Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)

SCHEME OF STUDIES & EXAMINATIONS

	Choice based Credit System Scheme Of Studies & Examinations w.e.i. 2021-22											
SI.	Course	Course Title	T S	eachi chedu	ng ule	Marks of Class	Exan M	nination arks	Total	Credits	Duration of	
NO.	Code		L	Т	Ρ	work	Theory	Practical			Lxam	
1	EE401C	Electric Drives	3	0	0	25	75	0	100	3	3	
2	EE481C	Electric Drives Lab.	0	0	2	25	0	75	100	1	3	
3	PE6	Program Elective - 6	3	0	0	25	75	0	100	3	3	
4	PE7	Program Elective - 7	3	0	0	25	75	0	100	3	3	
5	OE1	Open Elective - 1	3	0	0	25	75	0	100	3	3	
6	OE2	Open Elective - 2	3	0	0	25	75	0	100	3	3	
7	EE483C	Project Stage-1	0	0	8	25	0	75	100	4	3	
8	EE451C	Professional Training (Level- 3)	0	0	2	100	0	0	100	1	3	
Total				00	12	275	375	150	800	21		

B.Tech. 4th YEAR ELECTRICAL ENGINEERING (SEMESTER – VII) Choice Based Credit System Scheme Of Studies & Examinations w.e.f. 2021-22

L= Lecture, T = Tutorial, P = Practical,& MC = Mandatory Course (Audit)

1. The students will be allowed to use non-programmable scientific calculator in the examination. However,

Sharing/exchange of calculator is prohibited in the examination.

2. Electronics gadgets including Cellular phones are not allowed in the examination.

PROGRAM ELECTIVE-6 (PE6) ELECTIVE-7 (PE7)

EE421C	Computational Electromagnetics
EE423C	Power Distribution System
EE425C	Image Processing (Prerequisite Subject: DSP)
EE427C	Wavelet Transforms

PROGRAM

EE431C	Power System Protection
EE433C	High Voltage Engineering
EE435C	Control System Design
EE437C	Robotics

UM350C	Communication Skills for Professionals (Except BME & BTE)
UM352C	Soft Skills And Interpersonal Communication
GT402C	Human Resource Management
GT404C	Human Values, Ethics And IPR
HUM354C	Introduction To French Language
HUM356C	Introduction To German Language

CSE431C	Cyber Security
CSE305C	Computer Network
CHE457C	Industrial Safety
CE406C	Disaster Management
ECE327C	Consumer Electronics

EE401C

ELECTRICAL DRIVES

B.TECH. (ELECTRICAL ENGINEERING, EEE)

SEMESTER-VII

L	Т	Ρ	Credits	Class-work Marks	: 25
3	0	0	3	Exam Marks	: 75
				Total Marks	:100
				Duration of Examination	:3 Hrs

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- 1. Understand concept, various parts, dynamics and closed loop schemes of electrical drives
- 2. Understand the characteristics of dc motors and induction motors.
- 3. Understand the principles of speed-control of dc motors and induction motors.
- 4. Understand the power electronic converters used for dc motor and induction motor

UNIT-I

Introduction (4 Hours): Electrical Drives: definition, components and classification, Advantages and limitations of semiconductor controlled Electrical drives. Choice/selection of electric drives motor.

Dynamics of Electrical Drives (4 Hours): Fundamental torque equation, speed torque conventions and multiqudrant operation, Equivalent values of drive parameters, components of load torque, steady state stability.

Control of Electrical Drives (2 Hours): Modes of operation, Requirement of closed loop control of drives and various closed loop control configurations.

UNIT-II

Selection of motor power rating (5 Hours): Heating and cooling, determination of motor rating, continuous, short time and intermittent duties, load equalization, determination of moment of inertia of the flywheel.

DC motor Drives (5 Hours): Review of emf and torque equations of DC machine, review of torque-speed characteristics of dc motor, change in torque-speed curve with armature voltage, load torque-speed characteristics, operating point, armature voltage control for varying motor speed, flux weakening for high speed operation.

UNIT III

DC motor Drives (6 Hours): Static control of dc motors. Converter fed dc drive & chopper fed dc drive. Four quadrant operation of dc machine; single-quadrant, two-quadrant and fourquadrant choppers; steady-state operation of multi-quadrant chopper fed dc drive, regenerative braking.

Induction motor Drives (4 Hours): Review of induction motor equivalent circuit and torquespeed characteristic, variation of torque-speed curve with (i) applied voltage, (ii) applied frequency and (iii) applied voltage and frequency, typical torque-speed curves of fan and pump loads, operating point, constant flux operation, flux weakening operation.

UNIT IV

Induction motor Drives (10 Hours): Review of three-phase voltage source inverter, generation of three-phase PWM signals, sinusoidal modulation, space vector theory, conventional space vector modulation; constant V/f control of induction motor.

Impact of rotor resistance of the induction motor torque-speed curve, operation of slip-ring induction motor with external rotor resistance, starting torque, power electronic based rotor side control of slip ring motor, slip power recovery.

Text / References:

- 1. Power Semiconductor Controlled Drives, G. K. Dubey, Prentice Hall, 1989.
- 2. Fundamentals of Electrical Drives, G. K. Dubey, CRC Press/ Narosa Publishing House, 2002.
- 3. Electric Drives: V.Subrahmaniyam TMH.
- 4. Electric Motor Drives: Modeling, Analysis and Control, R. Krishnan Prentice Hall, 2001.
- 5. Control of Electric Drives, W. Leonhard, Springer Science & Business Media, 2001.
- 6. Power Electronics and variable frequency drives- Technology and applications: Bimal K. Bose, Wiley India.
- 7. Modern Power Electronics and AC drives: Bimal K. Bose, Pearson.

NOTE:

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- 3. For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students:

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EE481C

POWER ELECTRONICS LABORATORY

B.TECH. (ELECTRICAL ENGINEERING, EEE)

SEMESTER- VII

L	Т	Ρ	Credits	Class-work Marks	: 25
0	0	2	1	Exam Marks	: 75
				Total Marks	:100
				Duration of Examination	:3 Hrs

LIST OF EXPERIMENTS:

- 1. Speed control of dc motor using dc chopper.
- 2. Speed control of dc motor using single-phase converter.
- 3. Speed control of dc motor using 3-phase converter.
- 4. Speed control of dc motor using single- phase dual converter.
- 5. Inverter fed single-phase induction motor drive.
- 6. CSI fed induction motor drive.
- 7. Speed control of single- phase induction motor using ac regulator.
- 8. Regenerative braking of dc motor using single- phase converter.
- 9. Speed control of single-phase induction motor using cycloconverter.
- 10. Static rotor resistance control method.

Note:-

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

2 At least eight 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.

COMPUTATIONAL ELECTROMAGNETICS

B.TECH. (ELECTRICAL ENGINEERING, EEE)

SEMESTER- VII

L	Т	Ρ	Credits	Class-work Marks	: 25
3	0	0	3	Exam Marks	: 75
				Total Marks	:100
				Duration of Examination	3 Hrs

COURSE OUTCOMES:

At the end of this course, the students will be able to:

1Understand the basic concepts of electromagnetics.

2Understand computational techniques for computing fields.

3 Apply the techniques to simple real-life problems.

UNIT- I

INTRODUCTION (10 hours): Conventional design methodology, Computer aided design aspects – Advantages. Review of basic fundamentals of Electrostatics and Electromagnetics. Development of Helmhotz equation, energy transformer vectors- Poynting and Slepian, magnetic Diffusion-transients and time-harmonic.

UNIT- II

ANALYTICAL METHODS & FINITE DIFFERENCE METHOD (FDM) (10 hours): Analytical methods of solving field equations, method of separation of variables, Roth'smethod, integral methods- Green's function, method of images.

