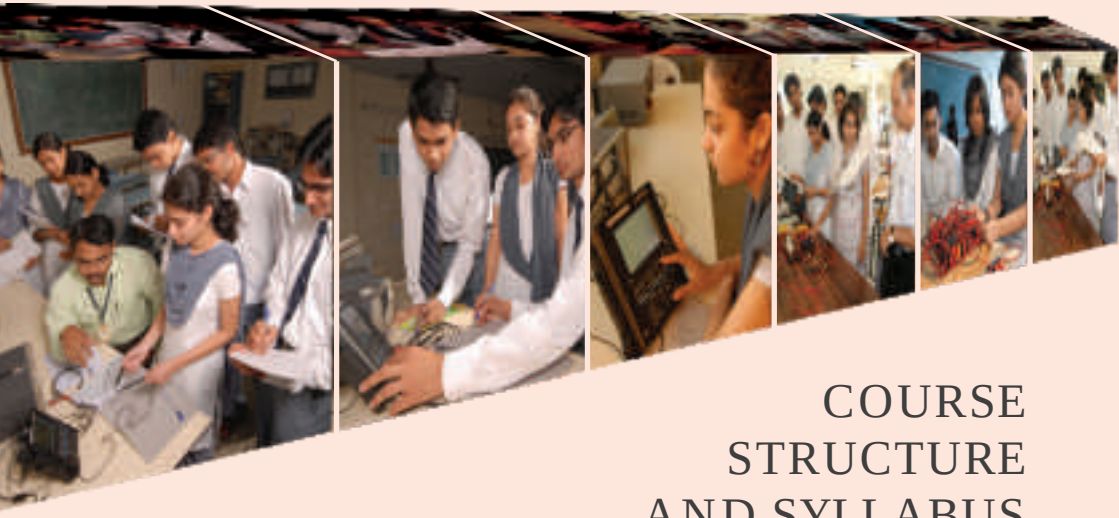
BHARATI VIDYAPEETH UNIVERSITY,
Pune.

(Established under Section 3 of UGC ACT 1956)



COURSE STRUCTURE AND SYLLABUS

B. Tech. (ELECTRONICS) (Sem. V & VI)

COURSE STRUCTURE & SYLLABUS

BHARATI VIDYAPEETH UNIVERSITY, PUNE

B. Tech. (ELECTRONICS) (Sem. V & VI)

HIGHLIGHTS

Bharati Vidyapeeth University College of Engineering (BVUCOE) is the largest Engineering College in Maharashtra with an intake of 700 students in each academic year. Imparting quality technical education from undergraduate to doctorate Level, BVUCOE is probably the only Engineering College in India with an accreditation from both NAAC as well as NBA. The faculty at BVUCOE boasts of highly qualified academicians, a quality that is further emphasized by the fact that 15 of them are presently pursuing their Ph.D. degree.

BVUCOE has been ranked 29th amongst the Top 50 Technical Schools of India in survey conducted by DATAQUEST-IDC. We have enjoyed a ranking in this list for the last 4 years. Research is of utmost importance in all our programs. A total of 113 research papers were published in 2007-2008.

Currently we have 12 ongoing research projects. The infrastructure of BVUCOE is state-of-the-art with 62 classrooms, 59 laboratories and a well-stocked library that currently holds 27,130 titles. The college has an international presence with MOUs signed with the North Carolina A&T State University (Greensboro, USA), University of Venice (Italy), Actel Corporation (USA). Corporate interaction is also inculcated in our programs through our association with Oracle India Ltd., Infosys Ltd. and Tata Consultancy Services.

SALIENT FEATURES

India is the fourth largest telecom market in Asia. The Indian telecom market is eighth largest in the world and second largest among emerging economies. The industry has witnessed an explosive growth in the field of electronics in the recent years. India has institutions that are deeply rooted in the principles of democracy and Justice. This ensures a transparent, predictable and secure environment for development of electronics field.

The National Telecom policy 1999 (NT 99) targets tele-density at 15 per cent by 2010. The Indian market presents a unique opportunity as compared to developed countries, hence increasing the attractiveness of the Indian market.

In the engineering field, electronics branch is one of the most significant as it reflects today's changing technology. It has become a must-know field as it forms the base for all other engineering branches.

To comply with the present day requirements & keep pace with the recent technology, the course is designed to provide the students with technical know-how. The department therefore aims to ensure that the students excel in hardware as well as software technologies. The department has started post-graduate course leading to M.E. Electronics (VLSI) which focuses on the theory, design, implementation and application of this upcoming technology in technical context.

The department has received a grant of Rs. 45.5 Lakhs from UGC under their innovative program scheme to start the Biomedical Engineering course with the intake capacity of 40 students.

College has established collaboration with ACTEL Corporation, USA. Under this collaboration an advanced VLSI laboratory is established jointly. For this laboratory, ACTEL Corporation has provided software and hardware worth $3, 56,000 (Approx. 1.5 Crores)

The department has well-qualified and experienced staff with 6 Professors, 2 Assistant-Professors and 11 lecturers. Most of them have completed post-graduation and some are pursuing.

MAJOR GROUPS / AREAS

Image Processing, Digital Signal Processing, Very Large Scale Integration, Biomedical Engineering, Fiber optic sensors

EXPERTISE IN RESEARCH AND CONSULTANCY

Electronics engineering department received a grant of 6.5 lakhs from All India Council for Technical Education (AICTE), New Delhi for development of DSP laboratory under MODROB scheme. Research has been carried out in the field of signal

processing, control and communication with credit of five research papers published at national level. Three staff members are pursuing PhD work in the field of signal processing and communication. The department has received the grant of Rs. 70, 000 from Institute of Engineers, Pune for various research projects undertaken by students.

