VELTECH HIGH TECH

Dr RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE

(Owned by Vel Trust 1997)

(An ISO 9001: 2008 Certified Institution)

Accredited By NAAC with 'A' Grade and NBA Accredited Institution

(Approved by AICTE New Delhi and Govt. of Tamil Nadu, Affiliated to Anna University Chennai)

SYLLABUS

WEEKLY SCHEDULE

V SEMESTER 2017-18

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

IV YEAR DEGREE COURSE

#42, Avadi – Vel Tech Road,
Avadi
Chennai – 600062
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Vision of the Institute

Elevating Well Being of Humanity by Augmenting Human Resource Potential Through Quality Technical Education and Training

Mission of the Institute

To effectuate supremacy in technical education through articulation of research and industry practices for social relevance. To inculcate the habit of lifelong learning To exhibit professional ethics, commitment and leadership qualities

Vision of the Department

To emerge as a centre of academic eminence in electronics and communication and related spheres through knowledge acquisition and propagation meeting global needs and standards

Mission of the Department

- To impart quality education by inculcating fundamental knowledge in electronics and communication engineering with due focus on research and industry practices.
- To propagate lifelong learning.
- To impart the right proportion of knowledge, attitudes and ethics in students to enable them take up positions of responsibility in the society and make significant contributions.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- PEO1: To prepare students with strong foundation in basic science and mathematics and ability to use these tools in professional career and/or higher education by acquiring knowledge in area of Electronics and Communication Engineering.
- PEO2: Analyze real life problems, design appropriate system to provide solutions that are technically sound, economically feasible and socially acceptable.
- PEO3: To train students with electrical and computer engineering breadth so as to Work on multi-disciplinary projects.
- PEO4: Exhibit professionalism, ethical attitude, communication skills, team work in their profession and adapt to current trends by engaging in lifelong learning.

PROGRAM OUTCOME (POs)

- PO1: Apply knowledge of computing, mathematics, science and engineering fundamentals appropriate to the discipline.
- PO2: Identify, formulate, research literature and solve complex Electronics and Communication Engineering problems for reaching substantial conclusions.
- PO3: Design, implement and evaluate an electronics-based system, process, component or program to the standards for the benefits of the society.
- PO4: Perform investigations of complex problems including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.
- PO5: Use current techniques, skills and modern engineering tools necessary for computing practice.
- PO6: Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.
- PO7: Understand that the solutions have to be provided taking the environmental issues and sustainability into consideration.
- PO8: Understand and commit to professional ethics, responsibilities and norms of engineering practice.
- PO9: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings
- PO10: Communicate effectively on complex Electronics and Communication engineering activities with the engineering community and with society at large, such as being able to comprehend, write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11: An understanding of engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects.
- PO12: Realize the need for lifelong learning and engage them to adopt technological changes.

WEEK DETAILS

SL.NO.	WEEK	FROM	TO
1	**WEEK1**	**24.06.2017**	**24.06.2017**
2	**WEEK2**	**27.06.2017**	**01.07.2017**
3	**WEEK3**	**03.07.2017**	**08.07.2017**
4	**WEEK4**	**10.07.2017**	**15.07.2017**
5	**WEEK5**	**17.07.2017**	**22.07.2017**
6	**WEEK6**	**24.07.2017**	**29.07.2017**
7	**WEEK7**	**31.07.2017**	**05.08.2017**
8	**WEEK8**	**07.08.2017**	**12.08.2017**
9	**WEEK9**	**16.08.2017**	**19.08.2017**
10	**WEEK10**	**21.08.2017**	**26.08.2017**
11	**WEEK11**	**28.08.2017**	**01.09.2017**
12	**WEEK12**	**04.09.2017**	**09.09.2017**
13	**WEEK13**	**11.09.2017**	**16.09.2017**
14	**WEEK14**	**18.09.2017**	**23.09.2017**
15	**WEEK15**	**25.09.2017**	**28.09.2017**
16	**WEEK16**	**03.10.2017**	**07.10.2017**
17	**WEEK17**	**09.10.2017**	**14.10.2017**

SUBJECT CONTENTS

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

TEST / EXAM SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	Pre Model Exam	UNIT TEST IV
1	EC6501	Digital Communication	10.07.2017 FN	27.07.2017 FN	16.08.2017	07.09.2017 FN
2	EC6502	Principles of Digital Signal Processing	10.07.2017 AN	27.07.2017 AN	17.08.2017	07.09.2017 AN
3	EC6503	Transmission Lines and Wave Guides	11.07.2017 FN	28.07.2017 FN	18.08.2017	08.09.2017 FN
4	EC6504	Microprocessor and Microcontroller	11.07.2017 AN	28.07.2017 AN	19.08.2017	08.09.2017 AN
5	GE6351	Environmental Science and Engineering	12.07.2017 FN	29.07.2017 FN	21.08.2017	09.09.2017

