filter, Error performance - Coherent and Non-coherent detection systems.

WEEK-16- UNIT TEST-V

WEEK-17 -MODEL EXAMINATION (5 UNITS)

TEXT BOOKS:

1. Amitabha Bhattacharya, "Digital Communications", Tata McGraw Hill, 2006.
2. Simon Haykin, "Digital Communications", John Wiley, 2006.

REFERENCES:

1. John.G. Proakis, "Fundamentals of Communication Systems", Pearson Education, 2006.
 2. Michael. B. Purrley, "Introduction to Digital Communication", Pearson Education, 2006.
- Bernard Sklar, Digital Communication, 2nd Edition, Paerson Education, 2006

EC2302 DIGITAL SIGNAL PROCESSING

UNIT I DISCRETE FOURIER TRANSFORM

WEEK1 – DFT and its properties, Relation between DTFT and DFT

WEEK2 - FFT computations using Decimation in time and Decimation in frequency algorithms

WEEK3–Overlap-add and savemethods

UNIT II INFINITE IMPULSE RESPONSE DIGITAL FILTERS

WEEK4- UNIT TEST-I

Review of design of analogue Butterworth and Chebyshev Filters, Frequency transformation in analogue domain

WEEK-5 Design of IIR digital filters using impulse invariance technique - Design of digital filters using bilinear transform - pre warping

WEEK-6 Realization using direct, cascade and parallel forms

WEEK 7 - UNIT TEST-II

UNIT III FINITE IMPULSE RESPONSE DIGITAL FILTERS

WEEK-8 - Symmetric and Antisymmetric FIR filters - Linear phase FIR filters - Design using Hamming, Hanning and Blackmann Windows - Frequency sampling method

WEEK-9 Realization of FIR filters - Transversal, Linear phase and Polyphasestructures.

UNIT IV FINITE WORD LENGTH EFFECTS

WEEK-10 UNIT TEST-III

Fixed point and floating point number representations - Comparison - Truncation and Rounding errors - Quantization noise - derivation for quantization noise power - coefficient quantization error

WEEK-11 Product quantization error - Overflow error - Roundoff noise power - limit cycle oscillations due to product roundoff and overflow errors - signal scaling

WEEK-12 UNIT TEST-IV

UNIT V- MULTIRATE SIGNAL PROCESSING

WEEK-13 Introduction to Multirate signal processing-Decimation-Interpolation-Polyphase implementation of FIR filters for interpolator and decimator

WEEK-14 Multistage implementation of sampling rate conversion- Design of narrow band filters - Applications of Multirate signal processing

WEEK-15– Revision class

WEEK-16- UNIT TEST-V

WEEK-17 -MODEL EXAMINATION (5 UNITS)

TEXT BOOKS:

1. John G Proakis and Manolakis, " Digital Signal Processing Principles, Algorithms and Applications", Pearson, Fourth Edition, 2007.
2. S.Salivahanan, A. Vallavaraj, C. Gnanapriya, Digital Signal Processing, TMH/McGraw Hill International, 2007

REFERENCES:

1. E.C. Ifeachor and B.W. Jervis, " Digital signal processing - A practical approach", Second edition, Pearson, 2002.

2. S.K. Mitra, Digital Signal Processing, A Computer Based approach, Tata Mc GrawHill, 1998.
3. P.P.Vaidyanathan, Multirate Systems & Filter Banks, Prentice Hall, Englewood cliffs, NJ, 1993.
4. Johny R. Johnson, Introduction to Digital Signal Processing, PHI, 2006.