MAJOR EQUIPMENT

Mixed Signal Oscilloscope, Vector Voltmeter, Digital Storage Oscilloscope, Wobbuloscope, Powerscope, Allen-Bradley PLC with RSLogix500 software, Ratio Control Unit Trainer, ICAP 4, DSP Processor Training Boards & EVMs, X-ray machine (Demo type), Ultrasound scanner (Demo type), Blood cell counter, EEG hardware and software, Spectrophotometer (Demo type), Gas chromatography system (Demo type), ECG stress test software with thread mill

SOFTWARE

ORCAD, XLINX 3.1, Altera, MATLAB, LabView, ALDEC, Code Composer Studio, Libero

LABORATORIES

ACTEL-VLSI Lab, Microelectronics Laboratory, Digital Electronics Laboratory, Network and Lines Laboratory, Electric Circuit Design and Project Laboratory, Communication Laboratory, Microprocessor and Microcontroller Laboratory, Computer Networking Laboratory, DSP and Image Processing Laboratory, Electronic Instrumentation and Measurements, Power Electronics Laboratory, Instrumentation and Control Laboratory, Biomedical Laboratory, Computer Lab

B. Tech. - Electronics Engineering

Semester V

Total Duration : 28 Hrs / Week
Total Marks : 750

Subject Code	Subject	Teaching Scheme (Hrs.)		Examination Scheme (Marks)				Total (Marks)
		L	P	Theory	Unit Test	TW & Pr	TW & Or	
K50301	Microprocessors & Micro controllers	04	02	80	20	50	50	200
K50302	Industrial Electronics	04	02	80	20	-	50	150
K50303	Digital Communication	04	02	80	20	-	50	150
K50304	Electronic Instruments & Measurement Systems	04	02	80	20	50	-	150
K50305	Electromagnetic Engineering	04	-	80	20	-	-	100
	Total	20	08	400	100	100	150	750

Teaching Scheme			Examination Scheme				Total
Lectures	Practical	Total	Theory	Unit Test	T. W. & Pr	T. W. & Or.	
20	08	28	400	100	100	150	750

Semester VI

Total Duration : 28 Hrs / Week
Total Marks : 750

Subject Code	Subject	Teaching Scheme (Hrs.)		Examination Scheme (Marks)				Total (Marks)
		L	P	Theory	Unit Test	TW & Pr	TW & Or	
K50306	Embedded Systems	04	02	80	20	50	-	150
K50307	Digital Signal Processing	04	02	80	20	-	50	150
K50308	Power Electronics Devices & Circuits	04	02	80	20	50	-	150
K50309	Circuit Design	04	02	80	20	-	50	150
K50310	Industrial Management and Humanities	04	-	80	20	-	50	150
	Total	20	08	400	100	100	150	750

Teaching Scheme			Examination Scheme				Total
Lectures	Practical	Total	Theory	Unit Test	T. W. & Pr	T. W. & Or.	
20	08	28	400	100	100	150	750

RULES FOR CONDUCTING TESTS

Mode of the test

- In each semester for each subject three tests shall be conducted. The schedule for the same will be declared at the commencement of academic year in the academic calendar.
- Each test shall carry 20 marks.
- University examination pattern has given weightage of 20 marks for the tests.
- To calculate these marks following procedure is followed:

  i) Out of the three tests conducted during the semester, the marks of only two tests in which the candidate has shown his / her best performance shall be considered, to decide the provisional marks in each subject.

  ii) Average marks obtained in two tests in which students have performed well, shall be considered as provisional marks obtained by the student in the tests.

  iii) If the candidate appears only for two tests conducted during the semester, he / she will not be given benefit of the best performance in the tests.

  iv) If the candidate appears only for one test conducted during the semester, to calculate the marks obtained in the tests it will be considered that the candidate has got 0 (zero) marks in other tests.

  v) The provisional marks obtained by the candidate in class tests should reflect as proportional to theory marks. In cases of disparity of more than 15% it will be scaled down accordingly; These marks will be final marks obtained by the student. No scaling up is permitted.

  vi) If the candidate is absent for theory examination or fails in theory examination his final marks for tests of that subject will not be declared. After the candidate clears the theory, the provisional marks will be finalized as above.

- Paper Pattern for Tests

  i) All questions will be compulsory with weightage as following

Question 1	-	7 marks
Question 2	-	7 marks
Question 3	-	6 Marks

  ii) There will not be any sub-questions.

- For granting the term it is mandatory to appear for all the three tests conducted in each semester.
- Roll numbers allotted to the students shall be the examination numbers for the tests.

SEMESTER - V

K50301: MICROPROCESSORS & MICROCONTROLLERS

TEACHING SCHEME		EXAMINATION SCHEME	
Lectures	: 04 Hrs / week	Theory	: 80 Marks
Practical	: 02 Hrs / week	Duration	: 03 Hours
		Unit Test	: 20 Marks
		T. W. & Pr.	: 50 Marks
		T. W. & Or.	: 50 Marks

Unit-I (09 Hours)

8085 Microprocessor:

Architecture, Block Diagram, Instruction set, Interrupts, Timing Diagrams, Stacks, Subroutines, Serial I / O.

Memory Design Concepts:

Decoding, Memory Types, Design of Microprocessor based system, Interfacing Techniques. (I / O Mapping & Memory Mapping) with eg. of 8255 IC.