Finite Difference schemes, treatment of irregular boundaries, accuracy and stability of FDsolutions, Finite-Difference Time-Domain (FDTD) method, Uniqueness and convergence.

UNIT- III

FINITE ELEMENT METHOD (FEM) (10 hours): Overview of FEM, Variational and Galerkin Methods, shape functions, lower and higher order elements, vector elements, 2D and 3D finite elements, efficient finite element computations.

UNIT- IV

SPECIAL TOPICS & APPLICATIONS (12 hours): Background of experimental methodselectrolytic tank, R-C network solution, Field plotting(graphical method), hybrid methods, coupled circuit - field computations, electromagnetic-thermal and electromagnetic - structural coupled computations, solution of equations, method of moments, Poisson's fields low frequency electrical devices, static/time-harmonic/transient problems in transformers, rotating machines, actuators, CAD packages.

Text/Reference Books.

1. P. P. Silvester and R. L. Ferrari "Finite Element for Electrical Engineers", Cambridge University press, 1996.

2. M. N. O. Sadiku, "Numerical Techniques in Electromagnetics", CRC press, 2001

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EE 423C

POWER DISTRIBUTION SYSTEM

B.TECH. (ELECTRICAL ENGINEERING, EEE)

SEMESTER- VIII

L	Т	Р	Credits	Class-work Marks	: 25
3	0	0	3	Exam Marks	: 75
	•			Total Marks	:100
				Duration of Examination	:3 Hrs

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- 1. Understand Power Distribution System, an important aspect of overall Electricity Supply System.
- 2. Understand the various components of power distribution systems.
- 3. Analyze the T&D losses in the power distribution system..
- 4. Understand the issues in the existing power distribution system.

UNIT-I

Introduction (10 Hours)

Introduction to sub-transmission and distribution system; classification of loads – residential, commercial, agricultural, industrial and their characteristics; distribution system planning – short-term, mid-term, long-term, Load scheduling & dispatch, Load balancing, load modeling and characteristics; definition of demand factor, utilization factor, load factor, plant factor, diversity factor, loss factor; computer applications to distribution system automation; tariff **UNIT-II**

Electrical System Components (10 Hours)

Basic Distribution System, Components of the distribution system, Distribution feeders, transformers and sub-stations; primary feeders – voltage level, radial and loop types, Operation & Maintenance (O&M) objectives, Activities involved in O&M, Distribution transformers - Reasons for DT failures, design considerations for secondary system – voltage level, location of substation, rating, service area with primary feeders, existing system improvement.

UNIT-III

Power Distribution System Analysis (10 Hours)

System analysis – voltage drop and power loss calculation; methods of solution for radial networks, three-phase balanced primary lines, loss reduction, voltage regulation, voltage control and improvement, issues in quality of service – voltage sag, swell and flicker, power factor correction, economic justification for capacitor with cost-benefit analysis aiming at most economic power factor, optimum location of capacitor, Distribution sub-station bus schemes.

UNIT-IV

T&D losses in Power Distribution system (12 Hours) Energy Accounting in power distribution system: Need, objectives & functions, Energy flow diagram in power distribution system, Concepts of T&D, AT&C losses in distribution system, factors contributing to high technical & commercial losses. Measures for Technical and

commercial loss reduction, long term plans for technical loss reduction, case studies.

- 1. Turan Gonen, "Electric Power Distribution System Engineering", McGraw Hill Dale
- 2. R. Patrick," Electrical Distribution System", 2nd Edition, CRC Press.
- 3. James A. Momoh, "Electric Power Distribution Automation, Protection and Control", CRC Press.
- 4. A. S. Pabla, "Electric Power Distribution", Tata McGraw Hill

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EE425C

IMAGE PROCESSING

B.TECH. (ELECTRICAL ENGINEERING, EEE)

SEMESTER- VII

L	Т	Р	Credits	Class-Work Marks	: 25
3	0	0	3	Exam Marks	: 75
				Total Marks	: 100
				Duration of Examination	3 Hrs.

COURSE OUTCOMES:

Students will be able to:

- 1. Apply suitable transform on the image for its analysis.
- 2. Enhance and restore the images using different types of filters and techniques as per the image.
- 3. Segment the image as per requirement and representing images in different color models.
- 4. Compress the image for different application.

UNIT - I

FUNDAMENTALS (12 hours): Basic introduction to digital image processing, Applications of DIP, Fundamental steps in DIP, Components of an image processing system, Elements of visual perception, Image sensing and acquisition, Basic concepts in sampling and quantization, Representing digital images, Spatial and intensity resolution, Image interpolation, Some basic relationships between pixels, Introduction to mathematical tools used in DIP.

UNIT – II

TWO DIMENSIONAL TRANSFORMS (12 hours): Basic geometric transformations, introduction to 2-dimensional systems and properties, Separable Image Transforms, 2D Fourier Transform, Discrete Cosine Transform, Wavelet Transform.

IMAGE ENHNACEMENT: Spatial Domain methods: Basic gray level transformation, Histogramequalization, Image subtraction, Image averaging, Spatial filtering: Smoothing, sharpening filters, Laplacianfilters, Frequency domain filters: Smoothing, Sharpening filters, Homomorphic filtering

UNIT – III

IMAGE RESTORATION (12 hours): Model of image degradation/restoration process, Noise models, Inverse filtering, Wiener filter, least mean square filtering, blind image restoration, Pseudo inverse, Singular value decomposition.

IMAGE SEGMENTATION (12 hours): Fundamentals of segmentation, Basics of point, line & edge detection, Thresholding: Basics of intensity thresholding, Role of noise, illumination and reflectance in image thresholding, Global thresholding.

UNIT – IV

IMAGE CODING AND COMPRESSION (12 hours): Lossless compression, Variable length coding, LZW coding, bit plane coding, predictive coding, DPCM, Lossy Compression: Transform coding, Wavelet coding, basics of Image compressionstandards: JPEG, MPEG, Basics of Vector quantization.

COLOUR IMAGE PROCESSING: Colour fundamentals, Colour models: The RGB Colour Model, The CMY and CMYK Colour models, The HSI Colour model; Conversion of colour

models, Pseudo colour image processing: Intensity Slicing, Intensity to colour Transformations, Basics of Full Colour image processing

TEXT BOOKS:

1. Rafeal C.Gonzalez, Richard E.Woods, Digital Image Processing, Fourth Edition, Pearson Education/PHI, 2018.

REFERENCE BOOKS:

- 1. Anil K Jain, Fundamentals of digital image processing, PHI, 2005.
- 2. William K Pratt, Digital Image Processing, John Wiley, 2014.
- 3. Milan Soanka, Vaclav Hlavac and Roger Boyle, Digital Image Processing and Computer Vision, Cengage Learning, 2014.
- 4. Rafael C.Gonzalez, Richard E.Woods, Steven L. Eddins, Digital Image Processing using MATLAB, Pearson Education, 2004.

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EE427C

WAVELET TRANSFORMS

B.TECH. (ELECTRICAL ENGINEERING, EEE)

SEMESTER- VII

L T P	Credits	Class-Work Marks	: 25

3	0	0	3	Exam Marks	: 75
				Total Marks	: 100
				Duration of Examination	3 Hrs.

COURSE OUTCOMES:

Students will be able to:

- 1. Analyze the need for time frequency analysis.
- 2. Understand fundamentals of continuous and discrete wavelet transform.
- 3. Interpret multiresolution analysis.
- 4. Familiarize with different wavelet families.
- 5. Apply wavelet transform for various signal processing applications.

UNIT - I

Review of mathematical preliminaries (10 hours): Vector space, Functions and function spaces, Basis function, Review of Fourier theory and properties of Fourier transform, Short time Fourier transform, Heisenberg's uncertainty principle and time-frequency tiling, Introduction to wavelet transform, Continuous wavelet transform and its properties, Continuous versus discrete wavelet transform.

