SEMESTER – V

SEMESTER – V

MICROPROCESSOR THEORY & APPLICATIONS **EC(ID) - 5001**

Course Code	**EC(ID) – 5001**	Credits : 4	L-3, T-1, P-0
Name of the Course	**MICROPROCESSOR THEORY & APPLICATIONS**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

- **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

- **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

Introduction:

- ♣ Evolution of microprocessor, General Architecture, resistors, ALU, System buses.
- ♣ Instruction cycle, fetch cycle, execute cycle, machine cycle, T states.
- ♣ Architecture of 8085, block diagram, pin diagram, instruction formats.
- ♣ Addressing Modes:- Direct addressing, indirect addressing, indexed, register direct, register indirect, implicit addressing mode, Timing diagrams.

SECTION – B

Instruction Set & Programming:

- ♣ Typical instruction set of 8085, data manipulation, data transfer, status management instructions.
- ♣ Development of Assembly language program.

SECTION – C

Interrupts & data transfer:

- ♣ Interrupts: Hardware & Software Interrupts, polled and vectored interrupts, level and edge triggered interrupts, enabling, disabling and masking of interrupts.
- ♣ Data transfer schemes: DMA, memory mapped, I/o, mapped, schemes of I/o interfacing.
- ♣ Interfacing of RAM, ROM Chips with a microprocessor, bus contention, concept of wait states.

SECTION – D

Peripheral devices & applications of microprocessor:

- ♣ Description of 8251, 8255, 8253, 8257, 8259, 8279.
- ♣ A temp. monitoring system, water level control, traffic control, Generation of square waves using I/o port and SOD lines.

Books Suggested:-

1. Microprocessor & Architecture, programming and application by Gaonkar.
2. Fundamentals of microprocessor & microcomputers – B.Ram.
3. An introduction to microprocessor – A.P.Mathur.

SEMESTER – V

ELECTROMAGNETIC FIELD THEORY **EC – 5002**

Course Code	**EC – 5002**	Credits : 4	L-3, T-1, P-0
Name of the Course	**ELECTROMAGNETIC FIELD THEORY**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

- **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

- **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed

Section A

INTRODUCTION: Review of vector analysis, Scalar and Vector product, gradient, divergence, curl and their physical interpretation, line integral, surface integral, volume integral, stokes theorem, rectangular, cylindrical and spherical co-ordinate system and their transformations.

Section B

ELECTROSTATICS:

Coulomb's Law electrostatic force, Electric field intensity, Electric potential, Electric potential difference, Electric dipole and equipotential surfaces, Electric flux density, displacement flux, Gauss's Law, Capacitance and Capacitors, electrostatic energy.

MAGNETOSTATICS: Inductors and magnetic inductance, back emf, Faradays law of EM induction, Amperes law in differential vector form, Magnetic scalar & vector potential, self & mutual inductance, equation of continuity for steady currents, magnetic field intensity (H), Magnetic flux density (B), ampere force law (Biot Savart Law), energy stored in magnetic field.

Section C

TIME VARYING FIELDS: Equation of continuity for time varying fields, inconsistency of amperes law, displacement current, Maxwell field equation in differential & integral form and their interpretation, uniform plane wave and relation between E and H in uniform plane wave, Intrinsic impedance, boundary conditions.

EM WAVES: wave equation for free space and conducting medium, phasor on exponential notation of Maxwell's equations, wave propagation in free space and lossy dielectric medium, conductors 7 dielectrics, wave propagation in good dielectrics and good conductors, depth of penetration, reflection & refraction of plane waves at surface of perfect conductor and dielectric (both normal & oblique incidence), surface impedance, energy flow and Poynting theorem.

Section D

TRANSMISSION LINE THEORY: Transmission line as a distributed circuit, basic transmission line equation , equation of transmission line terminated with any load impedance, infinite transmission line, characteristic impedance, open & short circuited line, Reflection coefficient, standing wave ratio and its relation with reflection coefficient, impedance matching.

Text Books :

1. Electro-magnetic Waves and Radiating System : Jordan & Balmain, PHI.

Reference Books :

1. Engineering Electromagnetic: Haytl TMH
2. Electro-Magnetic: Krauss JDF; Mc Graw Hill

SEMESTER – V

MICROELECTRONICS & LIC EC – 5003

Course Code	**EC – 5003**	Credits : 4	L-3, T-1, P-0
Name of the Course	**MICROELECTRONICS &LIC**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

- **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

- **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Section A

INTEGRATED CIRCUIT TECHNOLOGY: Classification of Integrated Circuits, Monolithic technology, Planar Processes, Fabrication of Devices-diodes, BJT,FET and passive components, Thick and Thin Film technology, Ion implantation Technology, Hybrid Integrated Circuits.