Unit-II (09 Hours)

Peripheral Ics:

a) 8255 PPI: Features, Block Diagram, Modes of 8255, Control word, Interfacing with 8085, applications such as ADC, DAC, Keyboard interfacing, Stepper motor.

b) 8253 / 8254 / Timer: Features, Block diagram, Mode definition, Operation description, interfacing with 8085.

c) 8259 PIC: Features, Block diagram, ICW OCW, Priority modes, Cascading multiple 8259, Interfacing with 8085.

d) 8251 USART: Transmission formats, Synchronous / Asynchronous communication, Control – Status word, Protocols like BISYNC, SDLC, RS232C, RS488A, interfacing with 8085.

Unit-III (08 Hours)

8 Bit Micro Controller 8051:

MCS 51 family architecture: Registers in MCS-51, Parallel I / O ports, Timers & Counters, Memory Organization, Pin Description, Instruction set, Addressing modes, Interrupts in MCS-51, Programming.

Unit-IV (08 Hours)

Peripheral Interfacing with 8051:

Serial Communication with RS232, 8051 based system design – Address decoding data memory space Interfacing & Applications – 8255, LCD, Stepper motor, Sensors, Keyboard.

Unit-V (07 Hours)

16 Bit Processor:

8086 Architecture, Instruction set, Interrupt structure, Maximum & Minimum mode configuration, Communication Controller.

Unit-VI (07 Hours)

8086 and/or 8051 Assembly Language Programming and System Simulation:

Conceptual study of various derivatives of 8051 micro controller such as RD, OTP, AVR containing PWM, RTC timer, EEPROM in system programming, microprocessor supervisory control and architecture of PIC micro controller.

List of Practical

Any 8 assignments should be conducted from the following list.

- Study of 8051 μc kit : Programs related to simple instructions involving data transfer.
- (a) Addition & subtraction of two 8 bit & 16 bit nos.

  (b) Multiplication and Division of two 8 bit nos.
- (a) Block Transfer of an array.

  (b) Block exchange of an array.
- (a) Generate Real time clock.

  (b) Generate & display BCD up / down counter.
- (a) Binary - BCD & BCD – Binary conversion.
- H / W Interfacing: using 8255 kit.
- ADC / DAC: using 0808 & 8051 – 8255 kit.
- P.I.C.: using 8259 kit.
- Timer: using 8253 kit.

- Serial communication: using 8251 USART kit.
- Assembly language programming of 8086 using assembler like MASM

Text Books / References

- R. S. Gaonkar, " Microprocessor, Architecture, Interfacing, & Applications", Penram International (3rd Edition)
- DouglasHalls, " Microprocessor & Digital Systems", International Students Edition. Mc. Graw Hill (2nd Edition)
- Kenneth Ayala, " 8051 Microcontroller", Penram International (2nd Edition)
- Muhammad Ali Mazidi, " 8051 Microcontroller", Pearson Education Edtion
- Ajay Deshmukh, "Microcontroller Theory and application"', TMH
- "Embedded Microcontrollers – Intel Manual"

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI

K50302: INDUSTRIAL ELECTRONICS

TEACHING SCHEME		EXAMINATION SCHEME	
Lectures	: 04 Hrs / week	Theory	: 80 Marks
Practical	: 02 Hrs / week	Duration	: 03 Hours
		Unit Test	: 20 Marks
		T. W. & Or.	: 50 Marks

Unit-I (09 Hours)

DC Motor & 3 ? Induction Motor:

D C Motor: Construction, types, working of dc motors, torque-speed characteristics, applications; 3 ? Induction Motor: construction, types, basic principles of operation, torque-speed characteristics, start up consideration, applications.

Unit-II (09 Hours)

Synchronous Motor & Special Purpose Motors:

Construction, types, basic principle of operation, methods of starting, applications.

Principle, working and application of stepper motor, dc brushless motor, servomotor and universal motor.

Unit-III (07 Hours)

Resistance Welding:

Welding technique and control, types, energy storage welding, polyphase welding.

Unit-IV (07 Hours)

RF Heating:

Induction heating: Principle, theory, merits and applications, HF power source.

Dielectric heating: Principle & theory, dielectric properties, electrodes, RF generator, applications.

Unit-V (08 Hours)

Ultrasonics:

Ultrasonic wave properties, generations of ultrasonic waves, various

applications, flow detecting, testing of materials, cutting, machining, cleaning, soldering, welding and drying.

Unit-VI (08 Hours)

Electronic Control of AC & DC Motor:

Speed control of dc motors, speed control of ac motors.

List of Practical

- Speed control of dc shunt motor by armature voltage & flux control method.
- Load test on dc shunt motor.
- Study of starters of 3? induction motor.
- Load test on 3? induction motor.
- Study of special purpose machines.
- Demonstration of resistance welding.
- Demonstration of R.F. heating.
- Ultrasonic distance measurement.
- Study of LASER.
- Study of speed control of dc / induction motor.

Text Books/ References

- B. L.Theraja, " Electrical technology"
- H. Cotton, " Electrical technology", VII edition
- E. Hynes, " Electrical Technology"
- G. M. Chute & R. D. Chute, " Electronics in industry"
- Umesh C. Rai , " Industrial and power electronics", Umesh pub. (Delhi)

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI

K50303: DIGITAL COMMUNICATION

TEACHING SCHEME		EXAMINATION SCHEME	
Lectures	: 04 Hrs / week	Theory	: 80 Marks
Practical	: 02 Hrs / week	Duration	: 03 Hours
		Unit Test	: 20 Marks
		T. W. & Or.	: 50 Marks

Unit-I (09 Hours)

Random Processes:

Introduction, Mathematical definition of Random process, Stationary process, Mean, Correlation, Covariance function, Ergodic process, transmission of random process through LTI filter, Gaussian Process, Power spectral density, Noise, Narrow band noise. Band limited, and time limited signals, Narrow band signals and systems, Sampling theorem in frequency domain and time domain, Nyquist criteria, Reconstruction using interpolation filters, Ideal, Natural, Flat Top samples, Aliasing, Aperture effect.

