

**DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL (SONEPAT)**  
**SCHEME OF STUDIES AND EXAMINATION**  
**B. TECH. II YEAR (ELECTRONICS & COMMUNICATION ENGINEERING)**  
**SEMESTER IV**  
**Credit Based Scheme w.e.f. 2013-2014**

Sr. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Exam. Marks		Total Marks	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	MGT201B	ENGINEERING ECONOMICS (Common for all branches Except BT& BME) (Gr-B)	4	-	-	25	75	-	100	4	3
	GES201B	ENVIRONMENTAL STUDIES(Common for all branches) (Gr-A)	3	-	-	-	75	-	75	-	3
2	CSE210B	COMPUTER ARCHITECTURE & ORGANIZATION(ECE,CSE, common with 5 <sup>th</sup> Sem. AEI)	3	1	-	25	75	-	100	4	3
3	ECE204B	DIGITAL CIRCUIT AND SYSTEM	3	1	-	25	75	-	100	4	3
4	ECE206B	ANALOG ELECTRONIC CIRCUITS (BME,ECE,common with 5 <sup>th</sup> Sem. AEI)	3	1	-	25	75	-	100	4	3
5	ECE208B	POWER ELECTRONICS (ECE,common with 6 <sup>th</sup> Sem. AEI)	3	1	-	25	75	-	100	4	3
6	ECE210B	COMMUNICATION SYSTEMS(ECE,common with 3 <sup>rd</sup> Sem. CSE,6 <sup>th</sup> Sem. AEI)	3	1	-	25	75	-	100	4	3
7	ECE212B	FIELD AND WAVES(ECE,common with 3 <sup>rd</sup> Sem. AEI)	3	1	-	25	75	-	100	4	3
8	ECE224B	DIGITAL CIRCUIT AND SYSTEM LAB	-	-	2	20	-	30	50	1	3
9	ECE226B	ANALOG ELECTRONIC CIRCUITS LAB(BME,ECE,common with 5 <sup>th</sup> Sem. AEI)	-	-	2	20	-	30	50	1	3
10	ECE228B	POWER ELECTRONICS LAB (ECE,common with 6 <sup>th</sup> Sem. AEI)	-	-	2	20	-	30	50	1	3
11	ECE230B	COMMUNICATION SYSTEMS LAB(ECE,6 <sup>th</sup> Sem. AEI)	-	-	2	20	-	30	50	1	3
12	GES203B	ENVIRONMENTAL STUDIES FIELD WORK(Gr-A)	-	-	-	-	-	25	25	-	-
13	GPEC202B	GENERAL PROFICIENCY & ETHICS	1	-	-	-	-	75	75	2	-
<b>Total</b>			<b>23</b>	<b>6</b>	<b>8</b>	<b>255</b>	<b>525</b>	<b>195</b>	<b>975</b>	<b>34</b>	
			<b>22</b>	<b>6</b>	<b>8</b>	<b>230</b>	<b>450</b>	<b>195</b>	<b>875</b>	<b>30</b>	

**Note:**

- Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of is given in General Proficiency Syllabus.
- The students will be allowed to use non-Programmable Scientific Calculator. However, sharing/exchange of calculator is prohibited in the examination.
- Electronic Gadgets including Cellular Phones are not allowed in the examination.
- At the end of 4<sup>th</sup> semester each student has to undergo four weeks Professional Training of 4 weeks in an Industry/ Institute/ Professional Organization/ Research Laboratory/ training centre etc. with the prior approval of the Training and Placement Officer of the University and submit in the department a typed report along with a certificate from the organization & its evaluation shall be carried out in the 5<sup>th</sup> Semester.
- The ENVIRONMENTAL STUDIES (GES201B) & ENVIRONMENTAL STUDIES FIELD WORK (GES203B) are compulsory & qualifying courses.
- All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.

**GES201B**

**ENVIRONMENTAL STUDIES**

B. Tech. Semester –III/IV (Common for all Branches)

L T P Credits  
3 - - -

Class Work : -  
Theory : 75 Marks  
Total : 75 Marks

Duration of Exam. : 3 Hrs.

**UNIT – I**

The Multidisciplinary nature of environmental studies, Definition, scope and importance. Need for Public awareness.

**Natural Resources:**

Renewable and non-renewable resources:

Natural resources and associated problems.