Section B

DIFFERENTIAL & CASCADE AMPLIFIERS: balanced ,unbalanced output differential amplifiers, FET differential amplifier, current mirrors, level translators, cascade configuration of amplifiers.

OPERATIONAL AMPLIFIERS: Introduction to ideal op-amp, characteristic parameters, interpretation of data sheets, practical op-amp, its equivalent circuit and op-amp circuit configuration.

Section C

OP-AMP WITH NEGATIVE FEEDBACK: Block diagram representation of feedback amplifier, voltage series feedback, voltage shunt feedback, differential amplifiers.

FREQUENCY RESPONSE OF AN OP-AMP: frequency response, compensating network, frequency response of internally compensated op-amp and non-compensated op-amp. High frequency op-amp equivalent circuit, open loop gain vs. frequency, closed loop frequency response, circuit stability, and slew rate.

Section D

OP-AMP APPLICATIONS: Peaking amplifier, summing, scaling, averaging and instrumentation amplifiers, voltage to current converter, current to voltage converter, very high input impedance circuit, integration, differentiation, wave shaping circuit, active filters, oscillators, comparators and 555 timer.

Reference books:

1. Op-amp & Linear Integrated Circuits, 2nd Edition by Ramakant A. Gayakward
2. Linear Integrated Circuits by D. R. Chaudhary
3. Integrated Circuits by K. R. Botkar

SEMESTER V

INDUSTRIAL ELECTRONICS EC-5004

Course Code	**EC-5004**	Credits: 4	L-3, T-1, P-0
Name of the Course	**INDUSTRIAL ELECTRONICS**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

- **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

- **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed

SECTION A

CHARACTERISTICS OF SELECTED DEVICES: PNPN diode, fast recovery diodes, Schottky diode, SCR, triggering methods and commutation circuits, Series and parallel connection of SCRs,

Diac, Triac, Power diodes, Power MOSFETs., applications.

SECTION B

CONTROLLED RECTIFIER: Single-phase half wave and full wave converter with resistive RL & R-L-E Freewheeling diode, three phase rectifiers, Bridge rectifiers -half controlled and fully controlled.

SECTION C

INVERTER, CHOPPER AND CYCLOCONVERTER: Voltage driven, current driven, bridge, parallel, , control of output voltage-PWM schemes, harmonic reduction, types of choppers, step up and step down cycloconverter.

MOTOR CONTROL: D.C. and A.C. motor control reversible drives, closed loop control,commutatorless d.c. motor control.

SECTION D

SWITCHED MODE POWER SUPPLIES: Basic principle, step-up and step-down circuits, integrated circuits for Switched Mode regulators.

Induction Heating, effect of frequencies and Power requirements, Dielectric heating and applications.

Suggested Test Books And References:-

1. Power Electronics - P.C.Sen, Tata McGraw Hill Publishing Co., Ltd.,1987.
2. Power Electronics and Control - S.K.Dutta, Prentice Hall of India Pvt. Ltd.,1986

SEMESTER – V

COMMUNICATION SYSTEM – II **EC- 5005**

Course Code	**EC – 5005**	Credits : 4	L-3, T-1, P-0
Name of the Course	**COMMUNICATION SYSTEM – II**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

- **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

- **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Section A:-

PULSE MODULATION:- Sampling process, pulse – amplitude modulation , other forms of pulse modulation, Bandwidth – noise trade off, quantization process, pulse code modulation, noise considerations in PCM system, Time- division multiplexing, digital multiplexers, virtues, limitations and modifications of PCM, delta modulation, linear prediction, differential pulse code modulation Adaptive differential pulse code modulation.

Section B:-

DIGITAL MODULATION TECHNIQUES: - Binary phase – shift keying, differential phase shift keying, differentially – encoding PSK (DEPSK), Quadrature phase shift keying (QPSK), M-ary PSK, Quadrature amplitude shift keying (QASK). Binary frequency shift keying, similarity of BFSK and BPSK, M-ary FSK, Minimum shift keying (MSK)

Section- C:-

DATA TRANSMISSION: - A base band signal receiver, probability of error, the optimum filter, white noise: the matched filter, probability of error of the matched filter, coherent reception: correlation, phase shift keying (PSK), frequency shift keying (FSK), Non coherent detection of FSK, differential PSK,).

Section D: -

SPREAD SPECTRUM MODULATION: - Pseudo-noise sequences, direct sequence spread spectrum, processing gain, frequency HOP spread spectrum,
Linear Block Codes, Convolution codes.

Books:-

1. COMMUNICATION SYSTEM – SIMON HAYKINS
2. PRINCIPLES OF COMMUNICATION SYSTEM – TAUB AND SCHILLING
3. ELECTRONICS COMMUNICATION SYSTEM – WAYNE TOMASI
4. INFORMATION THEORY, CODING AND CRYPTOGRAPHY BY RANJAN BOSE.