Unit–II (09 Hours)

Waveform Coding:

Pulse code modulation: PCM generation and reconstruction, Quantization noise, Non uniform quantization and companding. PCM with noise, Decoding noise, Error Threshold, Comparison of PCM Vs analog modulation.

Delta modulation and predictive coding: Delta modulation, Delta-Sigma modulation, Adaptive Delta modulation, Differential PCM, LPC speech synthesis. Digital Audio Recording: CD- recording, CD playback. Standards (ITU)-Voice Encoding Standards and Multiplexing standards.

Unit-III (07 Hours)

Performance in the Presence of Noise and Line Codes:

Performance in the presence of noise of PCM, DPCM, DM, ADM. Digital multiplexers (Synchronous, asynchronous, Quasi-synchronous) Data formats-Unipolar and Polar NRZ, RZ, Bipolar (AMI), Manchester, Synchronization -Bit and Frame, Scrambling-Unscrambling.

Unit-IV (08 Hours)

Digital Continuous Wave Modulation:

Introduction, Binary phase shift keying, Differential phase shift keying, Differentially -Encoded PSK, Quadrature phase shift keying, M-ary PSK, Quadrature Amplitude shift keying, Binary frequency shift keying, similarity of BFSK and BPSK, M -Ary FSK, Minimum shift keying (MSK), OMSK.

Unit-V (08 Hours)

Detection and Performance Analysis of Digital Signal:

Base band signal receiver, Probability of error, Optimum filter, White noise-Matched filter, probability of error of matched filter, correlation, FSK, PSK, Non-coherent detection of FSK, DPSK, QPSK, Calculation of error probability for BPSK & BFSK, Signal space to calculate Pe.

Unit-VI (07 Hours)

Spread Spectrum:

PN sequences, DSSS with coherent BPSK, Signal space representation and Processing Gain, Probability of error, Frequency hopped Spread Spectrum. Introduction to Multiple Access Techniques-TDMA, FDMA and CDMA.

List of Practicals

Any 8 assignments should be conducted from the following list.

- To verify the sampling theorem and observe the aliasing effect.
- Study of Pulse Code Modulation.
- To Study Delta modulation & Adaptive Delta modulation
- To Study Differential PCM.
- Study of line code formats.
- To Study amplitude shift keying.
- Study of BPSK system.
- Study of QPSK.
- Study of Hamming Code.
- Study of Cyclic Code.

Text Books/ References

- B. P. Lathi, “Modern Digital and Analog Communication Systems”, Oxford Publication
- Simon Haykin, ”Digital Communication ”, Wiley Publication
- A. B. Carlson,” Communication Systems”, McGraw Hill Publication
- J. Das, S. K. Mullick, P. K. Chattergee, ”Principles of Digital Communication - Signal Representation, Detection, Estimation & Information Coding”
- John Proakis, “Digital Communication ”, PHI Publication

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI

K50304: ELECTRONIC INSTRUMENTS & MEASUREMENT SYSTEMS

TEACHING SCHEME		EXAMINATION SCHEME	
Lectures	: 04 Hrs / week	Theory	: 80 Marks
Practical	: 02 Hrs / week	Duration	: 03 Hours
		Unit Test	: 20 Marks
		T. W. & Pr.	: 50 Marks

Unit-I (08 Hours)

Introduction to Measurement:

Voltage, Current, Resistance measurement using DMM- 4 ½ & 6 ½, Auto zeroing, Auto ranging. True RMS Measurement Principle, method & application, Phase and Magnitude Measurement at high frequency using instruments such as vector voltmeter and vector impedance meter, LCR-Q meter - principle of digital LCR-Q meter, important specifications & applications.

Unit–II (09 Hours)

Analysis:

Time, Frequency, Ratio, Time interval, Period & Multiple Period averaging using digital universal frequency counter, High frequency measurements on frequency counter using various techniques, such as pre-scalar, Heterodyne, Time standards - Stability using oscillators like TCXO, OCXO.

Unit-III (07 Hours)

Computer Controlled Test Measurements:

Computer controlled test measurements, Virtual measurement instrumentation and its application in TDM, IEEE 488, PCI / PCI express, buses, Introduction of Lab view software.

Unit-IV (07 Hours)

Signal Analyzing Instruments:

Harmonic and Wave analyzer, Distortion factor meter, Spectrum analyzer - FFT analyzer, Logic analyzer, Protocol analyzer.

Unit-V (09 Hours)

Communication Measurements:

Communication measurements, Measurements on transmitter and

receiver: sensitivity, selectivity, phase jitter, S/N ratio, co-channel interference, SINAD test etc. Network analyzer- system element, measurement accuracy, scalar network analyzer, vector network analyzer, S-parameter measurement using network analyzer.

Unit-VI (08 Hours)

Oscilloscope:

Overview of analog CRO, dual / Multi-trace CRO, Various CRO probes & its applications.

Digital Storage Oscilloscope - Sampling speed & Memory depth of DSO, Design considerations, Attachments to DSO for enhancing the functionality / Measurements such as FFT, Math Functions, Automatic Measurements, Curve Tracer, Power scope.