SL.NO	SUBJECT CODE	SUBJECT NAME	MODEL EXAM
1	EC6501	Digital Communication	28.09.2017
2	EC6502	Principles of Digital Signal Processing	04.10.2017
3	EC6503	Transmission Lines and Wave Guides	06.10.2017
4	EC6504	Microprocessor and Microcontroller	09.10.2017
5	GE6351	Environmental Science and Engineering	11.10.2017

EC 6501 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

UNIT TEST-II

UNIT III BASEBAND TRANSMISSION

WEEK-7 Properties of Line codes- Power Spectral Density of Unipolar / Polar RZ & NRZ – Bipolar NRZ - Manchester- ISI – Nyquist criterion for distortion less transmission

WEEK-8 Pulse shaping – Correlative coding - Mary schemes – Eye pattern – Equalization

WEEK-9&10 PRE MODEL

UNIT IV DIGITAL MODULATION SCHEME

Geometric Representation of signals - Generation, detection, PSD & BER of Coherent BPSK, BFSK

WEEK-11 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-14Cyclic codes - Convolutional codes - Vitterbi Decoder

WEEK-15,16&17 MODEL EXAM

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

UNIT TEST-II

UNIT III FIR FILTER DESIGN

WEEK-7 - Structures of FIR – Linear phase FIR filter – Fourier Series - Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window)

WEEK-8 Frequency sampling techniques – Finite word length effects in digital Filters: Errors, Limit Cycle, Noise Power Spectrum.

WEEK-9&10

PRE MODEL

UNIT IV FINITE WORD LENGTH EFFECTS

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– MODEL EXAM

WEEK-16- MODEL EXAM

WEEK-17 -MODEL EXAM

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. Schafer 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 TRANSMISSION LINE THEORY WEEK-1 General theory of Transmission lines - the transmission line - general solution - The infinite line - Wavelength, velocity of propagation - Waveform distortion - the distortion-less line

WEEK-2 Loading and different methods of loading - Line not terminated in Z_0

WEEK-3 Reflection coefficient - calculation of current, voltage, power delivered and efficiency of transmission - Input and transfer impedance - Open and short circuited lines - reflection factor and reflection loss.

UNIT II HIGH FREQUENCY TRANSMISSION LINES

WEEK-4 UNIT TEST-I

Transmission line equations at radio frequencies - Line of Zero dissipation - Voltage and current on the dissipation-less line

WEEK-5 Standing Waves, Nodes, Standing Wave Ratio - Input impedance of the dissipation-less line, Open and short circuited lines

WEEK 6 - Power and impedance measurement on lines - Reflection losses - Measurement of VSWR and wavelength.

UNIT TEST-II

UNIT III IMPEDANCE MATCHING IN HIGH FREQUENCY LINES

WEEK-7 Impedance matching: Quarter wave transformer - Impedance matching by stubs - Single stub and double stub matching

WEEK-8- Smith chart - Solutions of problems using Smith chart - Single and double stub matching using Smith chart

WEEK-9&10 PREMODEL EXAM

UNIT IV PASSIVE FILTERS

Characteristic impedance of symmetrical networks - filter fundamentals, Design of filters: Constant K - Low Pass, High Pass,

WEEK-11 Band Pass, Band Elimination, m- derived sections - low pass, high pass composite filters.

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– MODEL EXAM**

WEEK-16- MODEL EXAM

WEEK-17 -MODEL EXAM

TEXTBOOKS:

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

REFERENCES:

1. E.C.Jordan and K.G. Balmain, ―Electromagnetic Waves and Radiating Systems‖ Prentice Hall of India, 2006.
2. G.S.N Raju "Electromagnetic Field Theory and Transmission Lines‖ Pearson Education, First edition 2005.

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 **UNIT TEST-II**

UNIT III I/O INTERFACING

WEEK 7 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-8 Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface and Alarm Controller.

WEEK-9&10 PRE MODEL EXAM

UNIT IV MICROCONTROLLER

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-IV

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– MODEL EXAM

WEEK-16- MODEL EXAM

WEEK-17 MODEL EXAM

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. Doughlas 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: habitatloss, 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

UNIT TEST-II

UNIT III NATURAL RESOURCES

WEEK-7 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-8 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.

WEEK-9&10 PRE MODEL

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

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-IV

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–MODEL EXAM

WEEK-16- MODEL EXAM

WEEK-17 -MODEL EXAM

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)

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"s complement of a number
16. Unpacked BCD to ASCII

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