SHRI VENKATESHWARA UNIVERSITY

Syllabus
DIPLOMA

Electronic & Communication Engineering
IV SEMESTER
(Three Years Programme)

(w.e.f. 2019-20)

SCHOOL OF ENGINEERING & TECHNOLOGY

SEMESTER- IV

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	PEC- 401	Microcontroller and Applications	3	0	0	20	10	30		70		100	3
2	PEC- 402	Digital Communication Systems	3	0	0	20	10	30		70		100	3
3	PEC-403	Linear Integrated Circuits	3	1	0	20	10	30		70		100	4
4	PEC-404	Electronic Equipment Maintenance	2	0	0	20	10	30		70		100	2
5	PEC-405	Consumer Electronics	3	0	0	20	10	30		70		100	3
7	PEC-411	Microcontroller and Applications Lab	0	0	2				10		15	25	1
8	PEC-412	Digital Communication Systems Lab	0	0	2				10		15	25	1
9	PEC-413	Linear Integrated Circuits Lab	0	0	2				10		15	25	1
11	PEC-415	Minor Project	0	0	4				50			50	2
12	PMC- 418	Essence of Indian Knowledge and Tradition	2	0	0	20	10	70					0
	Essence of Indian Knowledge and Tradition- Noncredit Mandatory courses											625	20

Course Code	:	PEC-401
Course Title	:	Microcontroller and Applications
Number of Credits	:	3 (L: 3, T:0 P: 0)
Prerequisites	:	NIL
Course Category	:	PC

Course Content:

Unit I Introduction

Introduction to Microprocessors and Microcontrollers, Architectures [8085,8086] Intel MCS- 51 family features – 8051 -organization and architecture

Unit II Programming with 8051

10 8051 instruction set, addressing modes, conditional instructions, I/O Programming, Arithmetic logic instructions, single bit instructions, interrupt handling, programming count- ers, timers and Stack

Unit III

MCS51 and external Interfaces 8 User interface – keyboard, LCD, LED, Real world interface -

ADC, DAC, SENSORS Communication interface.

Unit IV C programming with 8051

8 I/O Programming, Timers/counters, Serial Communication, Interrupt, User Interfaces- LCD, Keypad, LED and communication interfaces [RS232].

Unit V ARM processor core based microcontrollers 14 Need for RISC Processor-ARM processor fun-

damentals, ARM core based controller [LPC214X], IO ports, ADC/DAC, Timers.

References:

S. No.	Title of Book	Author	Publication
1.	The 8051 Micro Controller and Embedded Systems	Muhammad Ali Mazidi & Janice Gilli Mazidi, R.D.Ki- nely	PHI Pearson Education, 5th Indian reprint
2.	Microprocessor and Microcontrollers	Krishna Kant	Eastern Company Edition, Prentice Hall of India, New Delhi
3.	Microprocessor & Microcontroller Architecture: Programming & Interfacing using 8085,8086,8051	Soumitra Kumar Mandal	McGraw Hill Edu,
4.	Microcontrollers: Architecture implementation and Programming	Tabak Daniel, Hintz Kenneth j	Tata McGraw Hill, 2007
5.	ARM Developer's Guide.UM10139 LPC214X User manual – Rev.4	Andrew N.Sloss, Dominic Symes, Chris Wright	User manual – Rev.4

| 6. | Microprocessors and interfacing: programming and hardware | Douglas V. Hall | Tata McGraw Hill, 2editon, 2007 |
| 7. | "Microcontroller – Fundamentals and Applications with Pic | Valder – Perez | Yeesdee Publishers, Tayler & Francis |

Course Code	:	PEC-411
Course Title	:	Microcontroller and Applications Lab
Number of Credits	:	1 (L: 0, T:0 P: 2)
Prerequisites	:	NIL
Course Category	:	PC

Course Content:

1. Programming 8051 Micro controller using ASM and C, and implementation in flash 8051 microcontroller.
2. Programming with Arithmetic logic instructions [Assembly]
3. Program using constructs (Sorting an array) [Assembly]
4. Programming using Ports [Assembly and C]
5. Delay generation using Timer [Assembly and C]
6. Programming Interrupts [Assembly and C]
7. Implementation of standard UART communication (using hyper terminal) [Assembly and C].
8. Interfacing LCD Display. [Assembly and C]
9. Interfacing with Keypad [Assembly and C]
10. Programming ADC/DAC [Assembly and C]
11. Interfacing with stepper motor. [Assembly and C]
12. Pulse Width Modulation. [Assembly and C] Programming ARM Micro controller using ASM and C using simulator. 11.Programming with Arithmetic logic instructions[Assembly]
13. GPIO programming in ARM microcontroller. [C Programming].
14. Timers programing in ARM Microcontroller. [C Programming].