List of Practical

Any 8 assignments should be conducted from the following list

- Peak average and r.m.s measurement on power electronics, phase controlled rectifier using SCR.
- Calibration of DVM for any one range: e.g. 200 V dc, 200 V ac, 200mA dc, using Standard calibrator or standard 6½DMM.
- Measurements on spectrum analyzer:

  i) Carrier and Sideband power of AM / FM, Signal.

  ii) Percentage modulation, iii) Channel Bandwidth, iv) S / N Ratio.
- Measurements on DSO:

  i) FFT analysis of LF signal

  ii) Capturing transients

  iii) Measuring ON / OFF Time of a Relay

  iv) Storing and Retrieving number of different signals

  v) Study of various operations like add, subtract, multiply, integrate, differentiate
- Measurements on Logic analyzer: Timing analysis and State analysis of a Microcontroller based system.

  OR

- Experiment with virtual instruments using software such as Lab view
- Measurement of Sensitivity, Selectivity, Fidelity of a Communication Receiver.
- Measurement of electromagnetic interference of a SMPS or any other power circuit using CE method.
- Measurement of Total harmonic distortion using distortion factor meter.
- Measurements on L-C-R Q meter.
- Measurements with Universal counter (Frequency, Period, frequency ratio, Period averaging, and Time interval).
- Study of vector voltmeter.
- Microprocessor based measurement system for any one parameter.

Text Books/ References

- A. J. Bowon, "Digital Communication"
- Oliver Cage, "Electronic Measurements & Instrumentation", Tata McGraw Hill
- H.S. Kalsi, "Digital Instrumentation", Tata McGraw Hill
- Coombs "Electronic Instrumentation Handbook"
- Cooper Herfric, "Electronic Instrumentation & Measurement Techniques", Prentice Hall Publication
- J. J. Carr, "Digital Instrumentation"
- M. M. S. Anand, "Electronic Instrument & Instrumentation Techniques"

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI

K50305: ELECTROMAGNETIC ENGINEERING

TEACHING SCHEME	EXAMINATION SCHEME	
Lectures : 04Hrs / week	Theory	: 80 Marks
	Duration	: 03 Hours
	Unit Test	: 20 Marks

Unit -I (07 Hours)

Vector Analysis:

Scalars & vectors, products of vectors, Co-ordinate systems, Cartesian & Rectangular co-ordinate systems, cylindrical co-ordinate system, Spherical co-ordinate system.

Unit –II (08 Hours)

Electrostatics:

Coulomb's law, Electric field intensity, charge distributions, Point charge distribution, Line charge distribution, Surface charge distribution, Volume charge distribution, Electric flux, Gauss's law, Applications of Gauss law, Divergence theorem, Electric potential, Potential energy of a charge configuration, Potential gradient, Capacitance, Boundary conditions, Poisson's and Laplace's equations.

Unit-III (07 Hours)

Magnetostatic:

Biot – Savart Law, Magnetic flux, Flux density, Magnetic Induction, Ampere's Circuital law, Vector Magnetic potential, Magnetic forces.

Unit-IV (08 Hours)

Time Varying Fields of Maxwell's Equations:

Faraday's law of induced emf, Lenz's law, Displacement current, Maxwell's Equations, Poynting Theorem.

Unit-V (09 Hours)

Uniform Plane Waves:

Uniform plane wave propagation, EM waves in charge free, Current free dielectric, Reflection by ideal conductor-Normal Incidence, Reflection and

transmission with Normal incidence at another dielectric, Plane waves in Lossy Dielectric (Conducting medium), Wave impedance, propagation constant, Depth of penetration (Skin Depth), Surface impedance and surface Resistance.

Unit-VI (09 Hours)

Transmission Line:

Physical Description of Transmission line propagation, Transmission line equations, Lossless propagation & lossless propagation of sinusoidal voltages, Complex analysis of sinusoidal waves, Transmission lines equations & their solutions in phasor form, Lossless & low-loss propagation, Power transmission & loss characterization, Wave reflection at discontinuities, Voltage standing wave ratio, Transmission line of finite length, Transmission line examples & graphical method, Transient analysis, Basic waveguide equation, Parallel plate guide analysis using the wave equation, rectangular waveguides & planar dielectric waveguides, EMI & EMC concepts.

Text Books / References

- W. Hyat, "Electromagnetic Engineering", M.G.Hill (5th Edition)
- Kraus "Electromagnetic Engineering", M. G. Hill
- Suzuki, "Electromagnetic Engineering", PTH
- Jordan Balman, " Electromagnetic Wave", PTH

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI

SEMESTER - VI

K50306: EMBEDDED SYSTEMS

TEACHING SCHEME		EXAMINATION SCHEME	
Lectures	: 04Hrs / week	Theory	: 80 Marks
Practical	: 02Hrs / week	Duration	: 03 Hours
		Unit Test	: 20 Marks
		T. W. & Pr.	: 50 Marks

Unit -I (09 Hours)

Introduction – 8 Bit Microcontroller:

8X51 series controller architecture, timer operation, serial communication, interfacing with LCD, ADC, sensors, motors, key-boards, ext. memory, programming with ports & devices.

Unit –II (08 Hours)

PIC Microcontroller & Interfacing:

Introduction, architecture (PIC 16C6X), registers, instruction set, addressing modes, timers, interrupt timing, i / p-o / p port expansion-serial peripheral interface, LCD display, I^2C bus operation, serial EPROM, DAC, Temp. Sensors, ADC, UART, oscillator configuration, low power operation, serial programming & parallel slave port.

Unit-III (07 Hours)

ARM & AVR Processors:

RISC, ARM design philosophy, ARM fundamentals, instruction sets, thumb instruction sets, exception & interrupt handling, efficient C programming, optimizing ARM assembly code, AVR architecture, instruction set, hardware interfacing, communication links & design issues.

