



**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 2015 - 2016**

**DEPARTMENT OF ELECTRONICS AND  
COMMUNICATION ENGINEERING**

**IV YEAR DEGREE COURSE**

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## WEEK DETAILS

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

## **SUBJECT CONTENTS**

<b>SL.NO</b>	<b>SUBJECT CODE</b>	<b>SUBJECT NAME</b>
<b>THEORY</b>		
1	<b>EC6501</b>	<b>Digital Communication</b>
2	<b>EC6502</b>	<b>Principles of Digital Signal Processing</b>
3	<b>EC6503</b>	<b>Transmission Lines and Wave Guides</b>
4	<b>EC6504</b>	<b>Microprocessor and Microcontroller</b>
5	<b>GE6351</b>	<b>Environmental Science and Engineering</b>
<b>PRACTICAL</b>		
6	<b>EC6511</b>	<b>Digital Signal Processing Lab</b>
7	<b>EC6512</b>	<b>Communication System Lab</b>
8	<b>EC6513</b>	<b>Microprocessors and Microcontrollers Lab</b>

**TEST / EXAM SCHEDULE**

<b>SL.NO</b>	<b>SUBJECT CODE</b>	<b>SUBJECT NAME</b>	<b>UNIT TEST I</b>	<b>UNIT TEST II</b>	<b>Pre Model Exam</b>	<b>UNIT TEST IV</b>
1	EC6501	Digital Communication	13.07.2015	03.08.2015	21.08.2015	14.09.2015
2	EC6502	Principles of Digital Signal Processing	14.07.2015	04.08.2015	22.08.2015	15.09.2015
3	EC6503	Transmission Lines and Wave Guides	15.07.2015	05.08.2015	24.08.2015	16.09.2015
4	EC6504	Microprocessor and Microcontroller	16.07.2015	06.08.2015	25.08.2015	18.09.2015
5	GE6351	Environmental Science and Engineering	17.07.2015	07.08.2015	26.08.2015	21.09.2015

<b>SL.NO</b>	<b>SUBJECT CODE</b>	<b>SUBJECT NAME</b>	<b>MODEL EXAM</b>
1	EC6501	Digital Communication	05.10.2015
2	EC6502	Principles of Digital Signal Processing	06.10.2015
3	EC6503	Transmission Lines and Wave Guides	07.10.2015
4	EC6504	Microprocessor and Microcontroller	08.10.2015
5	GE6351	Environmental Science and Engineering	09.10.2015

# **EC6501 DIGITAL COMMUNICATION**

## **UNIT I SAMPLING & QUANTIZATION**

**WEEK-1** Low pass sampling – Aliasing- Signal Reconstruction- Quantization

**WEEK-2** – Uniform & non-uniform quantization - quantization noise

**WEEK-3** - Logarithmic Companding of speech signal- PCM - TDM.

## **UNIT II WAVEFORM CODING**

### **WEEK-4- UNIT TEST-I**

Prediction filtering and DPCM

**WEEK-5** Delta Modulation - ADPCM & ADM

**WEEK-6** principles-Linear Predictive Coding

### **WEEK- 7 –UNIT TEST-II**

## **UNIT III BASEBAND TRANSMISSION**

**WEEK-8** Properties of Line codes- Power Spectral Density of Unipolar / Polar RZ & NRZ – Bipolar NRZ - Manchester- ISI – Nyquist criterion for distortion less transmission

**WEEK-9** Pulse shaping – Correlative coding - Mary schemes – Eye pattern - Equalization

## **UNIT IV DIGITAL MODULATION SCHEME**

### **WEEK-10 UNIT TEST-III**

Geometric Representation of signals - Generation, detection, PSD & BER of Coherent BPSK, BFSK **WEEK-QPSK** - QAM - Carrier Synchronization - structure of Non-coherent Receivers - Principle of DPSK