UNIT – II

Discrete Wavelet Transform (12 hours):Haar scaling functions and Function spaces, Translation and scaling of scaling function $\phi(t)$, Orthogonality of translates of $\phi(t)$, Function space V_0 , Finer Haar Scaling Functions, Nested spaces, Haar wavelet function, Orthogonality of scaling and wavelet function, Normalization of haar bases at different scales, Refinement relation for orthogonal wavelet systems, Restrictions on filter coefficients, Designing orthogonal wavelet systems: Daubechies, Coiflet, Symlet wavelet system coefficients.

UNIT – III

Discrete Wavelet Transform and Relation to Filter Banks (12 hours): Signal decomposition using DWT, Relation with filter banks, Frequency response, Signal reconstruction: Synthesis from coarse scale to fine scale using DWT, Upsampling and filtering, Multiresolution Formulation of Wavelet Systems: Signal spaces, Scaling function, Multiresolution analysis, Wavelet function.

Introduction to Biorthogonal Wavelets: Biorthogonal wavelet systems, Signal representation using biorthogonalwavelet system, Biorthogonal analysis,Biorthogonal synthesis

UNIT – IV

Applications of Wavelet Transforms (12 hours): Wavelet Denoising, Speckle Removal, Edge detection and object isolation, Imagefusion, Object detection by wavelet transforms of projections, Communication applications: Scalingfunctions as signalling pulses, Discrete

wavelet multi-tone modulation, Solving integral and differential equations, Solving partial differential equations.

TEXT BOOKS:

1. K. P. Soman, K. I. Ramachandran, "Insight into Wavelets: From Theory to Practice", Third Edition, PHI, 2004.

- 2. R. M. Rao and Ajit S. Bopardikar, "Wavelet Transform, Introduction to theory and Applications", Addison-Wesley, 1998.
- 3. C. Sidney Burrus, Ramesh A. Gopinath and HaitaoGuo, "Introduction to Wavelets and Wavelet Transforms: A primer", Prentice Hall, 1997.
- 4. S. S. Ray and A. K. Gupta, "Wavelet Methods for Solving Partial Differential Equations and Fractional Differential Equations," CRC Press, 2018.

REFERENCE BOOKS:

1. Gilbert Strang and Truong Nguyen, "Wavelets and Filter banks", Wellesley Cambridge Press, 1996.

- 2. I. Daubechies, "Ten lectures on wavelets", CBMS-NSF, SIAM, 1982.
- 3. P. P. Vaidyanathan, "Multirate Systems and Filter Banks", Pearson Education, 1993.

4. RobiPolikar, The Wavelet Tutorial: The Fundamental Concept and an Overview of the Wavelet Theory.

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EE431C

POWER SYSTEM PROTECTION

B.TECH. (ELECTRICAL ENGINEERING, EEE)

SEMESTER-VII

L	Т	Ρ	Credits	Class-work Marks	: 25
3	0	0	3	Exam Marks	: 75
				Total Marks	:100
				Duration of Examination	3 Hrs

COURSE OUTCOMES:

At the end of this course, the students will be able to:

- 1. Understand the different components of a protection system.
- 2. Evaluate fault current due to different types of fault in a network.
- 3. Understand the protection schemes for different power system components.
- 4. Understand the basic principles of digital protection.
- 5. Understand system protection schemes, and the use of wide-area measurements.

UNIT- I

INTRODUCTION AND COMPONENTS OF A PROTECTION SYSTEM: (10 hours)

Fundamentals of Power system protection, philosophy of protective relays, Principles of Power System Protection, Instrument transformers, Circuit Breakers, Isolator etc,

Faults and Over-Current Protection: Review of Fault Analysis, Sequence Networks. Introduction to Overcurrent Protection and overcurrent relay co-ordination. Principle, operation and setting of over current relays.

UNIT- II

EQUIPMENT PROTECTION SCHEMES: (10 HOURS)

Directional, Distance, Differential protection, Transformer and Generator protection, Bus bar Protection, Bus Bar arrangement schemes.

Protection of transmission lines and busbars using differential, directional-overcurrent and distance relays, back-up protection, carrier relaying

UNIT- III

MODELING AND SIMULATION OF PROTECTION SCHEMES: (12 HOURS)

CT/PT modeling and standards, Simulation of transients using Electro-Magnetic Transients (EMT) programs. Relay Testing. **Digital Protection**: Computer-aided protection, Fourier analysis and estimation of Phasors from DFT. Sampling, aliasing issues.

UNIT-IV

SYSTEM PROTECTION (12 HOURS) :

Effect of Power Swings on Distance Relaying. System Protection Schemes. Under-frequency, under-voltage and df/dt relays, Out-of-step protection, Synchro-phasors,

Introduction to PMU and its use, Fault location: Phasor Measurement Units and Wide-Area Measurement Systems (WAMS). Application of WAMS for improving protection systems.

TEXT BOOK:

1. J. L. Blackburn, "Protective Relaying: Principles and Applications", Marcel Dekker, New York, 1987.

2. Y. G.Paithankar and S. R. Bhide, "Fundamentals of power system protection", Prentice Hall, India, 2010.

REFERENCE BOOKS:

1. A. G. Phadke and J. S. Thorp, "Computer Relaying for Power Systems", John Wiley & Sons, 1988.

2. A. G. Phadke and J. S. Thorp, "Synchronized Phasor Measurements and their Applications", Springer, 2008.

3. D. Reimert, "Protective Relaying for Power Generation Systems", Taylor and Francis, 2006.

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HIGH VOLTAGE ENGINEERING

B.TECH. (ELECTRICAL ENGINEERING, EEE)

SEMESTER- VII

L	Т	Ρ	Credits	Class-work Marks	: 25
3	0	0	3	Exam Marks	: 75
				Total Marks	:100
				Duration of Examination	3 Hrs

COURSE OUTCOMES:

At the end of this course, the students will be able to:

1 Understand the basic physics related to various breakdown processes in solid, liquid and gaseous insulating materials.

2 Knowledge of generation and measurement of D. C., A.C., & Impulse voltages.

3 Knowledge of tests on H. V. equipment and on insulating materials, as per the standards.

4 Knowledge of how over-voltages arise in a power system, and protection against these over-voltages.

UNIT- I

BREAKDOWN IN GASES, LIQUID AND SOLID INSULATING MATERIALS (10 hours): Ionization processes and de-ionization processes, Types of Discharge, Gases as insulating materials, Breakdown in Uniform gap, non-uniform gaps, Townsend's theory, Streamer mechanism, Corona discharge. Breakdown in pure and commercial liquids, Solid dielectrics and composite dielectrics, intrinsic breakdown, electromechanical breakdown and thermal breakdown, Partial discharge, applications of insulating materials.

UNIT- II

GENERATION & MEASUREMENTS OF HIGH VOLTAGES AND CURRENTS (10 hours): Generation of high voltages, generation of high D. C. and A.C. voltages, generation of

impulse voltages, generation of impulse currents, tripping and control of impulse generators. **Measurements:** Peak voltage, impulse voltage and high direct current measurement method, cathode ray oscillographs for impulse voltage and current measurement, measurement of dielectric constant and loss factor, partial discharge measurements.

UNIT- III

LIGHTNING AND SWITCHING OVER-VOLTAGES (10 hours): Lightening phenomenon, theories for lightening, lightening stroke mechanism, Stepped leader, Dart leader, tower foot resistance, Lightning Surges. Switching over-voltages, Protection against over-voltages, Surge diverters, Surge modifiers.

UNIT- IV

HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS AND HIGH VOLTAGE LABORATORIES (10 hours): Various standards for HV Testing of electrical apparatus, IS, IEC standards, testing of insulators and bushings, testing of isolators and circuit breakers, testing of cables, power transformers and some high voltage equipment, High voltage laboratory layout, indoor and outdoor laboratories, testing facility requirements, safety precautions in H. V. Labs.