Unit-IV (07 Hours)

Introduction to Embedded Systems:

Introduction to Embedded system, processor selection, device drivers, interrupt servicing mechanism.

Unit-V (08 Hours)

Interfacing Considerations:

Inter process communication, Synchronization of processes, tasks, threads, devices & buses, for networks, hardware-software co-design embedded

programming in C / RT Linux.

Unit-VI (09 Hours)

Real Time Operating Systems:

Survey of software architectures- Round-Robin, With interrupts, function queue scheduling, RTOS architecture, selecting an architecture, Task States, Task & data, Semaphores & Shared data, messages queues, mailboxes, pipes, Timer functions, Events, memory management, interrupt routines in RTOS environment, basic design using RTOS, Embedded software development tools, micro C / OS-II, Vx works.

List of Practical

Any 8 assignments on above syllabus should be conducted.

Text Books/References

- Mazidi & Mazidi, " 8051 Microcontroller & Embedded Systems". Pearson education. (Latest edition)
- Keneth H. Ayala, "The 8051 Microcontroller", Penram International
- Rajkaml, "Embedded System-architecture, Programming And Design",TMH Publications, edition 2003
- David Simon, "An Embedded Software Primer", Pearson education, Asia
- John Peatman, "Design With PIC Microcontroller", Pearson education, Asia
- Jonarttan W. Valvano, Brooks, Cole "Embedded Microcomputer Systems-Realtime Interfacing", Thomson Learning

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI

K50307: DIGITAL SIGNAL PROCESSING

TEACHING SCHEME		EXAMINATION SCHEME	
Lectures	: 04Hrs / week	Theory	: 80 Marks
Practical	: 02Hrs / week	Duration	: 03 Hours
		Unit Test	: 20 Marks
		T. W. & Or.	: 50 Marks

Unit -I (08 Hours)

Discrete Time Signals & Systems:

Signals, systems & their classification, properties of LTI systems, linear convolution, causality, stability, FIR & IIR systems, sampling, aliasing and frequency aspects.

Unit –II (08 Hours)

Discrete Fourier Transform:

Definition, periodicity concept, relationship with Z transform and fourier series, properties, applications like linear filtering, overlap – save,overlap-add, frequency analysis etc.

Unit-III (09 Hours)

Fast Fourier Transform Algorithm:

Direct computation of D.F.T., its computational complexity, FFT algorithms, their classification, radix 2 FFT algorithms, DIT – FFT, DIF – FFT, Inverse radix 2 algorithms, FFT algorithms for composite value of N, Goertzel algorithm, Chirp Z transform algorithm, Quantization effects, applications.

Unit-IV (07 Hours)

Realization of Digital Filters:

Realization of FIR & IIR filters using direct form, cascade form, parallel form, lattice and ladder structure, frequency sampling

Unit-V (09 Hours)

Design of FIR Filters:

Symmetric and antisymmetric FIR filters, design of linear phase FIR filters using different windows, frequency sampling method, FIR differentiators, Hilbert transformers, and Optimum equiripple linear FIR filters.

Unit-VI (07 Hours)

Design of IIR Filters:

Butterworth and Chebyshev approximations, frequency transformations, design of IIR filters from analog filters using Approximation of derivatives, impulse invariance, Bilinear transform, design of IIR filters from pole zero plots.

List of Practical

At least one exhaustive assignment in C should be written on each topic & verification of the results using Matlab. In all 10 expts. / assignments should be conducted / submitted.

Text Books/ References

- John G. Proakis & Manolkis, " Digital Signal Processing", PHI
- Oppenheim & Schafer, "Digital Signal Processing", PHI
- Ifeachor, Jervis "Digital Signal Processing ", Pearson

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI

K50308: POWER ELECTRONICS DEVICES & CIRCUITS

TEACHING SCHEME		EXAMINATION SCHEME	
Lectures	: 04Hrs / week	Theory	: 80 Marks
Practical	: 02Hrs / week	Duration	: 03 Hours
		Unit Test	: 20 Marks
		T. W. & Pr.	: 50 Marks

Unit -I (07 Hours)

Power Devices:

Structure, Characteristics, ratings of SCR, GTO, IGBT, Power Diode Comparison of above devices with Power MOSFET & Power BJT

Driver Circuits (isolated & non-isolated) for IGBT & SCR

Protection circuits for IGBT & SCR

Unit –II (09 Hours)

Single & Three-phase AC/DC Converter:

Concept of line commutation, Single-phase half & fully controlled, Three phase half & fully Controlled bridges: Circuit diagram, operation & waveforms for resistive and level (highly inductive) loads for above circuits. An analysis of o/p voltage & supply current for single-phase bridges including the following performance parameters:

Average and RMS o/p voltage, Fourier series expressions for supply current. Derivation of fundamental power factor (Displacement power factor), Current distortion factor, Active, reactive & apparent power.

Unit-III (08 Hours)

Single & Three-phase DC/ AC Inverters:

Circuit diagram, operation & waveforms for single phase full bridge & Push pull inverters. Switching techniques for obtaining square, quasi-square & sinusoidal PWM o/p waveforms.

Use of Pulse width modulated IC's for Inverter control.

Fourier analysis of quasi-square waveform & harmonic load currents for R & RL loads.Circuit diagram, operation & waveforms for three phase voltage source bridge inverters for 20 degree & 180 degree conduction for balanced star resistive load.

Unit-IV (07 Hours)

Switched & Resonant DC/ DC Converters:

Control of DC / DC converters.