- a) Forest resources: Use and over-exploitation: deforestation, case studies, Timber exploitation, mining, dams and their effects and forests tribal people.
  - b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
  - c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
  - d) Food resources: World food problems, changes, caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
  - e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources; case studies.
  - f) 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.

**UNIT- II**

**Ecosystems:**

- 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 following eco-system: a) Forest ecosystem.
- b) Grassland ecosystem.
- c) Desert ecosystem.
- d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

**Biodiversity and its conservations:**

- Introduction – Definition: Genetic, species and ecosystem diversity.
- Biogeographically 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.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.

**UNIT – III**

**Environmental Pollution:**

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 • Solid waste management: Causes effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
  - Pollution case studies.
  - Disaster management: Floods, earthquake, cyclone and landslides.

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## UNIT – IV

### Social issues and the Environment:

- a) From unsustainable to sustainable development
- b) Urban problems related to energy
- c) Water conservation, rain water harvesting, watershed management
- d) Resettlement and rehabilitation of people; its problems and concerns, case studies
- e) Environmental ethics: Issues and possible solutions
- f) Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies
- g) Wasteland reclamation
- h) Consumerism and waste products
- i) Environment Protection Act
- j) Air (Prevention and Control of Pollution) Act
- k) Water (Prevention and Control of Pollution) Act
- l) Wildlife Protection Act
- m) Forest Conservation Act
- n) Issues involved in enforcement of environmental legislation
- o) Public awareness

### Human population and the Environment.

Population growth, variation among nations.

Population explosion – Family Welfare Programme.

Environment and human health.

Human Rights.

Value Education.

HIV/AIDS.

Woman and Child Welfare.

Role of Information Technology in Environment and human health.

Case Studies.

### REFERENCES:

1. Agarwal, K.C. 2001, Environmental Biology, Nidi Pub. Ltd. Bikaner.
2. Bharucha, Franch, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380013, India .
3. Brunner R.C. 1989, Hazardous Waste Incineration, Mc. Graw Hill Inc. 480p.
4. Clark R.S., Marine Pollution, Slanderson Press Oxford (TB).
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Pub. House, Mumbai. 1195p.
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment @.
8. Gleick, H.P., 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env. Institute, Oxford Univ., Press 473p.
9. Hawkins R.E. Encyclopedia of Indian Natural History, Bomaby Natural History Society, Bombay (R).
10. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
11. Jadhav, H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Helhi 284p.
12. Mckinney, M.L. & Schoch, RM 1996, Environmental Sciences Systems & Solutions, Web enhanced Edition 639p.
13. Mhaskar A.K., Mater Hazardous, Tekchno-Sciences Publications (TB).
14. Miller T.G. Jr. Environmental Science, Wadsoworth Publishing Co. (TB).
15. Odum, E.P. 1971, Fundamentals of Ecology, W.B. Saunders Co. USA, 574p.
16. Rao M.N. & Dutta, A.K. 1987, Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd., 345p
17. Sharma, B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
18. Survey of the Environment, The Hindu (M).
19. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Sciences (TB).
20. Trivedi, R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II Enviro Mdia (R).
21. Trividi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II Enviro Media (R).
22. Trividi R.K. and P.K. Goel, Introduction to air pollution, Techno Sciences Pub. (TB).
23. Wagner K.D., 1998, Environmental Management, W.B. Saunders Co. Philadelphia, USA 499p.
24. A text bok environmental education G.V.S. Publishers by Dr. J.P. Yadav.

### (M) Magazine (R) Reference (TB) Textbook

### Note:

1. In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.
2. The awards of this paper shall not be counted in the award of the Degree/DMC.

**CSE210B****COMPUTER ARCHITECTURE & ORGANIZATION**  
B. Tech. Semester – IV (ECE,CSE,common with 5<sup>th</sup> Sem. AEI)L T P Credits  
3 1 - 4Class Work : 25 Marks  
Theory : 75 Marks  
Total : 100 Marks

Duration of Exam. : 3 Hrs.

**UNIT I****General System Architecture:**

Classification of computers ( Based on Computation methodology(Analog, digital, hybrid), based on generations, based on size & capability, based on Flynn's criteria); Multilevel viewpoint of a machine: digital logic, micro architecture, ISA, operating systems, high level language ; Register Transfer language; Computer Buses ( basic design using multiplexers), Bus width, Bus clocking( synchronous , asynchronous), bus arbitration, Bus examples( ISA bus, PCI bus, Universal serial bus) ; Computer Arithmetic ,Addition , subtraction ( signed magnitude , signed 2's complement , Multiplication ( Booth's algorithm).