TEXT BOOK:

1. M. S. Naidu and V. Kamaraju, "High Voltage Engineering", McGraw Hill Education, 2013.

2. C. L. Wadhwa, "High Voltage Engineering", New Age International Publishers, 2007. **REFERENCE BOOKS:**

1. D. V. Razevig (Translated by Dr. M. P. Chourasia), "High Voltage Engineering Fundamentals", Khanna Publishers, 1993.

2. E. Kuffel, W. S. Zaengl and J. Kuffel, "High Voltage Engineering Fundamentals", Newnes Publication, 2000.

3. R. Arora and W. Mosch "High Voltage and Electrical Insulation Engineering", John Wiley & Sons, 2011.

4. Various IS standards for HV Laboratory Techniques and Testing.

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EE435C

CONTROL SYSTEMS DESIGN

B.TECH. (ELECTRICAL ENGINEERING, EEE)

SEMESTER- VII

L	Т	Ρ	Credits	Class-work Marks	: 25
3	0	0	3	Exam Marks	: 75
				Total Marks	:100
				Duration of Examination	3 Hrs

COURSE OUTCOMES:

At the end of this course students will demonstrate the ability to

- 1. understand various design specifications.
- 2. design controllers to satisfy the desired design specifications using simple controller structures (P, PI, PID, compensators).
- 3. design controllers using the state-space approach

UNIT- I

INTRODUCTORY CONCEPTS (10 hours):

A) DESIGN SPECIFICATIONS

Introduction to design problem and philosophy. Time domain and frequency domain design specification and its physical relevance. Effect of gain on transient and steady state response. Effect of addition of pole on system performance. Effect of addition of zero on system response.

B) DESIGN OF CLASSICAL CONTROL SYSTEM IN THE TIME DOMAIN

Need for compensation. Design of Lag, lead lag-lead compensator in time domain. Feedback and Feed forward compensator design. Feedback compensation. Realization of compensators.

UNIT- II

DESIGN OF CLASSICAL CONTROL SYSTEM IN FREQUENCY DOMAIN (10 hours):

Compensator design in frequency domain to improve steady state and transient response. Feedback and Feed forward compensator design using bode diagram.

UNIT- III

DESIGN OF PID CONTROLLERS (10 hours): Design of P, PI, PD and PID controllers in time domain and frequency domain for first, second and third order systems. Control loop with auxiliary feedback – Feed forward control.

UNIT- IV

CONTROL SYSTEM DESIGN IN STATE SPACE (12 hours): Review of state space representation. Concept of controllability & observability, effect of pole zero cancellation on the controllability & observability of the system, pole placement design through state feedback. Ackerman's Formula for feedback gain design. Design of Observer. Reduced order observer. Separation Principle.

TEXT BOOKS:

- 1. N. Nise, "Control system Engineering", John Wiley, 2000.
- 2. I. J. Nagrath and M. Gopal, "Control system engineering", Wiley, 2000.

REFERENCE BOOKS:

- 1. 3. M. Gopal, "Digital Control Engineering", Wiley Eastern, 1988.
- 2. K. Ogata, "Modern Control Engineering", Prentice Hall, 2010.

- 3. B. C. Kuo, "Automatic Control system", Prentice Hall, 1995.
- 4. J. J. D'Azzo and C. H. Houpis, "Linear control system analysis and design (conventional and modern)", McGraw Hill, 1995.
- 5. R. T. Stefani and G. H. Hostetter, "Design of feedback Control Systems", Saunders College Pub, 1994.

NOTE:

- 1. In Semester Examinations, the paper setter will set two questions from each unit (total 8 questions in all), covering the entire syllabus. Students will be required to attempt only five questions, selecting atleast one question from each unit.
- 2. The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.
- 3. For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students:

Examinations and evaluations of students shall be conducted, covering the entire syllabus, as per guidelines "AICTE Examination Reforms". Students shall be informed about these reforms.

EE437C

ROBOTICS

B.TECH. (ELECTRICAL ENGINEERING, EEE)

SEMESTER- VII

L	Т	Ρ	Credits	Class-work Marks	: 25
3	0	0	3	Exam Marks	: 75
				Total Marks	:100
				Duration of Examination	3 Hrs

Course objectives

- 1. To introduce robotics, actuators and drive systems.
- 2. Analysis of robot mechanism and planner kinematics.
- 3. Numerical analysis of Mathematics of Differential Motion and Statice.
- 4. Analysis and application of Force and Compliance Controls.

UNIT I

Introduction to Robotics (04 hours): Era of Industrial Robots, Creation of Robotics, Manipulation and Dexterity, Locomotion and Navigation.

Actuators and Drive Systems (06 hours): DC Motors, Dynamics of Single-Axis Drive Systems, Pulse width modulation (PWM), WM switching characteristics, Optical Shaft Encoders, Position measurement, Velocity estimate, Brushless DC Motors.

UNIT II

Robot Mechanisms (04 hours): Joint Primitives and Serial Linkages, Parallel Linkages.

Planar Kinematics (05 hours): Planar Kinematics of Serial Link Mechanisms, Inverse Kinematics of Planar Mechanisms, Kinematics of Parallel Link Mechanisms, Redundant mechanisms.

UNIT III

Differential Motion (05 hours): Differential Relationship, Properties of the Jacobian, Inverse Kinematics of Differential Motion.

Statice (06 hours): Free Body Diagram, Energy Method and Equivalent Joint Torques, Closed-Loop Kinematic Chains, Over-Actuated Systems.

UNIT IV

Dynamics (07 hours): Newton-Euler Formulation of Equations of Motion, Basic Dynamic Equations, Closed-Form Dynamic Equations, Physical Interpretation of the Dynamic Equations, Lagrangian Formulation of Robot Dynamics, Lagrangian Dynamics, Planar Robot Dynamics, Inertia Matrix, Generalized Forces,

Force and Compliance Controls (05 hours): Hybrid Position/Force Control, Architecture of Hybrid Position/Force Control System, Compliance Control, Task strategy, Compliance control synthesis.

Text books:

1. Asada, H., and J. J. Slotine. Robot Analysis and Control. New York, NY: Wiley, 1986. ISBN: 9780471830290

References:

1. MITOPENCOURSEWARE https://ocw.mit.edu/courses/mechanical-engineering/2-12introduction-to-robotics-fall-2005/lecture-notes/

NOTE:

- 1. In Semester Examinations, the paper setter will set two questions from each unit (total 8 questions in all), covering the entire syllabus. Students will be required to attempt only five questions, selecting atleast one question from each unit.
- 2. The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.
- 3. For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students:

Examinations and evaluations of students shall be conducted, covering the entire syllabus, as per guidelines "AICTE Examination Reforms". Students shall be informed about these reforms.

EE 451C

PROFESSIONAL TRAINING (LEVEL-3)

B.TECH. (ELECTRICAL ENGINEERING)

SEMESTER- VII

L	Т	Ρ	Credits	Class Work	: 100
0	0	2	1	Total	: 100
				Duration of Exam	: 3 Hrs

At the end of 6th semester each student would undergo four weeks Professional Training in an Industry/ Institute/ Professional Organization/Research Laboratory 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.

The typed report should be in a prescribed format.

The report will be evaluated in the 7th Semester by a Committee consisting of three teachers from different specialization to be constituted by the Chairperson of the department. The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization.

The student will interact with the committee through presentation to demonstrate his/her learning.

Teachers associated with evaluation work will be assigned 2 periods per week load.

COURSE OUTCOMES:

- 1. After the course is completed the student will have additional knowledge about professional attributes.
- 2. The students will develop a more professional outlook.
- 3. The students will know how to deal with time bound tasks in a more effective way.
- 4. The students will have more efficient attribute of multi-tasking.