EC2303 COMPUTER ARCHITECTURE AND ORGANIZATION

UNIT I INTRODUCTION

WEEK-1 Computing and Computers, Evolution of Computers, VLSI Era, System Design- RegisterLevel, Processor

WEEK-2 Level, CPU Organization, Data Representation, Fixed – PointNumbers

WEEK-3 – Floating Point Numbers, Instruction Formats, Instruction Types. Addressing modes

UNIT II DATA PATH DESIGN

WEEK-4 UNIT TEST-I

Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and Sequential ALUs

WEEK-5 Carry look ahead adder, Robertson algorithm, booth's algorithm, non-restoring division algorithm, Floating Point Arithmetic

WEEK 6 Coprocessor, Pipeline Processing, Pipeline Design, Modified booth's Algorithm

WEEK-7 UNIT TEST-II

UNIT III CONTROL DESIGN

WEEK-7 Hardwired Control, Micro programmed Control, Multiplier Control Unit, CPU Control Unit, Pipeline Control

WEEK-9- Instruction Pipelines, Pipeline Performance, Superscalar Processing, Nano Programming

UNIT IV MEMORY ORGANIZATION

WEEK-10 UNIT TEST-III

Random Access Memories, Serial - Access Memories, RAM Interfaces, Magnetic Surface Recording

WEEK-11 Optical Memories, multilevel memories, Cache & Virtual Memory, Memory Allocation, Associative Memory

WEEK-12 UNIT TEST-IV

UNIT V SYSTEM ORGANIZATION

WEEK-13 Communication methods, Buses, Bus Control, Bus Interfacing, Bus arbitration, IO and system control, IO interface circuits, Handshaking, DMA and interrupts, vectored interrupts

WEEK-14 – vectored interrupts, PCI interrupts, pipeline interrupts, IOP organization, operation systems, multiprocessors, fault tolerance, RISC and CISC processors, Superscalar and vector processor.

WEEK-15– REVISION CLASS

WEEK-16- UNIT TEST-V

WEEK-17 -MODEL EXAMINATION (5 UNITS)

TEXTBOOKS:

1. John P.Hayes, ‘Computer architecture and Organisation’, Tata McGraw-Hill, Third edition, 1998.
2. V.Carl Hamacher, Zvonko G. Varanescic and Safat G. Zaky, “ Computer Organisation“, V edition, McGraw-Hill Inc, 1996.

REFERENCES:

1. Morris Mano, “Computer System Architecture”, Prentice-Hall of India, 2000.

2. Paraami, "Computer Architecture", BEH R002, Oxford Press.
3. P.Pal Chaudhuri, , "Computer organization and design", 2nd Ed., Prentice Hall of India, 2007.
4. G.Kane & J.Heinrich, ' MIPS RISC Architecture ', Englewood cliffs, New Jersey,Prentice Hall, 1992.

EC2305 TRANSMISSION LINES AND WAVEGUIDES

UNIT I FILTERS

WEEK-1 The neper - the decibel - Characteristic impedance of Symmetrical Networks – Current and voltage ratios

WEEK-2 Propagation constant, - Properties of Symmetrical Networks - Filter fundamentals – Pass and Stop bands. Behaviour of the Characteristic impedance. Constant K Filters - Low pass, High pass band

WEEK-3 - pass band elimination filters - m - derived sections – Filter circuit design – Filter performance – Crystal Filters.

UNIT II TRANSMISSION LINE PARAMETERS

WEEK-4 UNIT TEST-I

A line of cascaded T sections - Transmission lines - General Solution, Physical Significance of the equations

WEEK-5 , the infinite line, wavelength, velocity, propagation, Distortion line, the telephone cable, Reflection on a line not terminated in Z_0

WEEK 6 Reflection Coefficient, Open and short circuited lines, Insertion loss.