**UNIT II****CPU Organization:**

CPU Architecture types (accumulator, register, stack, memory/ register) Instruction cycle (Fetch-Decode-Execute); Instruction set based classification of processors (RISC, CISC, and their comparison); Addressing modes(register, immediate, direct, indirect, indexed); Operations in the instruction set; Arithmetic and Logical, Data Transfer, Control Flow; Instruction set formats (fixed, variable, hybrid) .

**UNIT III****Input /Output & Control Unit:**

Input Output Interface , Asynchronous data transfer ( Strobe control, handshaking , serial transfer); Serial Vs parallel data transmission;Modes of data transfer( Programmed I/O, Interrupt driven, Direct Memory access ( DMA)).  
Control Unit design:- Control unit design methods ( hardwired & microprogrammed ) Control Memory, Address Sequencing, Micro instructions.

**UNIT IV****Memory Organization:**

Memory device characteristics(access/ cycle time, cost per bit, volatility , storage density) ;Memory hierarchy ;Main memory Design (Semiconductor RAM & ROM organization, memory expansion, Static & dynamic memory types , their comparison); Associative memory Design ,Match logic ,Locality of reference principle( Temporal & Spatial),Cache mapping( Direct , associative , set associative ); Cache writing policies ( Copy-Back , Write-through); Virtual Memory( Address space , memory space , Address mapping using pages , Page replacement).

**Text Books:**

1. Computer System Architecture by M. Mano, Prentice-Hall.
2. Structured Computer Organisation by A.S. Tanenbaum, 6th edition, Prentice-Hall of India, Eastern Economic Edition

**Reference Books:**

1. Computer Organization, 5th Edi, by Carl Hamacher, Zvonko Vranesic,2002, SafwatZaky.
2. Computer Organization and Design, 2nd Ed., by David A. Patterson and John L. Hennessy, Morgan 1997, Kauffmann.
3. Computer Architecture and Organization, 3rd Edi, by John P. Hayes, 1998, TMH
4. Computer Organisation& Architecture: Designing for performance by W. Stallings, 4th edition, 1996, Prentice-Hall International edition.

**Note:**

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Approved by UG BOS & FET

**ECE204B****DIGITAL CIRCUIT & SYSTEMS**

B. Tech. Semester –IV

L	T	P	Credits
3	1	-	4

Class Work	:	25 Marks
Theory	:	75 Marks
Total	:	100 Marks

Duration of Exam. : 3 Hrs.

**UNIT I****NUMBER SYSTEM AND CODES:**

Number System, Binary Codes, Boolean Algebras, Sets, Relations and Lattices.

**MINIMISATION OF SWITCHING FUNCTIONS:**

Five and Six variable Karnaugh map, Quine McCluskey and VEM Methods of Simplifications

**UNIT II****LOGICAL DESIGN:**

Design with Basic logical Gates, logic Design with Integrated Circuits, NAND and NOR Circuits, Design of High- Speed Adders

**FUNCTIONAL DECOMPOSITION AND SYMMETRIC FUNCTIONS:**

Functional Decomposition, Symmetric Networks, Identification of Symmetric Functions, Introduction to Threshold logic, Synthesis of Threshold Networks.

**UNIT III****SYNCHRONOUS SEQUENTIAL CIRCUITS:**

Sequential Circuits, The Finite State Model-Basic Definitions, Memory Elements and Their Excitations Functions, Synthesis of Synchronous Sequential Circuits.

**CAPABILITIES, MINIMISATION. AND TRANSFORMATION OF SEQUENTIAL MACHINES:**

The Finite State Model-Further Definitions, Capabilities and limitations of Finite State Machines, State Equivalence, and Machine Minimization, Simplification of Incompletely Specified Machines.

**UNIT IV****ASYNCHRONOUS SEQUENTIAL CIRCUITS:**

Fundamental- Mode Circuits, Synthesis, State Assignment in Asynchronous Sequential Circuits.

**STRUCTURE OF SEQUENTIAL CIRCUITS:**

State Assignments using Partitions, The Lattice of Closed Partitions, and Reduction of the output Dependency.