References:

S.No.	Title of Book	Author	Publication
1.	The 8051 Micro Controller and Embedded Systems	Muhammad Ali Mazidi & Janice Gilli Mazidi, R.D.Kinely	PHI Pearson Education, 5th Indian reprint
2.	Microprocessor and Micro-controllers	Krishna Kant	Eastern Company Edition, Prentice Hall of India, New Delhi
3.	Microprocessor & Micro-controller Architecture: Programming & Interfacing using 8085,8086,8051	Soumitra Kumar Mandal	McGraw Hill Edu,

4.	Microcontrollers: Architecture implementation and Programming	Tabak Daniel, Hintz Kenneth j	Tata McGraw Hill, 2007
5.	ARM Developer's Guide. UM10139 LPC214X User manual – Rev.4	Andrew N.Sloss, Dominic Symes, Chris Wright	User manual – Rev.4
6.	Microprocessors and interfacing: programming and hardware	Douglas V. Hall	Tata McGraw Hill, 2editon, 2007
7.	"Microcontroller – Fundamentals and Applications with Pic	Valder – Perez	Yeesdee Publishers, Tayler & Francis

Course Code	:	PEC-402
Course Title	:	Digital Communication Systems
Number of Credits	:	3 (L: 3, T:0, P: 0)
Prerequisites	:	NIL
Course Category	:	PC

Course Content:

UNIT1

Block diagram and sub-system description of a digital communication system. Sampling of low-pass and band-pass signals, PAM , PCM, signal to quantization noise ratio analysis of linear and nonlin- ear quantizers, Line codes and bandwidth considerations; PCM TDM hierarchies, frame structures, frame synchronization and bit stuffing.

UNIT 2

Quantization noise analysis of DM and ADM; DPCM and ADPCM; Low bit rate coding of speech and video signals. Baseband transmission, matched filter, performance in additive Gaussian noise; In- tersymbol interference (ISI), Nyquist criterion for zero ISI, sinusoidal roll-off filtering, correlative coding, equalizers and adaptive equalizers; Digital subscriber lines.

UNIT 3

Geometric representation of signals, maximum likelihood decoding; Correlation receiver, equiva- lence with matched filter.Generation, detection and probability of error analysis of OOK, BPSK, co- herent and non-coherent FSK, QPSK and DPSK; QAM, MSK and multicarrier modulation; Comparison of bandwidth and bit rate of digital modulation schemes.

UNIT 4

Introduction to Information and Coding Theories: Information Theory: information measures, Shan- non entropy, differential entropy, mutual information, capacity theorem for point-to-point channels with discrete and continuous alphabets. Coding Theory: linear block codes – definitions, properties, bounds on minimum distance (singleton, Hamming, GV, MRRW), soft versus hard decision decoding, some specific codes (Hamming, RS, Concatenated); Convolutional codes – structure, decoding (the Viterbi and BCJR algorithms); Turbo codes, LDPC codes.

References:

S. No.	Title of Book	Author	Publication
1.	Communication Systems	Haykin, S	4th Ed., John Wiley & Sons
2.	Modern Digital and Analog Communication Systems	Lathi, B.P. and Ding, Z	Intl. 4th Ed., Oxford University Press.
3.	Digital Communications	Proakis, J.G. and Saheli, M	5th Ed., McGraw-Hill
4.	Digital Communication: Fundamentals and Applica- tions	Sklar, B., and Ray, P.K	2nd Ed., Dorling Kindersley

5.	Elements of Information Theory	T. Cover and J. Thomas	2/e, Wiley.
6.	Principles of Digital Communication	R. G. Gallager	Cambridge Univ. Press
7.	A Foundation in Digital Communication	A. Lapidoth	Cambridge Univ. Press
8.	Error Control Coding	S. Lin and D. Costello	2/e, Prentice Hall.

Course Code	:	PEC-403	
Course Title	:	Linear Integrated Circuits	
Number of Credits	:	4 (L: 3, T: 1, P: 0)	
Prerequisites	:	NIL	
Course Category	:	PE	

Course Contents:

UNIT I - IC Fabrication and Circuit Configuration for Linear IC

Advantages of ICs over discrete components – Manufacturing process of monolithic Ics Construction of monolithic bipolar transistor – Monolithic diodes – Integrated Resistors Monolithic Capacitors

– Inductors. Current mirror and current sources, Current sources as active loads, Voltage sources,

Voltage References, BJT Differential amplifier with active loads, General operational amplifier stages

-and internal circuit diagrams of IC 741, DC and AC performance characteristics, slew rate, Open and

closed loop configurations.

UNIT II Applications Of Operational Amplifiers

Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarith- mic amplifier, Comparators, Schmitt trigger, Precision rectifier, peak detector, clipper and clamper, Low-pass, high-pass and band-pass Butterworth filters.