### **WEEK-12 –UNIT TEST-IV**

## **UNIT V ERROR CONTROL CODING**

**WEEK-13** Channel coding theorem - Linear Block codes - Hamming codes

**WEEK-**, Cyclic codes - Convolutional codes - Vitterbi Decoder

### **WEEK-16- UNIT TEST-V**

### **WEEK-17 -MODEL EXAMINATION (5 UNITS)**

#### **TEXT BOOKS:**

1. S. Haykin, “Digital Communications”, John Wiley, 2005

#### **REFERENCES:**

1. B. Sklar, “Digital Communication Fundamentals and Applications”, 2nd Edition, Pearson Education, 2009

2. B.P.Lathi, “Modern Digital and Analog Communication Systems” 3rd Edition, Oxford University Press 2007.
3. H P Hsu, Schaum Outline Series - “Analog and Digital Communications”, TMH 2006
4. J.G Proakis, “Digital Communication”, 4th Edition, Tata Mc Graw Hill Company, 2001.

## **EC6502 PRINCIPLES OF DIGITAL SIGNAL PROCESSING**

### **UNIT I DISCRETE FOURIER TRANSFORM**

**WEEK1** – Discrete Signals and Systems- A Review – Introduction to DFT – Properties of DFT

**WEEK2** - Circular Convolution - Filtering methods based on DFT – FFT Algorithms

**WEEK3**–Decimation in time Algorithms, Decimation in frequency Algorithms – Use of FFT in Linear Filtering

### **UNIT II IIR FILTER DESIGN**

#### **WEEK4- UNIT TEST-I**

Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter

**WEEK-5** IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives

**WEEK-6** (LPF, HPF, BPF, BRF) filter design using frequency translation

#### **WEEK 7 - UNIT TEST-II**

### **UNIT III FIR FILTER DESIGN**

**WEEK-8** - Structures of FIR – Linear phase FIR filter – Fourier Series - Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window)

**WEEK-9** Frequency sampling techniques – Finite word length effects in digital Filters: Errors, Limit Cycle, Noise Power Spectrum.

### **UNIT IV FINITE WORDLENGTH EFFECTS**

#### **WEEK-10 UNIT TEST-III**

Fixed point and floating point number representations – ADC –Quantization- Truncation and Rounding errors - Quantization noise – coefficient quantization error

**WEEK-11** Product quantization error - Overflow error – Roundoff noise power - limit cycle oscillations due to product round off and overflow errors – Principle of scaling

**WEEK-12 UNIT TEST-IV**

**UNIT V DSP APPLICATIONS**

**WEEK-13** Multirate signal processing: Decimation, Interpolation, Sampling rate conversion by a rational factor

**WEEK-14** Adaptive Filters: Introduction, Applications of adaptive filtering to equalization

**WEEK-15– Revision class**

**WEEK-16- UNIT TEST-V**

**WEEK-17 -MODEL EXAMINATION (5 UNITS)**

**TEXT BOOKS:**

1. John G. Proakis & Dimitris G. Manolakis, “Digital Signal Processing – Principles, Algorithms & Applications”, Fourth Edition, Pearson Education / Prentice Hall, 2007.

**REFERENCES:**

1. Emmanuel C. Ifeachor, & Barrie W. Jervis, “Digital Signal Processing”, Second Edition, Pearson Education / Prentice Hall, 2002.
2. Sanjit K. Mitra, “Digital Signal Processing – A Computer Based Approach”, Tata Mc Graw Hill, 2007.
3. A.V. Oppenheim, R.W. Schaffer and J.R. Buck, “Discrete-Time Signal Processing”, 8th Indian Reprint, Pearson, 2004.
4. Andreas Antoniou, “Digital Signal Processing”, Tata Mc Graw Hill, 2006