**Text Books :**

1. Modern Digital Electronics (Edition III): R. P. Jain; TMH
2. Switching and Finite Automation Theory: Z.Kohavi; TMH

**Reference Books:**

1. Introduction to Logic Design: MARKOVITZ ; TMH
2. Digital Design: Morris Mano; PHI.
3. Digital Electronics:Green; Pearson

**NOTE:**

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

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**ECE206B****ANALOG ELECTRONICS CIRCUITS**B. Tech. Semester –IV (BME, ECE, common with 5<sup>th</sup> Sem. AEI)

L	T	P	Credits
3	1	-	4

Class Work	:	25 Marks
Theory	:	75 Marks
Total	:	100 Marks

Duration of Exam. : 3 Hrs.

**UNIT I****MULTISTAGE AMPLIFIER:**

RC Coupled Transistor Amplifier, Lower & Upper Cut off Frequency, Frequency Response curve & Bandwidth, Transformer Coupled Amplifier, Direct Coupled Amplifier, Cascode Amplifier, Darlington Pair Amplifier, Distortion In Amplifiers.

**FEEDBACK AMPLIFIERS:**

Feedback concept , Transfer Gain with Feedback, General Characteristics of Negative Feedback, Advantages & disadvantages, Input And Output Resistance, Voltage Series Feedback topology, Voltage Shunt, Current Series & Current Shunt topology ,Equivalent circuit for each topology, Effects of Negative Feedback.

**UNIT II****OSILLATORS:**

Introduction, Barkhausen Criterion, Oscillator with RC Feedback circuit (RC Phase Shift, Wien Bridge), Tuned Collector, Tuned Base Oscillator, LC Feedback circuits (Hartley, Colpitts), Condition for Sustained Oscillations & Frequency of Oscillations, Crystal Oscillator.

**POWER AMPLIFIER:**

Definition, Application & Types of Power Amplifiers, Amplifier Classes of Efficiency (Class - A, B, AB, C), Push Pull Amplifiers, Distortion in Simple & Push Pull Amplifier, Complementary Push Pull Amplifier, Integrated Circuit Power Amplifier , Introduction to MOSFET & CLASS D Power Amplifier.

**UNIT III****VOLTAGE REGULATORS:**

Voltage Regulation, Basic Series Regulators, Basic Shunt Regulators, Power Supply Parameters, Basic Switching Regulators, Step up Configuration, Step down Configuration, IC Voltage Regulator, SMPS.

**SWITCHING CIRCUIT:**

Switching action & Characteristics of a Transistor, Switching Times in Transistor, Multivibrators, Astable Multivibrator, Monostable Multivibrator, Bistable Multivibrator, 555 Timer, Monostable & Astable Operation with 555 Timer.

**UNIT IV****A/D CONVERTERS:**

Basic Principle of DAC & ADC, Types of DAC Circuits: Resistor Divider, R/2R Ladder network, Types of ADC circuits: Parallel Comparator, Counter type, Successive approximation & Dual Slope, Specifications.

**SPECIAL SEMICONDUCTOR DEVICES:**

Optoelectronic Devices, Photoconductors, Photo Diode, Photo Transistor, Photo Voltaic Sensor, Photo Emission, LED, LCD, Laser Diode, Schottky Diode, SCR, TRIAC, DIAC, UJT, Single Electron Transistor. Infrared LEDs, IGBT, Opto Coupler.

**Reference Books:**

- |                                 |   |
|---------------------------------|---|
| 1. Electronics Device & Circuit | By David.A. Bell - Oxford University Press.                       |
| 2. Electronics Device & Circuit | By Theodore F. Bogart, Jeffrey.S.Bealey,Guillermo Rico - Pearson. |
| 3. Electronics Device & Circuit | By Robert Boylestad ,Louis Nashelsky.                             |
| 4. Electronics Device           | By Floyd , Pearson.   |
| 5. Integrated Electronics       | By Millman Halkias - TMH.   |
| 6. Electronics Device & Circuit | By Sanjeev Gupta.   |
| 7. Electronics Device & Circuit | By I. J. Nagrath - PHI  |
| 8. Electronic Principles        | By Albert Malvino.  |

**NOTE:**

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

Approved by UG BOS &amp; FET

**ECE208B****POWER ELECTRONICS**B. Tech. Semester –IV (ECE, common with 6<sup>th</sup> Sem. AEI)L T P Credits  
3 1 - 4Class Work : 25 Marks  
Theory : 75 Marks  
Total : 100 Marks

Duration of Exam. : 3 Hrs.