EE483C PROJECT STAGE-I

			B. Tech.	Semester – VII (Electrica	l Engg.)	
L	Т	Ρ	Credits	Class Work	:	25 Marks
-	-	8	4	Examination	:	75 Marks
				Total	:	100 Marks

Course Objectives:

- 1. To align student's skill and interests with a realistic problem or project
- 2. To understand the significance of problem and its scope.
- 3. Students will make decisions within a framework

Project involving design/ fabrication/ testing/ computer simulation/ case studies etc. will be evaluated through a panel of examiners consisting of the following:

Chairman of Department	Chairperson						
Project coordinator	Member Secretary						
Respective project supervisor	Member						
The student will be required t	to submit two copies of his						

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).

Project coordinator will be assigned the project load of maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.

The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

Course Outcomes:

After completing the course the students will be able to:

- 1. Develop the professional quality of employing technical knowledge obtained in the field of Engineering & Technology.
- 2. Design and make analysis augmented with creativity, innovation and ingenuity.
- 3. Develop an understanding on how to work in actual industry environment.
- 4. Utilise the technical resources and write the technical report.

Open Elective-I

(Common for All Branches except Bio Technology and Bio-Medical Engg for all Semesters)

HUM 350 CCommunication Skills for Professionals

			B. Tech. Semes	ter – VII (Electrical Engg., EEE)		
L	Т	Р	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

- 1. To hone verbal and written communication
- 2. To acquaint students with multiple forms and formats of various technical and business reports
- 3. To develop competence for report writing with a focus on its techniques
- 4. To develop English Language Proficiency

UNIT I (Contact hours 8)

Mechanics of Report Writing: Objectives of Report Writing; Types of Reports on the basis of forms and content. Introduction to Formats of Reports; Structure of Reports: Front Matter, Main Body, Back Matter

UNIT II (Contact hours 10)

Writing Business and Technical Report: Preliminary Strategies for Report Writing: Data Collection, Report Planning, Use of Illustrations, Point Formation, Preparing Notes/Drafts Using Appropriate Formats: Memo Format, Letter Format, Manuscript Format, Printed Forms

UNIT III(Contact hours 10)

Oral Communication and Soft Skills: Group Discussions; Interviews for jobs: preparation and facing them Professional Presentations: Power Point Presentation, Oral Presentation, Role of Kinesics (Body Language) in Communication, General Etiquettes in Office areas, corporate lunch and dinner Handling, Telephone calls

UNIT IV (Contact hours 8)

Resumes and Job application: Writing of Resume--Chronological Resume and Functional Resume, Request for Reference/Recommendation, Writing Application Letters for Job; Writing Covering letter

RECOMMENDED READING

1. Sharma, Sangeeta, and Binod Mishra. Communication Skills for Engineers and Scientists.

PHI,2009.

- 2. Tyagi, Kavita, and Padma Mishra. Advanced Technical Communication. PHI, 2011.
- 3. Rizvi, M. Ashraf. Effective Technical Communication. McGraw Hill Education, 2014.
- 4. Kumar, Sanjay, and PushpLata. Communication Skills. OUP, 2011.
- 5. Raman, Meenakshi and SangeetaSharma.Communication Skills. OUP,2011.
- 6. *Bhatnagar, Nitin, and MamtaBhatnagar. Communicative English for Engineers and Professionals. Pearson Education, 2013.

(The soft copy of the book is available in the university library)

- 7. Mitra, Barun K. Personality Development and Soft Skills. OUP, 2011.
- 8. Kaul, Asha. Business Communication. PHI, 2nd Edition.
- 9. Namee, Patrick Mc. Success in Interviews: How to Succeed in any Job Interview, Ist Edition.

10. Argenti, Paul. Corporate Communication.6th Edition. McGraw Hill Education, **2012**. Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Learning Outcomes:

At the end of the course, students will be able to:

- 1. Get acquainted with multiple forms and formats of various technical and business reports
- 2. Develop competence for report writing with a focus on its complex writing techniques and procedures.
- 3. Develop their speaking skills with professional proficiency.
- 4. Equip themselves for Letter Writing Skills.



Open Elective-I

(Common for All Branches)

HUM 352 CSoft Skills and Interpersonal Communication

		B. Tech. Semes	ter – VII (Electrical Engg., EEE)		
Т	Р	Credits	Class Work	:	25 Marks
0	0	3	Examination	:	75Marks
			Total	:	100 Marks
			Duration of Examination	:	3 Hours
	Т 0	T P 0 0	B. Tech. Semes T P Credits 0 0 3	B. Tech. Semester – VII (Electrical Engg., EEE) T P Credits Class Work 0 0 3 Examination Total Duration of Examination	B. Tech. Semester – VII (Electrical Engg., EEE) T P Credits Class Work : 0 0 3 Examination : Total : Duration of Examination :

Course Objective:

To train students to learn Soft Skills and engage in a successful and fruitful Interpersonal Communication UNIT I (Contact hrs 08)

Soft Skills: Introduction to Soft Skills & their classification, Importance of Soft Skills: Writing Resume/CV, Engaging in Group discussion, Appearing for Job interviews

UNIT II (Contact hrs 10)

Interpersonal Skills, Behaviour, Relationships and Communication: Development and Role of Effective Interpersonal Skills, Development of Effective Speaking and Listening Skills

UNIT III (Contact hrs 10)

Non-Verbal Elements in Interpersonal Communication: Role of Body Language, Paralinguistic Features, Proxemics/Space Distance and Haptics in Interpersonal Communication

UNIT IV (Contact hrs 08)

Personality Development for Personal and Professional Growth: Desirable Personality, Personality Types, Analysis of Personality Development (Freudian and Swami Vivekananda's Concept), Grooming Personality for Personal and Professional Life

RECOMMENDED READING:

- 1. Mitra, Barun K. Personality Development and Soft Skills. Delhi: OUP, 2nd Edition, 2016.
- 2. Butterfield, Jeff.Soft Skills for Everyone. Cengage Learning, 2017.
- 3. Raman, Meenakshi and Sangeeta Sharma. Communication Skills. OUP, 2011.
- 4. Ramesh, Gopalaswamy and Mahadevan Ramesh. The ACE of Soft Skills, Pearson India, 2010.



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5. Ribbons, Geoff and Richard Thompson.Body Language.Hodder& Stoughton, 2007.

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6. Sharma, Sangeeta and Binod Mishra.Communication Skills for Engineers and Scientists. PHI, 2017. Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

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For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Learning Outcomes:

At the end of the course, students will be able to:

- 1. Know now how soft skills complement hard skills for career growth
- 2. Enhance communicative competence for professional enhancement
- 3. Learn desirable body language and other non-verbal elements in interpersonal communication

C A M P U

4. Groom personality for handling effectively various situations of personal and professional life

Open Elective-I

(Common for All Branches for all Semesters)

HUM 354 CIntroduction to French Language



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	B. Tech. Semester – VII (Electrical Engg., EEE)								
L	Т	Р	Credits	Class Work	:	25 Marks			
3	0	0	3	Examination	:	75Marks			
				Total	:	100 Marks			
				Duration of Examination	:	3 Hours			

Course Objectives:

- 1. To enable students to understand the elementary communication structures of French language
- 2. To enable students to know and learn elementary vocabulary and grammar of French language
- 3. To enable students to engage in simple dialogues in French language

UNIT I (Contact hours 10)

VOCABULAIRE: Les Salutations, Les jours de la semaine, Les moins de l'année, Les couleurs, Les professions, Les nombrescardinaux, Les lieux de la ville, Les nationalites, Personnesetobjetscaractéristiques d'un pays, Civilisation: France, de la sociétéfrancaise, les monuments, les fêtes

UNIT II (Contact hours 10)