UNIT III Analog Multiplier and PLL

Analog Multiplier using Emitter Coupled Transistor Pair - Gilbert Multiplier cell – Variable transcon- ductance technique, analog multiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detec- tion, FM detection, FSK modulation and demodulation and Frequency synthesizing.

UNIT IV Analog to digital and digital to analog converters

Analog and Digital Data Conversions, D/A converter – specifications - weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode R2R Ladder types switches for D/A converters, high speed sample-and-hold circuits, A/D Converters specifications - Flash type - Successive Approxima- tion type - Single Slope type – Dual Slope type - A/D Converter using Voltage-to-Time Conversion - Over-sampling A/D Converters.

UNIT V Waveform generators and special function ICs

Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator, ICL8038 function generator, Timer IC 555, IC Voltage regulators – Three terminal fixed and adjust- able voltage regulators - IC 723 general purpose regulator Monolithic switching regulator, Switched capacitor filter IC MF10, Frequency to Voltage and Voltage to Frequency converters, Audio Power amplifier, Video Amplifier, Isolation Amplifier, Opto-couplers and fibre optic IC.

SUGGESTED TEXT/REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1.	Design with operational amplifiers and analog integrated circuits, 3rd Edition	Sergio Franco	Tata McGraw-Hill, 2007
2.	Linear Integrated Circuits,	. D.Roy Choudhry, Shail Jain	New Age International Pvt. Ltd
3.	System design using Integrated Circuits	. B.S.Sonde	New Age Pub, 2nd Edition, 2001
4.	Analysis and Design of Analog Integrated Circuits	Gray and Meyer	Wiley International, 2005.
5.	OP-AMP and Linear ICs	Ramakant A.Gayakwad	Prentice Hall / Pearson Education, 4th Edition, 2001
6.	Operational Amplifier and Linear Integrated Circuits	K Lal Kishore	, Pearson Education, 2006

Course Code	:	PEC-413
Course Title	:	Electronic Devices and Circuits Practical
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	PE

1. Operational Amplifiers (IC741)-Characteristics and Application.
2. Waveform Generation using Op-Amp (IC741).
3. Applications of Timer IC555.
4. Design of Active filters.
5. Study and application of PLL IC's
6. Design of binary adder and subtractor.
7. Design of counters.
8. Study of multiplexer and demultiplexer /decoders.
9. Implementation of combinational logic circuits.
10. Study of DAC and ADC 11. Op-Amp voltage Regulator- IC 723

Course Code	:	PEC-412
Course Title	:	Digital Communication Systems Lab
Number of Credits	:	1 (L: 0, T:0, P: 2)
Prerequisites	:	NIL
Course Category	:	PC

Course Content:
1. Pulse Code Modulation and Differential Pulse Code Modulation.
2. Delta Modulation and Adaptive Delta modulation.
3. Simulation of Band Pass Signal Transmission and Reception • Amplitude Shift Keying • Fre- quency Shift Keying • Phase Shift Keying.

4. Performance Analysis of Band Pass Signal Transmission and Reception • Amplitude Shift Keying • Frequency Shift Keying • Phase Shift Keying.
5. Implementation of Amplitude Shift Keying
6. Implementation of Frequency Shift Keying
7. Implementation of Phase Shift Keying.
8. Time Division Multiplexing: PLL (CD 4046) based synch, clock and data extraction

References:

S. No.	Title of Book	Author	Publication
1.	Communication Systems	Haykin, S	4th Ed., John Wiley & Sons
2.	Modern Digital and Analog Communication Systems	Lathi, B.P. and Ding, Z	Intl. 4th Ed., Oxford University Press.
3.	Digital Communications	Proakis, J.G. and Saheli, M	5th Ed., McGraw-Hill
4.	Digital Communication: Fundamentals and Applications	Sklar, B., and Ray, P.K	2nd Ed., Dorling Kindersley
5.	Elements of Information Theory	T. Cover and J. Thomas	2/e, Wiley.
6.	Principles of Digital Communication	R. G. Gallager	Cambridge Univ. Press
7.	A Foundation in Digital Communication	A. Lapidoth	Cambridge Univ. Press
8.	Error Control Coding	S. Lin and D. Costello	2/e, Prentice Hall.

Course Code	:	PEC-404
Course Title	:	Electronic Equipment Maintenance
Number of Credits	:	2 (L: 2, T: 0, P: 0)
Prerequisites	:	NIL
Course Category	:	PE

Course Content:

Unit 1 : Fundamental Troubleshooting Procedures Inside An Electronic Equipment: Reading Draw- ings And Diagrams – Block Diagram, Circuit Diagram, Wiring Diagram; Disassembly and re-assembly of equipment, Equipment Failures and causes such as poor design, production deficiencies, careless storage and transport, inappropriate operating conditions, Nature of faults, Fault location procedure, Fault finding aids – Service and maintenance manuals and instruction manuals, Test and Measuring instruments, special tools Troubleshooting techniques, Approaching components for tests, Ground-ing systems in Electronic Equipment, Temperature sensitive Intermittent problems Corrective ac- tions, Situations where repairs should not be attempted.