**UNIT I****Power Semiconductor Diodes and Transistors:**

Characteristics of Power Diodes, Types of Power Diodes, Power Transistors, Power MOSFET, Insulated Gate Bipolar Transistors (IGBT), MOS Controlled Thyristors.

**Thyristors:**

Terminal Characteristics of Thyristors, Thyristor Turn ON Methods, Switching Characteristics of Thyristors, Thyristors Gate Characteristics, Two Transistor Model of a Thyristor, Thyristor Ratings, Thyristors Protection, Heating Cooling and Mounting of Thyristors, Series and Parallel Operation of Thyristors, Programmable Unijunction Transistors(PUT), Silicon Unilateral Switch(SUS), Silicon Controlled Switch(SCS), Light Activated Thyristors, Static Induction Thyristors, Diac, Triac, Asymmetric Thyristors, Reverse Conducting Thyristors, Firing Circuits for Thyristors, Pulse Transformer in Firing Circuits, Triac Firing Circuit

**UNIT II****Thyristors Commutation Techniques:**

Class A Commutation (Load Commutation), Class B Commutation (Resonant Pulse Commutation), Class C Commutation (Complementary Commutation), Class D Commutation (Impulse Commutation), Class E Commutation (External Pulse Commutation), Class F Commutation (Line Commutation)

**Phase Controlled Rectifier:**

Principle of Phase Control, Full Wave Controlled Converters, Single Phase Full Wave Converter, Single Phase Two Pulse Converter with Discontinuous Load Current, Three Phase Converter Systems Using Diodes, Three Phase Thyristor Converter Circuits, Effect of Source Impedance on Performance of Converter, Dual Converters.

**UNIT III****Choppers:**

Principle of Chopper Operation, Control Strategies, Step Up Choppers, Types of Chopper Circuits, Steady State Time Domain Analysis of Type A Chopper, Thyristor Chopper Circuits, Multiphase Choppers.

**Inverters:**

Single Phase Voltage Source Inverter: Operating Principle, Force Commutated Thyristor Inverters, Three Phase Bridge Inverter, Voltage Control in Single Phase Inverter, Pulse Width Modulated Inverter, Reduction of Harmonics in the Inverter Output Voltage, Current Source Inverters, Series Inverters, Single Phase Parallel Inverter.

**UNIT IV****AC Voltage Controller and Cycloconverters:**

Types of AC Voltage Controller, Integral Cycle Control, Single Phase Voltage Controllers, Sequence Control of AC Voltage Controller. Principle of Cycloconverter Operation, Three Phase Half Wave Cycloconverter, Output Voltage Equation for Cycloconverter, Load Commutated Cycloconverter.

**Applications:**

Switched Mode Power Supply(SMPS), Uninterruptible Power Supplies, High Voltage DC Transmission, Static Switches, Static Circuit Breakers, Solid State Relays.

**Text Books:**

1. P.S Bimbhra : Power Electronics, Khanna Publisher
2. Muhamed H.Rashid : Power Electronics Circuits, Devices and Applications, PHI.
3. Singh And Kanchandani : Power Electronics, TMH.1.

**Reference Books:**

1. Sen : Power Electronics, TMH .
2. Dubey : Thyristorised Power Controllers, Wiley Eastern .
3. Vithayathil : Power Electronics – Principles And Applications, McGraw-Hill.
4. Lander : Power Electronics, McGraw-Hill.

**NOTE:**

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

Approved by UG BOS &amp; FET

**ECE210B****COMMUNICATION SYSTEMS**B. Tech. Semester –IV (ECE, common with 3<sup>rd</sup> Sem. CSE, 6<sup>th</sup> Sem. AEI)

L	T	P	Credits
3	1	-	4

Class Work	:	25 Marks
Theory	:	75 Marks
Total	:	100 Marks

Duration of Exam. : 3 Hrs.

**UNIT I****INTRODUCTION TO COMMUNICATION SYSTEM:**

Modulation, Demodulation, Radio Frequency Spectrum, Signals & their classification, Limitations & Advantages of a Communication System, Comparison of Analog & Digital Communication Systems, Historical Perspective, Modes & Medias of Communication.