GRAMMAIRE: Conjugation des verbeetre, avoir, aller; Conjugation des verbe –er, -ir, -re Masculin/feminine,Singulier/ pluriel, Accord des nomset des adjectives, Articles indéfinisetdéfines, Négation simple, Interrogation, Futurproche, On= Nous, Articles partitifsetcontractes, La date etl'heure

UNIT III (Contact hours 8)

ECRITURE (comprehension des écrits, Production écrite), Presentez- vous, Mon meuillierami, Ma famille, Carteset messages d'invitation, d'acceptationou de refus, Ecrives des scenes

UNIT IV (Contact hours 8)

COMPREHENSION (écouter, production orale): Se presenter à ungroupe, Parlez/ écoutezdevotreville, Parlez/écoutezdesesactivités de loisirs, Parlez /écoutez de vosgoûts, Demander/ donnerun explication, Identifier unepersonneouun objet, Demander/dire cequ'ona fait

RECOMMENDED READING

- 1. Echo A1 Methode de Francais, CLE International (Distributed in India by W. R. Goyal Publishers & Distributors, Delhi)
- 2. Connexions, niveau 1, Yves Loiseau and R_gineM_rieux(Goyal Publishers)
- 3. Alter Ego-1, Hachette (Distributed in India by W. R. Goyal Publishers & Distributors, Delhi)
- 4. Forum- Methode de Francais 1, Hachette (Distributed in India by W. R. Goyal Publishers & Distributors, Delhi)
- 5. 450 Exercises de Grammaire, CLE International (Distributed in India by W. R. Goyal Publishers & Distributors, Delhi)
- 6. Audio- Video study material



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7. Supplementary handouts Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Learning Outcomes:

At the end of the course, students will be able to:

- 1. Familiarize with the basics of French language
- 2. Understand and express vocabulary and grammar through writing
- 3. Demonstrate understanding through simple dialogues in French



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Open Elective-I

(Common for All Branches for all Semesters)

HUM 356 CIntroduction to German Language

			B. Tech. Semes	ter – VII (Electrical Engg., EEE)		
L	Т	Р	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

- 1. To enable students to understand the elementary communication structures of German language
- 2. To enable students to know and learn elementary vocabulary and grammar
- 3. To enable students to engage in simple dialogues in German

UNIT I (Contact hours 10)

Introduction to German alphabets, Numbers 0- 100 (basic algebraic expressions), Vocabulary of days and months, Adverbs of time, Ordinal numbers in German, Phonetics and pronunciation

UNIT II (Contact hours 10)

Introduction to the simple possessive pronouns, Sentence: statement, question, (question for completion and decision) command, Coordination of clauses, Placing of the verb in the sentence: first, second and last place, Word order in main clause, Details of time, manner and place (casual)

UNIT III (Contact hours 8)

Verb: infinitive, imperative, indicative – Präsens, Perfekt, Präteritum of auxiliary and modal verbs, modal verbs (meaning, indicative Präsens&Präteritum, möchten), Verbs with prefixes – separable and inseparable, Nouns: Gender, plural, Nominative, Accusative, Dative Articles: Definite and Indefinite, Adjectives: predicative use

UNIT IV (Contact hours 8)

Day-to-day conversation in German: Introducing oneself and other, greeting and taking leave, Meeting people, Time and date, months and weekdays, Inquire and name the country of origin, languages, Introduce family members and friends

RECOMMENDED READING



- 1. Tangram AktuellNiveau A1, Max HeuberVertag, Ismaning, 2005 (Published and distributed in India by German Book Depot, Delhi)
- 2. Netzwerk A1, KlettVerlag, Muenchen, 2013 (Published and distributed in India by German Book Centre, Delhi, 2015).
- 3. Sprachkurs Deutsch I & 2. Diesterweg (Moritz) Verlag, Frankfurt am Main, 1989, (Published and distributed in India by Goyal Saab Publishers & Distributors, New Delhi)
- 4. Schuelerduden Grammatik, BibliographischesInstitutand F.ABrockhaus, 2000.
- 5. ThemenAktuell 1, Kursbuch, Max HeuberVerlag, Ismaning, Deutschland, 2003 (Published and distributed in India by German Book Centre, Delhi, 2010).
- 6. Audio-video Study Material
- 7. Supplementary Handouts

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

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For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines AICTE Examinations reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Learning Outcomes:

At the end of the course, students will be able to:

- 1. Familiarize with the basics of German language
- 2. Understand and express vocabulary and grammar through writing
- 3. Demonstrate understanding through simple dialogues in German



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Open Elective-I

MGT402CHUMAN VALUES, ETHICS AND IPR

			B. Tech. Semes	ter – VII (Electrical Engg., EEE)		
L	Т	Р	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

To help the students appreciate the essential complementarities between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

Unit-I

Human Values: Understanding the need, basic guidelines, Self Exploration - its content and process; 'Natural Acceptance' and Experiential Validation, Continuous Happiness and Prosperity- Human Aspirations, Right understanding, Relationship and Physical Facilities, Understanding Happiness and Prosperity correctly.

Unit-II

Different kinds of value: Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya.

Unit-III

Modern approach to the study of values: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship Understanding harmony in the Family, Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman).



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Unit-IV

Professional Ethics & IPR: Values in Work-life, Professional Ethics and Ethos, Code of conduct, Whistle Blowing, Corporate Social Responsibility.IPR: meaning, nature, scope and relevance of IPR. Kinds of IPR: Copyright, Patents, Trademark, Geographical Indication, Industrial design, Plant Variety. Benefits, Emerging dimensions and Rational for protection of IPR.

Suggested Readings:

- 1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics, Excel Books, New Delhi
- 2. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
- 3. E G Seebauer& Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
- 4. M Govindrajan, S Natrajan& V. S Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
- 5. S. B. Gogate, Human Values & Professional Ethics, Vikas Publishing House Pvt. Ltd., Noida.

Reference Books

- 1. A Nagraj, 1998 JeevanVidyaekParichay, Divya Path Sansthan, Amarkantak.
- 2. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
- 3. Prof. A.R.Aryasri, DharanikotaSuyodhana, Professional Ethics and Moral, Maruthi Publications.
- 4. A. Alavudeen, R.Kalil Rahman and M. Jayakumaran, Professional Ethics and Human Values, University Science Press.
- 5. Prof.D.R.Kiran, 2013, Professional Ethics and Human Values, Tata McGraw-Hill
- 6. Jayshree Suresh and B. S. Raghavan, Human Values And Professional Ethics, S.Chand Publications

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:



111

At the end of the course:

- 1. Students will be able to understand the significance of value inputs in a classroom and start applying them in their life and profession
- 2. Understand and can distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
- 3. Understand the role of a human being in ensuring harmony in society and nature.
- 4. Students will be aware of the significance of Intellectual Property as a very important driver of growth and development in today's world and to be able to statutorily acquire and use different types of intellectual property in their professional life.



<u>Campus</u> : Puran Murti Campus, Kami Road, Sonepat - 131001 (Delhi - NCR) - Haryana, India

Mob: +91-9812816666, +91-9812814444 Ph: +91-0130-2203500 Web: www.puranmurti.com E-mail: puranmurti@gmail.com



111

Open Elective-I

MGT404C HUMAN RESOURCE MANAGEMENT

			B. Tech. Semes	ter – VII (Electrical Engg., EEE)		
L	Т	Р	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

To help the students develop an understanding of the management of human resources and develop abilities and skills required to manage them.

Unit-I

Introduction – nature and scope of human resource management, HRM objectives and functions, HRM policies, HRM in globally competitive environment; strategic human resource management.

Unit-II

Acquiring human resources – Man power planning, Job evaluation, job analysis and job design. Recruitment: Sources, Methods, constraints & challenges, selection: objectives and process, placement and induction.

Unit-III

Developing human resources: Training: types, methods, training vs. development and evaluation of a training programme and training need assessment, career planning and development.