## **EC6503 TRANSMISSION LINES AND WAVE GUIDES**

**UNIT I TIME VARYING FIELDS AND MAXWELL’S EQUATIONS**

**WEEK-1** Motional Electromotive Force, General Expression for motional EMF, Faraday’s Law of Induction, Displacement current, Maxwell’s equation in the point or differential form

**WEEK-2** Maxwell’s equations in Integral form, Maxwell’s equations from Gauss’s Law, Maxwell’s equations and Boundary conditions

**WEEK-3** – Poynting’s theorem, Time harmonic (sinusoidal) fields, Maxwell’s equations in phasor form **UNIT II TRANSMISSION LINES**

**WEEK-4 UNIT TEST-I**

Need for Transmission Lines, Types of Transmission lines, Characterization in terms of primary and secondary constants, Characteristic impedance, General wave equation

**WEEK-5** Loss less propagation, Propagation constant, Wave reflection at discontinuities, Voltage standing wave ratio,

**WEEK 6** Transmission line of finite length, The Smith Chart, Smith Chart calculations for lossy lines, Impedance matching by Quarter wave transformer, Single and double stub matching.

**WEEK-7 UNIT TEST-II**

**UNIT III THE UNIFORM PLANE WAVE**

**WEEK-7** Wave propagation in free space, Wave propagation in dielectrics, Forward and Backward Travelling Wave, Poynting Theorem and Wave Power, Energy of the Radiated wave,

**WEEK-9-** Propagation in good conductors and good dielectrics, Skin effect, Wave polarization, Linearly, Elliptically and Circularly polarized waves

**UNIT IV TRANSMISSION AND REFLECTION OF PLANE WAVES AT BOUNDARIES**

**WEEK-10 UNIT TEST-III**

Normal incidence of Uniform Plane waves: Conductor-Conductor interface, Dielectric-Dielectric interface, Dielectric-perfect Conductor interface, Dielectric-Conductor interface

**WEEK-11** Oblique incidence on a plane boundary for perpendicular polarization, Dielectric-Dielectric interface, Dielectric-Conductor interface.

**WEEK-12 UNIT TEST-IV**

**UNIT V WAVE GUIDES AND CAVITY RESONATORS**

**WEEK-13** General Wave behaviours along uniform Guiding structures, Transverse Electromagnetic waves, Transverse Magnetic waves, Transverse Electric waves, TM and TE waves between parallel plates **WEEK-14** – TM and TE waves in Rectangular wave guides, Bessel’s differential equation



and Bessel function, TM and TE waves in Circular wave guides, Rectangular and circular cavity Resonators.

**WEEK-15– REVISION CLASS**

**WEEK-16- UNIT TEST-V**

**WEEK-17 -MODEL EXAMINATION (5 UNITS)**

**TEXTBOOKS:**

1. John D Ryder, “Networks lines and fields”, Prentice Hall of India, New Delhi, 2005

**REFERENCES:**

1. William H Hayt and Jr John A Buck, “Engineering Electromagnetics” Tata Mc Graw-Hill Publishing Company Ltd, New Delhi, 2008
2. David K Cheng, “Field and Wave Electromagnetics”, Pearson Education Inc, Delhi, 2004
3. John D Kraus and Daniel A Fleisch, “Electromagnetics with Applications”, Mc Graw Hill Book Co, 2005
4. GSN Raju, “Electromagnetic Field Theory and Transmission Lines”, Pearson Education, 2005
5. Bhag Singh Guru and HR Hizirolu, “Electromagnetic Field Theory Fundamentals”, Vikas Publishing House, New Delhi, 2001.
6. N. Narayana Rao, “ Elements of Engineering Electromagnetics” 6th edition Prentice Hall,2004

**EC6504 MICROPROCESSOR AND MICROCONTROLLER**

**UNIT I THE 8086 MICROPROCESSOR**

**WEEK-1** Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives

**WEEK-2** Assembly language programming – Modular Programming - Linking and Relocation - Stacks

**WEEK-3** Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation

## **UNIT II 8086 SYSTEM BUS STRUCTURE**

### **WEEK-4 UNIT TEST-I**

8086 signals – Basic configurations – System bus timing –System design using 8086 – IO programming