**NOISE:**

Sources of Noise, External & Internal Noise, Noise Calculations, Noise Figure, Noise Figure Calculation, Noise Temperature, Noise in Communication Systems, Band Pass Noise Model, Cascaded Stages & its Noise Figure Calculation, Signal in presence of Noise, Pre-Emphasis & De-Emphasis, Noise Quieting Effect, Capture Effect, Noise in Modulation Systems.

**UNIT II****LINEAR MODULATION:**

(AM) Basic definition & derivation for Modulation & Modulation Index, Modulation & Demodulation of AM, Suppressed Carrier Modulation, Quadrature Amplitude Modulation, SSB-SC, DSB-SC, VSB Modulation & Demodulation, Comparison of various AM Systems, Generation of AM waves.

**ANGLE MODULATION:**

Basic definition & derivation for Modulation & Modulation Index, Generation of FM waves, Comparison between PM & FM, Frequency Spectrum of FM, B.W. & required spectra, Types of FM, vector representation of FM, Universal Curve, Multiple FM, Demodulation of FM waves, Demodulation of PM waves, Comparison between AM & FM.

**UNIT III****TRANSMITTERS & RECEIVERS:**

Classification of Radio Transmitters, Basic Block Diagram of Radio Transmitter, Effect of Feedback on operation of Transmitter, Radio Telephone Transmitters, Privacy Device in Radio Telephony, FM Transmitter using Reactance Modulator, Armstrong FM Transmitter, Radio Receivers, Classification, TRF Receiver, Super Heterodyne Receiver, Image Rejection & Double Spotting, Choice of IF, Tracking & Alignment of Receivers, AGC.

**PROBABILITY THEORY & RANDOM PROCESSES:**

Probability, Properties, Conditional Probability, Random Variables, CDF, PDF, Uniform Distribution, Random or Stochastic Process, Ergodic Process, PSD, Properties of PSD, Correlation Function.

**UNIT IV****PULSE ANALOG MODULATION:**

Sampling theory, TDM, FDM, PAM, PWM, PPM, Modulation & Demodulation techniques of above all.

**PULSE DIGITAL MODULATION:**

Elements of Pulse Code Modulation, Noise in PCM Systems, Bandwidth of PCM Systems, Measure of Information, Channel Capacity, Channel Capacity of PCM System, Differential Pulse Code Modulation (DPCM). Delta Modulation (DM)

**Reference Books:**

- |                                     |                                      |
|-------------------------------------|--------------------------------------|
| 1. Communication Systems            | By Manoj Duhan – I. K. International |
| 2. Electronic Communication Systems | By Kennedy – TMH                     |
| 3. Communication Systems            | By Singh & Sapre – TMH               |
| 4. Electronic Communication,        | By Roody Coolen – Pearson            |
| 5. Analog Communication             | By P. Chakarbarti – DR & Co.         |
| 6. Communication Systems            | By Simon Haykins – Wiley             |

**NOTE:**

In the Semester examination, the examiner will set 08 questions in all selecting two from each unit. The candidates will be required to attempt five questions in all, atleast one from each unit. All questions carry equal marks.

Approved by UG BOS &amp; FET

**ECE212B****FIELD AND WAVES**  
B. Tech. Semester –IV (ECE, AEI)

L T P Credits  
3 1 - 4

Class Work : 25 Marks  
Theory : 75 Marks  
Total : 100 Marks

Duration of Exam. : 3 Hrs.

**UNIT I**

Coulomb's Law of Electrostatic Force, Electric Field Intensity, Electric Potential, Electric Charge Density, Field of A Finite Line Of Charge, Field Potential of an Infinite Line Of Charge, Electric Potential Difference, Electric Dipole, Electric Flux Density  
Gauss Law, Application of Gauss Law, Laplace Equation, Solution of Laplace Equation in Rectangular And Cartesian Coordinates, Uniqueness Theorem of Electrostatic Field Solutions, Methods of Electrostatic Images, Electrostatic Energy, Capacitance.