SEMESTER - V

MICROPROCESSOR LAB **EC(ID) - 5006**

Course Code	**EC (ID) - 5006**	Credits: 2	L-0, T-0, P-3
Name of the Course	**MICROPROCESSOR LAB**		
Lectures to be delivered	**39 hours of Lab sessions**		
Semester End Examination	**Max. Time: 3 hrs**	**Max. Marks: 50**	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).

ii) Viva-voice examination (25 marks).

Viva-voice examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

List of Experiments :

1. Study of 8085 Microprocessor Trainer kit.
2. Write a program using 8085 for
   (a) 8 bit two numbers addition.
   (b) 16 bit two numbers addition
3. Write a program using 8085 for
   (a) Two 8 bit numbers subtraction
   (b) Two 16 bit numbers subtraction
4. Write a program for multiplication of two 8 bit numbers using 8085.
5. Write a program for division of two 8 bit numbers division using 8085
6. Write a program for sorting a list of numbers in ascending & descending order.
7. Code conversion-Binding to Gray & Gray to binary .
8. Write a program for finding square of a number using look up table & verify
9. Write a program for temp control using 8085 & 8255 PPI
10. Write a program for water level control using 8085 & 8255 PPI

11. Generate different waveforms using DAC after interfacing it with a microprocessor kit-use 8255 PPI port.

SEMESTER V

INDUSTRIAL ELECTRONICS LAB EC-5007

Course Code	EC-5007	Credits : 2	L-0, T-0, P-2
Name of the Course	**INDUSTRIAL ELECTRONICS LAB**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Maximum Time: 3 hrs.**	**Max. Marks: 50**	**Min. Pass Marks : 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).

ii) Viva-voice examination (25 marks).

Viva-voice examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

List of experiments

1. To draw the characteristics of SCR.
2. To draw the characteristics of DIAC.
3. To draw the characteristics of TRIAC.
4. To vary the speed of a dc motor with the help of an SCR.
5. To determine the ripple factor of a full wave rectifier using SCR for various firing angles.
6. To control the firing angle of thyristor by varying
   i) dc bias alone
   ii) dc bias with superimposed ac.
7. To vary the firing angle of an SCR using a phase shift circuit and a peaking transformer.

8. To vary the frequency of an inverter circuit
9. To determine frequency of a relaxation oscillator for various values of C.
10. To obtain the average current of an SCR as a function of resistance**.**

SEMESTER – V

COMMUNICATION SYSTEMS LAB EC – 5008

Course Code	**EC – 5008**	Credits : 2	L-0, T-0, P-3
Name of the Course	**COMMUNICATION SYSTEM LAB**		
Lectures to be delivered	**39 hours of Lab sessions**		
Semester End Examination	**Max. Time : 3 hrs**	**Max. Marks : 50**	**Min. Pass Marks : 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).
ii) Viva-voice examination (25 marks).

Viva-voice examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

List of Experiments:

1. To study the signal sampling and reconstruction techniques.
2. To study Pulse Code Modulation.
3. To study Delta Modulation and De-Modulation.
4. To study Adaptive Delta Modulation and De-Modulation.
5. To study Delta Sigma Modulation and De-Modulation.

6. To study Time Division Multiplexing (PAM) .

7. To study Time Division Multiplexing (PCM).

8. To study Amplitude shift Keying.

9. To study Phase shift Keying.

10. To study Frequency shift Keying.

SEMESTER – V

ELECTRONICS DESIGN LAB EC-5009

Course Code	EC-5009	Credits : 2	**L-0, T-0, P-3**
Name of the Course	**ELECTRONICS DESIGN LAB**		
Lectures to be delivered	**39 hours of Lab sessions**		
Semester End Examination	**Maximum Time: 3 hrs.**	**Max. Marks: 50**	**Min. Pass Marks : 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

iii) Performing a practical examination assigned by the examiner (25 marks).

iv) Viva-voice examination (25 marks).

Viva-voice examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

List of experiments

1. Design of Power Supply of 12 V
2. Design a Single stage amplifier
3. Design a combinational Circuits which multiplies two, two bit binary numbers.
4. Design a MOD-8 counter using J-K F/F.

5. (a) Design of Differentiator to differentiate a input signal that varies in frequency from 10Hz to 1 KHz

(b) Design a Integrator circuit to process input sinusoidal Wave forms p to 1 KHz by input amplitude is 10 mV

6. (a) Design a Second order LPF at a high cut off frequency of 1 KHz.

(b) Design a Second order HPF cut off filter of 1 KHz with a pass band gain of 2

7. (a) Design a wideband pass filter with FL=200 KHz and FH=1KHz and a pass band gain of 4

(b) Design a 60 Hz active notch filter.

8. Design a square wave generator using 555 timer.

9. Design a R.C. phase shift Oscillator using 741 IC

10. Design a Wein bridge oscillator using 741 IC