**WEEK-5** Introduction to Multiprogramming – System Bus Structure - Multiprocessor configurations

**WEEK 6** Coprocessor, Closely coupled and loosely Coupled configurations – Introduction to advanced processors

### **WEEK 7 UNIT TEST-II**

## **UNIT III I/O INTERFACING**

**WEEK 8** Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller

**WEEK-9** Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface and Alarm Controller.

## **UNIT IV MICROCONTROLLER**

### **WEEK-10 UNIT TEST-III**

Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits

**WEEK-11** Instruction set - Addressing modes - Assembly language programming

### **WEEK-12 UNIT TEST-V**

## **UNIT V INTERFACING MICROCONTROLLER**

**WEEK-13** Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing

**WEEK-14** ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation

**WEEK-15– Revision class**

### **WEEK-16- UNIT TEST-V**

### **WEEK-17 MODEL EXAMINATION ( 5 UNITS)**

## **TEXT BOOKS**

1. Yu-Cheng Liu, Glenn A.Gibson, “Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design”, Second Edition, Prentice Hall of India, 2007.
2. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”, Second Edition, Pearson education, 2011.

## **REFERENCES**

1. Douglas V.Hall, “Microprocessors and Interfacing, Programming and Hardware”, TMH, 2012

# **GE6351 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 act<sup>48</sup>– 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’, 2<sup>nd</sup> 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)

## **EC6511 DIGITAL SIGNAL PROCESSING LABORATORY**

### **LIST OF EXPERIMENTS:**

#### **MATLAB / EQUIVALENT SOFTWARE PACKAGE**

1. Generation of sequences (functional & random) & correlation
2. Linear and Circular Convolutions
3. Spectrum Analysis using DFT
4. FIR filter design
5. IIR filter design
6. Multirate Filters
7. Equalization

#### **DSP PROCESSOR BASED IMPLEMENTATION**

8. Study of architecture of Digital Signal Processor
9. MAC operation using various addressing modes
10. Linear Convolution
11. Circular Convolution
12. FFT Implementation
13. Waveform generation
14. IIR and FIR Implementation
15. Finite Word Length Effect

## **EC6512 COMMUNICATION SYSTEMS LABORATORY**

### **LIST OF EXPERIMENTS:**

1. Signal Sampling and reconstruction
2. Time Division Multiplexing
3. AM Modulator and Demodulator
4. FM Modulator and Demodulator
5. Pulse Code Modulation and Demodulation
6. Delta Modulation and Demodulation
7. Observation (simulation) of signal constellations of BPSK, QPSK and QAM

8. Line coding schemes
9. FSK, PSK and DPSK schemes (Simulation)
10. Error control coding schemes - Linear Block Codes (Simulation)
11. Communication link simulation
12. Equalization – Zero Forcing & LMS algorithms(simulation)

## **EC6513 MICROPROCESSOR AND MICROCONTROLLER LABORATORY**

### **LIST OF EXPERIMENTS:**

#### **8086 Programs using kits and MASM**

1. Basic arithmetic and Logical operations
2. Move a data block without overlap
3. Code conversion, decimal arithmetic and Matrix operations.
4. Floating point operations, string manipulations, sorting and searching
5. Password checking, Print RAM size and system date
6. Counters and Time Delay

#### **Peripherals and Interfacing Experiments**

7. Traffic light control
8. Stepper motor control
9. Digital clock
10. Key board and Display
11. Printer status
12. Serial interface and Parallel interface
13. A/D and D/A interface and Waveform Generation

#### **8051 Experiments using kits and MASM**

14. Basic arithmetic and Logical operations
15. Square and Cube program, Find 2<sup>n</sup>'s complement of a number
16. Unpacked BCD to ASCII

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