**UNIT II**

Introduction, Faraday Induction Law, Magnetic Effect on Current Carrying Conductor, Magnetic Flux, Magnetic Flux Density, Biot-Savart's Law, Ampere's Law of Force,  
Magnetic Field of A Solenoid, Magnetic Field In Vector Notations, Magnetic Field Intensity, Magnetic Flux Density outside and inside an Infinitely Long Cylinder Containing Uniform Current Density, Magnetic Vector Potential, Energy Stored In A Magnetic Field, Energy Density In A Magnetic Field.

**UNIT III**

Introduction, Displacement Current Maxwell's Equations: In Free Space, Differential Form And Integra Form, Physical Interpretations Of Maxwell's Field Equations, Boundary Conditions  
Electromagnetic Wave In Homogeneous Medium, Wave Equation, Plane Wave And Uniform Plane Wave, Electromagnetic Wave Equations, Wave Propagation In Conducting Medium, Polarization

**UNIT IV**

Introduction, Basic Principles Of Transmission Lines, Equivalent Circuit Representation, General Transmission Line Equation, Wave Characteristics on Finite Transmission Lines, Transients on Transmission lines, Primary Constant, Voltage And Current Calculations, Characteristic Impedance, Open And Short Circuit Lines, Reflection Coefficient, VSWR, Smith's Chart And Its Applications.

**Text Books:**

1. Electro-magnetic Waves and Radiating System : Jordan & Balmain, PHI.
2. Antenna & Wave Propagation: K.D Prasad, Satya Prakashan.
3. Field and Wave Electromagnetics: David K.Cheng, Pearson, Second edition

**Reference Books:**

1. Engineering Electromagnetics: Umran S.Inan & Aziz S. Inan, Pearson
2. Engineering Electromagnetics : Hayt; TMH
3. Electro-Magnetics : Krauss J.DF; Mc Graw Hill.

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Approved by UG BOS & FET

**ECE224B**

**DIGITAL CIRCUIT AND SYSTEM LAB**

B. Tech. Semester –IV

L T P Credits  
- - 2 1

Class Work : 20 Marks  
Practical : 30 Marks  
Total : 50 Marks

Duration of Exam. : 3 Hrs.

**LIST OF EXPERIMENTS:**

1. To study & design basic gates.
2. To realize and minimize five & six variables using K-Map method
3. To realize and minimize five & six variables using Quine Meluskey method
4. To study conversion of S-R Flip Flop to J-K.
5. To study conversion of J-K flip flop to T flip flop.
6. To study conversion of D flip flop to T flip flop.
7. To design and implement a ckt to detect a Count Sequence.
8. To design and implement a Asynchronous sequential ckt.
9. To design and implement a Synchronus Counter with Count Sequence.
10. To design an Asynchronus Counted for a Count Sequence.
11. Conversion of state digram to the state table and implement it using logical ckt.
12. To design and implement a Melay Machine.
13. To design and implement a Moorey Machine.

**Note:-**

- 1 Total ten experiments are to be performed in the semester.
- 2 At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.

Approved by UG BOS & FET

**ECE226B****ANALOG ELECTRONICS CIRCUITS LAB**B. Tech. Semester –IV (BME, ECE, common with 5<sup>th</sup> Sem. AEI)L T P Credits  
- - 2 1Class Work : 20 Marks  
Practical : 30 Marks  
Total : 50 Marks

Duration of Exam. : 3 Hrs.

**LIST OF EXPERIMENTS:**

- 1 To Study frequency response of RC coupled amplifier.
- 2 To Study different types of feedback topology.
- 3 To Study RC phase shift oscillator.
- 4 To study wein bridge oscillator.
- 5 To Study three terminal IC voltage regulator.
- 6 To draw characteristics of a transistor.
- 7 To study CE amplifier and calculate its gain.
- 8 To study 555 timer as a square wave generator.
- 9 To study SMPS power supply.
- 10 To study characteristics of SCR.
- 11 To study characteristics of DIAC.
- 12 To study UJT as a relaxation oscillator.

**Note:-**

- 1 Total ten experiments are to be performed in the semester.
- 2 At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.

Approved by UG BOS &amp; FET

**ECE228B**

**POWER ELECTRONICS LAB**  
B. Tech. Semester –IV (ECE, common with 6<sup>th</sup> Sem. AEI)

L T P Credits  
- - 2 1

Class Work : 20Marks  
Practical : 30Marks  
Total : 50Marks

Duration of Exam. : 3 Hrs.