Unit-IV

Performance appraisal: methods, process and challenges of performance appraisal, performance appraisal vs. potential appraisal, Compensation: wages & salaries administration and factors influencing compensation levels.

Suggested Readings:

- 1. Jyothi, Human Resource Management, Oxford University Press
- 2. Bohlander George and Scott Snell, Management Human Resources, Cengage, Mumbai
- 3. Bhattacharyya, Dipak Kumar, Human Resource Management, Excel Books, NewDelhi
- 4. Cascio Wayne F., Managing Human Resources, TMH, New Delhi



- 5. DeCenzo, David A, and Stephan P. Robbins, Fundamentals of Human Resource Management, Wiley India, New Delhi
- 6. Denisi, Angelo S, and Ricky W Griffin, Human Resource Management, Biztantra, New Delhi

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms. **Course Outcomes:**

At the end of the course:

- 1. To have an understanding of the basic concepts, functions and processes of human resource management
- 2. To be aware of the role, functions and functioning of human resource department of the organizations.
- 3. To Design and formulate various HRM processes such as Recruitment, Selection, Training, Development, Performance appraisals and Reward Systems, Compensation Plans and Ethical Behavior.
- 4. Develop ways in which human resources management might diagnose a business strategy and then facilitate the internal change necessary to accomplish the strategy.



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Open Elective-II CSE431C CYBER SECURITY

			B. Tech. Se	mester – VII (Electrical Engg., EEE)		
L	Т	Р	Credits	Class Work	:	25 Marks
3	0		3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

- 1. To understand cyber crime and its laws.
- 2. To work with tools and methods used in cyber crime.
- 3. To understand the life cycle of digital forensics.
- 4. To learn and understand web threats, challenges and protection policies.

UNIT- I

Introduction To Cybercrime:- Cybercrime and Information Security, Classificationsof Cybercrimes, The need for Cyber laws, The Indian IT Act Challenges to Indian Law and Cybercrime Scenario in India, Weakness in Information Technology Act and it consequences, Digital Signatures and the Indian IT Act, Cybercrime and Punishment; Technology, Students and Cyber law; Survival tactics for the Netizens, Cyber-offenses: Cybers talking, Cyber cafe and Cyber crimes, Botnets, Attack Vector, Cloud Computing;

UNIT- II

Tools And Methods Used In Cybercrime:- Proxy Servers and Anonymizers, Phishingand identity theft, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Stenography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow; Cybercrime: Mobile and Wireless Devices: Trends in Mobility, Attacks on Wireless Networks, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges, Registry Settings for Mobile Devices, Authentication Service Security Attacks on Mobile/Cell Phones

UNIT- III

Understanding Computer Forensics:- The Need for Computer Forensics, Cyberforensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Computer Forensics and Stenography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics, Forensics Auditing, Anti forensics.

UNIT- IV



Cyber security Organizational Implications:- Cost of Cybercrimes and IPR Issues,Web Threats for Organizations, Security and Privacy Implications from Cloud Computing, Social Media Marketing, Social Computing and the Associated Challenges for Organizations, Protecting People's Privacy in the Organization, Organizational Guidelines for Internet Usage, Safe Computing Guidelines and Computer Usage Policy, Incident Handling, Forensics Best Practices, Media and Asset Protection, Importance of Endpoint Security in Organizations.

TEXT/ REFERENCE BOOKS:

1. "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Nina Godbole, Sunit Belapur, Wiley India Publications, April, 2011.

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines AICTE Examinations reforms covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

- 1. Able to demonstrate cyber crime its laws and related terms.
- 2. Work with SQL injection, DOS attacks etc.
- 3. Explain computer forensic, Network forensic cyber forensic.
- 4. Understand safe computing guidelines, usage policies and incident handling.



A Unit of Puran Murti Educational Society Approved by AICTE, Ministry of HRD Affiliated to Deenbandhu Chhotu Ram University of Science & Technology Affiliated to Haryana State Board of Technical Education, Panchkula Recognized Under Section 2 (f) by UGC

111

			CSE30 B. Tech. Sen	OPEN ELECTIVE-II 5C COMPUTER NETWORKS nester – VII (Electrical Engg. & EEE)		
L	Т	Р	Credits	Class Work	:	25 Marks
3	0		3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

- 1. To learn the concepts, vocabulary and techniques currently used in the area of computer networks.
- 2. To understand the concepts of the OSI model and the TCP/IP model.
- 3. To be familiar with wireless networking concepts
- 4. To be familiar with contemporary issues in networking technologies.

UNIT- I

OSI Reference Model and Network Architecture: Introduction to Computer Networks, Example Networks ARPANET, Internet, Private Networks, and Network Topologies: Bus, Star, Ring, Hybrid, Tree, Complete, Irregular –Topology; Types of Networks: Local Area Networks, Metropolitan Area Networks, Wide Area Networks; layering architecture of networks, OSI model, Functions of each layer, Services and Protocols of each layer.

UNIT-II

TCP/IP: Introduction, History of TCP/IP, Layers of TCP/IP, Protocols, Internet Protocol, TransmissionControl Protocol, User Datagram Protocol, IP Addressing, IP address classes, Subnet Addressing, Internet Control Protocols, ARP, RARP, ICMP, Application Layer, Domain Name System, Email – SMTP, POP,IMAP; FTP, NNTP, HTTP, Overview of IP version 6.

UNIT-III

Local Area Networks: Introduction to LANs, Features of LANs, Components of LANs, Usage of LANs,LAN Standards, IEEE 802 standards, Channel Access Methods, Aloha, CSMA, CSMA/CD, Token Passing, Ethernet, Layer 2 & 3 switching, Fast Ethernet and Gigabit Ethernet, Token Ring, LAN interconnecting devices: Hubs, Switches, Bridges, Routers, Gateways.

UNIT-IV

Wide Area Networks: Introduction of WANs, Routing, Congestion Control, WAN Technologies, Distributed Queue Dual Bus (DQDB), Synchronous Digital Hierarchy (SDH)/ Synchronous Optical Network (SONET), Asynchronous Transfer Mode (ATM), Frame Relay, Wireless Links



Introduction to Network Management: Management, Class of Service, Quality Firewalls, VLANs, Proxy Servers.

Remote Monitoring Techniques: Polling, Traps, Performance of Service, Security management, Digital signatures, SSL

Text Book/ Reference Books:

- 1. Computer Networks (3rd edition), Tanenbaum Andrew S., International edition, 1996.
- 2. Data Communications, Computer Networks and Open Systems (4th edition), Halsall Fred, 2000, Addison Wesley, Low Price Edition.
- 3. Business Data Communications, Fitzgerald Jerry, Computer Networks A System Approach, Larry L. Peterson & Bruce S. Davie, 2nd Edition.

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

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Course Outcomes:

After successful completion of the course, students will be able to:

- 1. Understand the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.
- 2. Apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission.
- 3. Design a network routing for IP networks.
- 4. Demonstrate proper placement of different layers of ISO model and illuminate its function and determine proper usage of the IP address, subnet mask and default gateway in a routed network.



111

Open Elective-II CHE457C : INDUSTRIAL SAFTEY

			B. Tech. Semes	ter – VII (Electrical Engg., EEE)		
L	Т	Р	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

The purpose of this course is

- 1. To teach the students the concept of industrial safety and provide useful practical knowledge for workplace safety.
- 2. To identify, evaluate control the hazards to prevent or mitigate harm or damage to people, property and the environment.
- 3. To understand about fire and explosion, preventive methods, relief and its sizing methods
- 4. To analyze industrial hazards and its risk assessment

UNIT-I

Introduction: Concept of loss prevention, origin of process hazards, types of process hazards, acceptable risks, accident and loss statics, nature of accident process, concepts of inherent safety in plants or Factories, dose Vs response curve, toxicants entry route, thresh limit values, safety regulations.