Circuit diagram, Waveforms & operation (o / p voltage calculation) of step down chopper (Buck converter), Step up chopper (Boost converter) & 2-quadrant type C chopper. Circuit diagram, waveforms, operation, analysis & design aspects of Fly back converter (SMPS) including magnetics.

Need for resonant converters:

Circuit diagram, waveforms & operation of SLR half bridge DC / DC converter in low frequency (discontinuous conduction) mode.

Unit-V (09 Hours)

Control Circuits for Power Electronics Converters:

Principle of integral cycle and phase angle control, Triggering circuits for single phase and three phase converter, Choppers, PWM techniques for inverters, Use of IC TCA785 in phase angle control, IC 3524 for inverter, Microprocessor based control.

Unit-VI (08 Hours)

Applications:

1) ON-line and OFF line UPS with battery AH, back up time, battery charger rating, calculations
2) Electronic ballast: characteristics of fluorescent lamps and advantages over conventional ballast
3) Single phase separately excited DC motor drive
4) HVDC transmission one line diagram, twelve pulse converter, arrangement and advantages over HVAC transmission
5) HF induction heating
6) Electric welding
7) Servo Motor
8) Synchronous Motor

List of Practical:

Any 8 assignments from the following list should be conducted.

- SCR, Triac, IGBT characteristics.

- Study of triggering, isolation and protection circuits for SCRs, IGBTs / MOSFETs.
- Single Phase half controlled bridge converter with R and RL load.
  OR

  Single Phase full controlled bridge converter with R and RL and active (RLE) load.
- 3 Phase half controlled bridge rectifier with R load.
- Step down chopper. (Transistor based)
- Study of MOSFET based three phase inverter.
- Study of SMPS.
- Study of UPS

  OR

  Speed control of DC motor.
- Study of firing angle control scheme.
- Study of Microprocessor based control scheme for inverter.

Text Books/ References

- M. H. Rashid, "Power Electronics Circuits, Devices And Applications", PHI, 3rd edition, 2004, New Delhi
- M. S. Tamil Asgar, "Power Electronics", PHI, 2004, New Delhi
- N. Mohan, T. M. Undeland & W. P. Robbins, "Power Electronics, Converters Applications And Design", John Willey and sons, 3rd edition, Singapore
- U. R. Moorthi, "Power Electronics, Devices, Circuits & Industrial Applications", Oxford University Press, New Delhi, 2005
- M D Singh & K B Khanchandani, "Power Electronics", TMH, New Delhi
- P. C. Sen,"Modern Power Electronics", S. Chand & Co., New Delhi
- "GE SCR Manual" 6th edition, General Electric, New York, USA

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI

K50309: CIRCUIT DESIGN

TEACHING SCHEME		EXAMINATION SCHEME	
Lectures	: 04Hrs / week	Theory	: 80 Marks
Practical	: 02Hrs / week	Duration	: 03 Hours
		Unit Test	: 20 Marks
		T. W. & Or.	: 50 Marks

Unit -I (08 Hours)

Study of System Design Philosophy:

Classification of electronic systems, Design considerations for system reliability & repeatability, Component selection, Standard duration, Cost considerations, availability ergonomics.

Unit –II (09 Hours)

Linear and Switch Mode Power Supply:

Classification & comparison, Block schematic & topology, Discrete components & IC based design for linear power supply e.g. IC723, Three terminal regulator, IC based design for switch mode power supply e.g. µA 78S40 or MC 34063.

Unit-III (08 Hours)

Design of Data Acquisition System:

Circuit level design of DAS, Design should included signal sensing, isolation, signal conditioning ADC storage & display systems.

Unit-IV (07 Hours)

Design of State Machine:

Design to include following: State machines, State diagram, ASM technique, Implementation of combinational logic in state machines, using MSI, LSI devices, Assignment based on real life problems like Traffic Light Control, Elevator, vending machine etc.

Unit-V (07 Hours)

Programmable Controller:

Continuous & discrete process control, microcontroller based process controller. Assignment on systems like Oven, Washing Machine, Electronic

locking systems etc.

Unit-VI (09 Hours)

Design of an Annunciator:

Design to include following, multiple inputs, audio visual indicator, logging facility interface to microprocessor / PC, inputs to include from the following detectors smoke / fire, voltage levels, over current, movement, Light, temperature etc. indication by LED / LCD, Alphanumeric display.

Mini Project & Assignments

- Mini project should be from small systems required in laboratory or real life, project to be designed, tested on bread board, fabricated on manual or CAD based PCBs with due consideration to mechanical aspects for enclosure & control panel design. Complete documentation in the form of project report is to be submitted. Due consideration should be given to Mini Project while assessing students for term work.
- Three assignments to be completed. Out of three two should be corresponding to complete design of analog and digital system design each. Third assignment should be corresponding to the software simulation of system.
- Use of programming language like C / C ++ / VC ++ & packages like PSPICE is expected.

Text Books/ References

- "Data & Application Manuals & Application Notes of well known organization like", National Semiconductor, Philips, BEL, CEDT etc.
- P. M. Chirlial, "Analysis & Design of Integrated Electronic Circuits", Wiley Eastern
- Winkel Prosser, " Art of Digital Design", PHI
- Hayt & Nudeck, " Electronic Circuit Analysis & Design ", Jaico Publishing House
- Horowitz Paul & Winfield Hill, " Art of Electronics", Cambridge University Press IInd Edition 1989
- B. S. Sonde, " Introduction to system Design Using Integrated Circuits", Wiley Eastern 2nd Edition
- M. M. Shah, " Design of Electronic Circuits & Computer Aided Design", Wiley Eastern

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI

K50310: INDUSRIAL MANAGEMENT AND HUMANITIES

TEACHING SCHEME	EXAMINATION SCHEME	
Lectures : 04 Hrs / week	Theory	: 80 Marks
	Duration	: 03 Hours
	Unit Test	: 20 Marks
	T. W. & Or.	: 50 Marks

Unit -I (09 Hours)

Indusrial Engineering, Management Science and Organization:

Concepts of industrial engineering, history and development of industrial engineering, Roles of industrial engineer, Production management, Production management versus industrial engineering, Concepts of organization, Importance of organization, Characteristics of organization, Elements of organization.