WEEK 7 UNIT TEST-II

UNIT III THE LINE AT RADIO FREQUENCY

WEEK 8 Parameters of open wire line and Coaxial cable at RF – Line constants for dissipation - voltages and currents on the dissipation less line - standing waves – nodes - standing wave ratio - input impedance of open and short circuited lines

WEEK-9 power and impedance measurement on lines – $1/4$ line, Impedance matching – single and double-stub matching circle diagram, smith chart and its applications – Problem solving using Smith chart

UNIT IV GUIDED WAVES BETWEEN PARALLEL PLANES

WEEK-10 UNIT TEST-III

Application of the restrictions to Maxwell's equations – transmission of TM waves between Parallel plans – Transmission of TE waves between Parallel planes

WEEK-11 Transmission of TEM waves between Parallel planes – Manner of wave travel. Velocities of the waves – characteristic impedance - Attenuators

WEEK-12 UNIT TEST-V

UNIT V WAVEGUIDES

WEEK-13 Application of Maxwell's equations to the rectangular waveguide. TM waves in Rectangular guide. TE waves in Rectangular waveguide .

WEEK-14 Cylindrical waveguides. The TEM wave in coaxial lines. Excitation of wave guides. Guide termination and resonant cavities.

WEEK-15– Revision class

WEEK-16- UNIT TEST-V

WEEK-17 MODEL EXAMINATION (5 UNITS)TEXT BOOKS

1. John D.Ryder, "Networks, lines and fields", Prentice Hall of India, 2nd Edition, 2006.

REFERENCES

1. E.C.Jordan, K.G. Balmain: "E.M.Waves & Radiating Systems", Pearson Education, 2006.
2. Joseph Edminister, Schaum's Series, Electromagnetics, TMH, 2007.
3. G S N Raju, Electromagnetic Field Theory and Transmission Lines, Pearson Education, 2006

GE2021 ENVIRONMENTAL SCIENCE AND ENGINEERING

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY

WEEK-1 Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

WEEK-2 – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels –India as a mega-diversity nation – hot-spots of biodiversity

WEEK-3 Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds
Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION

WEEK-4 UNIT TEST-I

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards

WEEK 5 soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution

WEEK-6 pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial/Agricultural.

WEEK 7 UNIT TEST-II

UNIT III NATURAL RESOURCES

WEEK-8 Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and

ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies

WEEK-9 Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill/ mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

WEEK-10 UNIT TEST-III

From unsustainable to sustainable development – urban problems related to energy –water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of nongovernmental organization- environmental ethics.

WEEK-11-Issues and possible solutions–climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act⁴⁸– enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

WEEK 12 UNIT TEST-V

UNIT V HUMAN POPULATION AND THE ENVIRONMENT

WEEK-13 Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education

WEEK-14 - HIV /AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

WEEK-15– Revision Class

WEEK-16- UNIT TEST-V

WEEK-17 -MODEL EXAMINATION (5 UNITS)

TEXT BOOKS:

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education (2004).
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, (2006).

REFERENCES

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press (2005)

EC2304 MICROPROCESSOR AND MICROCONTROLLER UNIT I

INTRODUCTION TO 8 BIT AND 16 BIT MICROPROCESSORS – H/W

WEEK-1 Introduction to microprocessor, computer and its organization, Programming system, Address bus, data bus and control bus, Tristate bus, clock generation, Connecting Microprocessor to I/O devices , Data transfer schemes, Architectural advancements of microprocessors

WEEK-2 Introductory System design using microprocessors, 8086 – Hardware Architecture, External memory addressing, Bus cycles, some important Companion Chips, Maximum mode bus cycle, 8086 system configuration

WEEK-3 Memory Interfacing, Minimum mode system configuration, Maximum mode system configuration, Interrupt processing, Direct memory access

UNIT II 16 BIT MICROPROCESSOR INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING

WEEK-4-

UNIT TEST-I

Programmer's model of 8086, operand types, operand addressing, **WEEK-5** Assembler directives, instruction set - Data transfer group, Arithmetic group, logical group, control transfer group

WEEK-6 miscellaneous instruction groups, programming.

WEEK- 7 –UNIT TEST-II

UNIT III MICROPROCESSOR PERIPHERAL INTERFACING

WEEK-8 Introduction, Generation of I/O Ports, Programmable Peripheral Interface (PPI)-Intel 8255, Sample-and-Hold Circuit and Multiplexer, Keyboard and Display Interface

WEEK- Keyboard and Display Controller (8279), Programmable Interval timers (Intel 8253,8254), D-to-A converter, A-to-D converter, CRT Terminal Interface, Printer Interface .