Unit 2 : Passive Components and Their Testing Passive Components- Resistors, Capacitors, Induc- tors Failures in fixed resistors, testing of resistors, variable resistors, variable resistors as potenti- ometers, failures in potentiometers, testing of potentiometers, servicing potentiometers, LDRs and Thermistors Types of capacitors and their performance, Failures in capacitors, testing of capacitors and precautions therein, variable capacitor types, Testing of inductors and inductance measurement

Unit 3 : Testing of Semiconductor Devices Types of semiconductor devices, Causes of failure in Semiconductor Devices, Types of failure Test procedures for Diodes, special types of

Diodes, Bipolar Junction Transistors, Field Effect Transistors, Thyristors Operational Amplifiers, Fault diagnosis in op-amp circuits

Unit 4: Logic IC families, Packages in Digital ICs, IC identification, IC pin-outs, Handling ICs, Digital troubleshooting methods – typical faults, testing digital ICs with pulse generators Logic clip, Logic Probe, Logic Pulser, Logic Current Tracer, Logic Comparator Special consideration for fault diagnosis in digital circuits Handling precautions for ICs sensitive to static electricity Testing flip-flops, count- ers, registers, multiplexers and de- multiplexers, encoders and decoders; Tri-state logic.

Unit 5: Rework and Repair of Surface Mount Assemblies Surface Mount Technology and surface mount devices Surface Mount Semiconductor packages – SOIC, SOT, LCCC, LGA, BGA, COB, Flatpacks and Quad Packs, Cylindrical Diode Packages, Packaging of Passive Components as SMDs Repairing Surface Mount PCBs, Rework Stations.

S. No.	Title of Book	Author	Publication
1.	Modern Electronic Equipment: Trouble-shooting, Repair and Maintenance	Khandpur	TMH 2006
2.	Electronic Instruments and Systems: Prin-ciples, Maintenance and Troubleshooting	R. G. Gupta	Tata McGraw Hill Edition 2001
3.	Student Reference Manual for Electronic Instrumentation Laboratories	David L Terrell	Butterworth-Heinemann
4.	Electronic Testing and Fault Diagnosis	G. C. Loveday, A. H	Wheeler Publishing

Course Code	:	PEC-405
Course Title	:	Consumer Electronics
Number of Credits	:	3 (L: 3, T:0 P: 0)
Prerequisites	:	NIL
Course Category	:	PC

Course Content:

UNIT-I Audio Fundamentals and Devices

Basic characteristics of sound signal, Audio level metering, decibel level in acoustic measurement, Microphone & Types, speaker types & working principle, Sound recording principle & types

UNIT-II Audio Systems

CD player, home theatre sound system, surround sound, Digital console block diagram, working prin- ciple, applications, FM tuner , ICs used in FM tuner TDA 7021T , PA address system.

UNIT-III Television Systems-

Monochrome TV standards, scanning process, aspect ratio, persistence of vision and flicker, interlace scanning, picture resolution, Composite video signal, Colour TV standards, colour theory, hue, bright- ness, saturation, luminance and chrominance, Different types of TV camera, Transmission standards

UNIT-IV Television Receivers and Video Systems-

PAL-D colour TV receiver, Digital TVs:- LCD, LED , PLASMA, HDTV, 3-D TV, projection TV, DTH receiv- er, Video interface, Digital Video, SDI, HDMI Multimedia

Interface , Digital Video Interface, CD and DVD player

UNIT-V Home / Office Appliances

Diagrams, operating principles and controller for FAX and Photocopier, Microwave Oven, Washing
Machine, Air conditioner and Refrigerators, Digital camera and cam coder.

References:

S. No.	Title of Book	Author	Publication
1.	Consumer Electronics	Bali S.P.	Pearson Education India,2010 , latest edition
2.	Audio video systems : principle practices & trou-bleshooting	Bali R and Bali S.P	Khanna Book Publishing Co. (P) Ltd., 2010Delhi , India, latest edition
3.	Modern Television prac-tices	Gulati R.R.	New Age International Publication (P) Ltd. New Delhi Year 2011, latest edition
4.	Audio video systems	Gupta R.G.	Tata Mc graw Hill, New Delhi, India 2010, latest edition
5.	Mastering Digital Televi-sion	Whitaker Jerry & Benson Blair	McGraw-Hill Professional, 2010, latest edition
6.	Standard handbook of Au-dio engineering	Whitaker Jerry & Benson Blair	McGraw-Hill Professional, 2010 , latest edition.