Unit –II (08 Hours)

Work Stuudy:

Definition and concepts, Need for work study, Advantages of work study, Objectives of methods study, Objectives of work measurement, Method study procedures, process charts symbols, Flow process chart, Flow diagram.

Unit-III (08 Hours)

Management Concepts:

Management, Administration, Organization, Differences and relationship between management, administration and organization, Importance of management, Characteristics of management, management skills, managerial objectives.

Unit-IV (07 Hours)

Industrial Psychology:

Definition and concepts, Industrial psychology versus personnel management, Aims and objectives of industrial psychology, Scope of industrial psychology, individual and group, Individual differences in behavior, Group dynamics.

Unit-V (07 Hours)

Engineering Economics:

Definition and concepts, Importance of economics for engineers, Wealth, Value and price, Capital, Money, Income, Margin, Utility, Demand and supply, Demand, The law of substitution, Supply, Production, Factors of Production.

Unit-VI (09 Hours)

Business Environment and Professional and Business Ethics:

Meaning of business, earlier business objectives, Changing concepts and objectives of business, Professionalization, business ethics, Social responsibility of business, The Indian situation, Meaning of environment, Concepts of professional / Professionalism, Concepts of Ethics, Ethics and morals, Business ethics, professional ethics, Need for professional and business ethics.

Text Books/ References

- O. P. Khanna, "Industrial Engineering and Management", Dhanpat Rai Publications
- Harold Koontz & Heinz, "Essentials of Management"
- K. K. Deweett, "Personnel Management"
- J. S. Chandan, "Management Theory and Practice"

Syllabus for Unit Test

Unit Test 1	Unit I & II
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RULES REGARDING ATKT, CONTINUOUS ASSESSMENT AND AWARD OF CLASS

A. T. K. T.

- A candidate who is granted term for B.Tech. Semester-I will be allowed to keep term for his / her B.Tech. Semester-II examination even if he / she appears and fails or does not appear at B.Tech. Semester-I examination.
- A candidate who is granted term for B. Tech. Semester - III will be allowed to keep term for his / her B.Tech. Semester-IV examination even if he / she appears and fails or does not appear at B.Tech. Semester-III examination.
- A candidate who is granted term for B.Tech. Semester-V will be allowed to keep term for his / her B.Tech. Semester-VI examination if he / she appear and fails or does not appear at B.Tech. Semester-V examination.
- A candidate who is granted term for B.Tech. Semester-VII will be allowed to keep term for his / her B.Tech. Semester-VIII examination if he / she appears and fails or does not appear at B.Tech. Semester-VII examination.
- A student shall be allowed to keep term for the B.Tech. Semester-III course if he / she has a backlog of not more than 3 Heads of passing out of total number of Heads of passing in theory examination at B.Tch. Semester-I & II taken together.
- A student shall be allowed to keep term for the B.Tech. Semester-V of respective course if he / she has no backlog of B.Tech Semester-I & II and he / she has a backlog of not more than 3 Heads of passing in theory examination and not more than 3 heads of passing in termwork and practical examination or termwork and oral examination.
- A student shall be allowed to keep term for the B.Tech. Semester-VII course if he / she has no backlog of B.Tech. Semester-III & IV and he / she has a backlog of not more than 3 Heads of passing in theory examination and not more than 3 Heads of passing in termwork and practical examination or termwork and oral examination.

CONTINUOUS ASSESSMENT

- In respect of Term work at B.Tech. Semester-I & II, B.Tech. Semester-III & IV and B.Tech. Semester-V & VI, target date shall be fixed for the completion of each job, project experiment or assignment as prescribed in the syllabus and the same shall be collected on the target date and assessed immediately at an affiliated college by at least one pair of the concerned teachers for the subject and the marks shall be submitted at the end of each term to the Principal of the college.

• Termwork and performance of Practical / Oral examination shall be assessed on the basis of the depth of understanding of the principles involved, correctness of results and not on ornamental or colorful presentation.

• For B.Tech. Semester-VII & VIII, termwork assessment will be done by external and internal examiners jointly during the examination schedule declared by the university. The record of continuous assessment shall be made available to the examiners during Term work and practical and Term work and oral examinations. Examiner shall use this record for overall assessment of the performance of the student. Every practical / termwork assignment shall be assessed on the scale of 20 marks and weightage of 20 marks shall be distributed as follows:

Sr. No.	Activity	Marks
1	Timely Submission	04
2	Presentation	06
3	Understanding	10

Marks obtained out of 20 for all assignments together will be converted on scale of marks assigned to term work of respective subject in the structure of the course.

CLASS

• The class should be awarded to the student on the basis of aggregate marks obtained together in both the semesters of the respective year by him. The award of class shall be as follows.

A	Aggregate 66% or more marks	First Class with Distinction
B	Aggregate 60% or more marks but less than 66%	First Class
C	Aggregate 55% or more marks but less than 60%	Higher Second Class
D	Aggregate 50% or more marks but less than 55%	Second Class
E	Aggregate 40% or more marks but less than 50%	Pass Class