UNIT IV BIT MICROCONTROLLER- H/W ARCHITECTURE, INSTRUCTION

WEEK-10 UNIT TEST-III

Introduction to 8051 Micro-controller, Architecture, Memory organization, Special function registers, Port Operation, Memory Interfacing **WEEK-11** - /O Interfacing, Programming 8051 resources, interrupts, Programmer's model of 8051, Operand types, Operand addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Programming

WEEK- 12 –UNIT TEST-IV

UNIT V SYSTEM DESIGN USING MICRO PROCESSOR & MICROCONTROLLER

WEEK-13 Case studies – Traffic light control, washing machine control

WEEK-14- RTC Interfacing using I2CStandard- Motor Control- Relay, PWM,DC&StepperMotor.

WEEK-15– Revision Class

WEEK-16- UNIT TEST-V

WEEK-17 -MODEL EXAMINATION (5 UNITS)

TEXT BOOKS

1. Krishna Kant, "MICROPROCESSORS AND MICROCONTROLLERS Architecture,programming and system design using 8085, 8086, 8051 and 8096". PHI 2007.

2. Douglas V Hall, "MICROPROCESSORS AND INTERFACING, PROGRAMMING AND HARDWARE" TMH, 2006.58

REFERENCES

1. Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D.MCKinlay The 8051 Microcontroller and Embedded Systems, Second Edition, Pearson Education 2008.
2. Kenneth J. Ayala, "The 8086 Microprocessor: Programming & Interfacing The PC", Delmar Publishers, 2007.
3. A K Ray, K M Bhurchandi, Advanced Microprocessors and Peripherals, TMH, 2007.

EC2306 DIGITAL SIGNAL PROCESSING LABORATORY

1. Study of various addressing modes of DSP using simple programming examples
2. Implementation of Linear and Circular Convolution
3. Sampling of input signal and display
4. Waveform generation
5. Implementation of FIR filter

USING MATLAB

1. Generation of Signals
2. Linear and circular convolution of two sequences
3. Sampling and effect of aliasing
4. Design of FIR filters
5. Design of IIR filters
6. Calculation of FFT of a signal
7. Decimation by polyphase decomposition.

EC2307 COMMUNICATION SYSTEMS LAB

1. Amplitude modulation and Demodulation.
2. Frequency Modulation and Demodulation
3. Pulse Modulation – PAM / PWM / PPM
4. Pulse Code Modulation
5. Delta Modulation, Adaptive Delta Modulation.
6. Digital Modulation & Demodulation – ASK, PSK, QPSK, FSK (Hardware &

MATLAB)

7. Designing, Assembling and Testing of Pre-Emphasis / De-emphasis Circuits.
8. PLL and Frequency Synthesizer
9. Line Coding
10. Error Control Coding using MATLAB.
11. Sampling & Time Division Multiplexing.
12. Frequency Division Multiplexing,

EC2308 MICROPROCESSOR AND MICROCONTROLLER LAB

1. Programs for 16 bit Arithmetic operations (Using 8086).
2. Programs for Sorting and Searching (Using 8086).
3. Programs for String manipulation operations (Using 8086).
4. Programs for Digital clock and Stop watch (Using 8086).
5. Interfacing ADC and DAC.
6. Parallel Communication between two MP Kits using Mode 1 and Mode 2 of 8255.
7. Interfacing and Programming 8279, 8259, and 8253.
8. Serial Communication between two MP Kits using 8251.
9. Interfacing and Programming of Stepper Motor and DC Motor Speed control.
10. Programming using Arithmetic, Logical and Bit Manipulation instructions of 8051 microcontroller.
11. Programming and verifying Timer, Interrupts and UART operations in 8051 microcontroller.
12. Communication between 8051 Microcontroller kit and P C .