**LIST OF EXPERIMENTS:**

1. To study Steady-state characteristics of SCR by plotting graph between voltage and current of Thyristers.
2. To Study R and RC Triggering Circuit for SCR.
3. To study UJT as Relaxation Oscillator.
4. To study SCR Half Wave and Full Wave Bridge Controlled Rectifier-Output characteristics.
5. To study 1-Phase Full Wave Bridge Controlled Rectifier using SCR and UJT with R and R-L Load and observe its input/output characteristics with and without free wheeling (commutating ) diode.
- 6 To study three Phase Full-Wave Uncontrolled Rectifier Operation with R and R-L Load and Observe its input/output Characteristics.
7. To study single Phase Cycloconvener output characteristics.
8. To study Series operation of SCR's.
9. To study Parallel operation of SCR's.
10. To study Speed Control of DC motor using SCR's.
11. To study Lamp-Dimmer Using Diac & Triac With Lamp Load.

**Note:-**

- 1 Total ten experiments are to be performed in the semester

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- 2 At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.

**ECE230B**

**COMMUNICATION SYSTEMS LAB**  
B. Tech. Semester –IV (ECE, 6<sup>th</sup> Sem. AEI)

L	T	P	Credits	Class Work	:	20Marks
-	-	2	1	Practical	:	30Marks
Duration of Exam.				Total	:	50Marks

**LIST OF EXPERIMENTS:**

1. To study and waveform analysis of amplitude modulation and determine the modulation index of amplitude modulation.
2. To study and waveform analysis of amplitude demodulation by any method.
3. To study and waveform analysis of frequency modulation and determine the modulation index of frequency modulation.
4. To study and waveform analysis of frequency demodulation by any method.
5. To study Amplitude Shift Keying (ASK) modulation.
6. To study Frequency Shift Keying (FSK) modulation.
7. To study Phase Shift Keying (PSK) modulation.
8. To study and waveform analysis of phase modulation.
9. To study Phase demodulation.
10. To study Pulse code modulation.
11. To study Pulse amplitude modulation and demodulation.
12. To study Pulse width modulation.
13. To study Pulse position modulation.
14. To study delta modulation.
15. To deliver a seminar by each student on ADVANCE COMMUNICATION SYSTEM.

**Note:-**

- 1 Total ten experiments are to be performed in the semester

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- 2 At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.

**GES203B**

**ENVIRONMENTAL STUDIES FIELD WORK**  
B. Tech. Semester –III/IV (Common for all Branches)

L	T	P	Credits
-	-	-	-

Class Work	:	-
Practical	:	25 Marks
Total	:	25 Marks

**FIELD WORK:**

- Visit to a local area to document environmental assets – river/ forest/ grassland/ hill/ mountain.
- Visit to a local polluted site-Urban/ Rural/ Industrial/ Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems – pond, river, hill slopes, etc. (Field work equal to 5 lectures hours).

**Note:**

The awards of this paper shall not be counted in the award of the Degree/DMC.

**GPEC202B****GENERAL PROFICIENCY & ETHICS**

B. Tech. Semester – IV (Common for all Branches)

L	T	P	Credits	Examination	:	-
1	-	-	2	Practical	:	75 Marks
				Total	:	75 Marks

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him /her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

**A. The student will present a written report before the committee with following in view:**

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

I.	Academic Performance	-----
II.	Extra Curricular Activities / Community Service, Hostel Activities	<b>(8 Marks)</b>
III	Technical Activities / Industrial, Educational tour	<b>(8 Marks)</b>
IV	Sports/games	<b>(14 Marks)</b>
V	Moral values & Ethics	<b>(15 Marks)</b>

**NOTE:** Report submitted by the students should be typed on both sides of the paper.

**B..** A student will support his/her achievement and verbal & communicative skill through presentation before the committee. **(30 Marks)**

**C. Moral values & Ethics**

Syllabus - Process for Value Education, self-evaluation concept and process.

A minor test will be conducted during the semester and It will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.

The evaluation of this course will be made by the following Committee.

**University Departments:**

1	Chairperson of the Department	Chairman
2	Senior Most Faculty Counselor	Member
3	Vice- Chancellor's Nominee	Member

**Affiliated Colleges:**

1	Director/Principal	Chairman
2	Head of the Department/Sr. Faculty	Member
3	External Examiner to be appointed by the University	Member

**Note:** Remuneration will be paid to the external examiner only (at par with the other practical examinations).

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