UNIT-II

Hazards: Fire, Chemical (industrial and laboratory scale), electrical, mechanical, biohazards (natural and anthropogenic), toxic materials, their types and preventive measures, Liquid and vapor phase hazardous methods, storage and handling, containment, precautions, Personal safety precautions.

UNIT-III

Risk management principles, risk analysis techniques, risk control, hazards operability studies, hazard analysis, Fault tree analysis, Consequences analysis, human error analysis, accidental error analysis, economics of risk management, check list, reliability theory, event tree, HAZOP, safety reviews, what if analysis.

UNIT-IV

Safety audit, procedure for safety auditing, audit report, safety report, safety training, emergency planning and disaster management, introduction to security risk factors tables.



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TEXT BOOKS:

- 1. Chemical Hazards and safety, 2nd Edition, DawandeDenet& Co., 2012
- 2. Loss preventions in process industries, Lees Butterworth-Heinemann, 1980.
- 3. Industrial safety Handbook, William and Handley, McGraw Hill.

REFERENCE BOOKS:

- 1. Safety and Hazard management in Chemical Industries, Vyas, Atlantic 2013.
- Industrial safety, health environment & Security, Basudev Panda, Laxmi publication ISBN- 97893-81159-43-9
- 3. Industrial Safety and Health Management, 4th Edition, C. Ray Asfahl, Prentice Hall International Series, 1984
- 4. Industrial Accident Prevention : A Safety Management Approach, Herbert William Heinrich

NOTES:

1. Part A: Till academic session 2020-2021: In Semester Examinations, the paper setter will set two questions from each unit (total 8 questions in all), covering the entire syllabus. Students will be required to attempt only five questions, selecting at least one question from each unit.

Part B: From Academic Session 2021-2022 onwards: For the semester examination, nine questions are to be set by the examiner. Question no. 1, containing 6-7 short answer type questions, will be compulsory & based on the entire syllabus. Rests of the eight questions are to be set by setting two questions from each of the four units of the syllabus. The candidates will be required to attempt five questions in all, selecting one from each unit. All questions will carry equal marks.

- 2. The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.
- For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students: Examinations and evaluations of students shall be conducted, covering the entire syllabus, as per guidelines "AICTE Examination Reforms". Students shall be informed about these reforms.

Course Outcomes:

Students will be able to:

- 1. Analyze the effect of release of toxic substances.
- 2. Understand the industrial laws, regulations and source models.
- 3. Understand the methods of hazard identification and preventive measures and develop safety programs to prevent the damage or loss.
- 4. Conduct safety audits and improve safety practices.



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Open Elective-II

CE406C : DISASTER MANAGEMENT

B. Tech. Semester – VII (Electrical Engg., EEE)

Т 0	Р 0	Credits 3	Class Work Examination	:	25 Marks 75Marks
			Total	:	100 Marks
			Duration of Examination	:	3 Hours
	Т 0	T P 0 0	T P Credits 0 0 3	T P Credits Class Work 0 0 3 Examination Total Duration of Examination	T P Credits Class Work : 0 0 3 Examination : Total : Duration of Examination

Unit-I

Introduction to Disaster Management: Disaster, Emergency, Hazard, Mitigation, Disaster Prevention, Preparedness and Rehabilitation, Risk and Vulnerability, Classification of Disaster, Natural and Man-made Disasters, International day and Decade of Disaster Reduction.

Risk and Vulnerability to disaster mitigation and management options: Warning and Forecasting.

Unit-II

Hydro-meteorological based disasters I: Disaster Management Act 2005, Role of NDMA, NDRF, NIDM, Tropical Cyclones, Floods, droughts, mechanism, causes, role of Indian Metrological Department, Central Water Commission, structure and their impacts, classifications, vulnerability, Early Warning System, Forecasting, Flood Warning System, Drought Indicators, recurrence and declaration, Structural and Non-structural Measures.

Hydro-meteorological based disasters II: Desertification Zones, causes and impacts of desertification, Characteristics, Vulnerability to India and Steps taken to combat desertification, Forest Fires; Causes of Forest Fires; Impact of Forest Fires, Prevention.

Unit-III

Geological based disasters: Earthquake, Reasons, Compression, Shear, Rayleigh and Love Waves; Magnitude and Intensity Scales, Direct and Indirect Impact of Earthquake; Seismic Zones in India, Factors, Indian Standards Guidelines for RCC and Masonry Structures, Prevention and Preparedness for Earthquake, Tsunamis, Landslides and avalanches: Definition, causes and structure; past lesson learnt and measures taken; their Characteristic features, Impact and prevention, Atlas (BMTRPC); structural and non-structural measures.



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Unit-IV

Manmade Disasters I: Chemical Industrial hazards; causes and factors, pre- and post-disaster measures; control; Indian Standard Guidelines and Compliance;

Traffic accidents; classification and impact, Fire hazards; Classification as per Indian Standards;

Fire risk assessment; Escape routes; fire-fighting equipment; classification of buildings, fire zones, occupancy loads; capacity and arrangements of exits,

Use of remote sensing and GIS in disaster mitigation and management.

Text Books:

- 1. Thomas D. Schneid., Disaster Management and Preparedness, CRC Publication, USA, 2001
- 2. Patrick Leon Abbott, Natural Disasters, Amazon Publications, 2002
- 3. Ben Wisner., At Risk: Natural Hazards, People vulnerability and Disaster, Amazon Publications, 2001
- 4. Oosterom, Petervan, Zlatanova, Siyka, Fendel, Elfriede M., "Geo-information for Disaster Management", Springer Publications, 2005
- 5. Savindra Singh and Jeetendra Singh, Disaster Management, Pravalika Publications, Allahabad
- 6. NidhiGaubaDhawan and AmbrinaSardar Khan, Disaster Management and Preparedness, CBS Publishers & Distribution

Reference Books:

1. Selected Resources Published by the National Disaster Management Institute of Home Affairs, Govt. of India, New Delhi.

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:



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Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

At the end of the course, the student will be able to:

- 1. Knowledge of the significance of disaster management,
- 2. Analyze the occurrences, reasons and mechanism of various types of disaster
- 3. Understand the preventive measures as Civil Engineer with latest codal provisions
- 4. Apply the latest technology in mitigation of disasters



Mob: +91-9812816666, +91-9812814444 Ph: +91-0130-2203500



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Open Elective-II

ECE327C Consumer Electronics

			B. Tech. Seme	ster – VII (Electrical Engg., EE	E)	
L	Т	Р	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75Marks
				Total	:	100 Marks

Duration of Examination : 3 Hours

Unit I (12 Lectures)

Monochrome TV (Introduction): Elements of a TV System, Picture transmission, Sound transmission, Picture reception, Sound reception, Synchronization, Receiver control, Image continuity, Scanning Process, Aspect Ratio, Flicker, Composite Video Signal, Picture Elements, Kell factor, Vertical Resolution, Horizontal Resolution, Video bandwidth, Interlacing, 625 Line System, Bandwidths for TV Transmission, Vertical and horizontal synch detail, Vestigial Side Band transmission(Advantages and Disadvantages)

Monochrome TV (Picture and Camera Tubes): Monochrome picture tube, beam reflection, Beam focusing, Screen Phosphor, Faceplate, Picture tube characteristics, picture tube circuit controls, Monochrome Camera Tubes: Basic principle, Image Orthicon, Vidicon, Plumbicon

Unit II (12 Lectures)

Colour TV Essentials: Compatibility, Colour perception, Three Colour theory, Luminance, Hue and Saturation, Dispersion and Recombination of light, Primary and secondary colours, luminance signal, Chrominance Signal, Colour picture tube, colour TV Camera, Colour TV display Tubes, colour Signal Transmission, Bandwidth for colour signal transmission, Colour TV controls. Cable TV, Block Diagram and principle of working of cable TV.

Plasma and LCD: Introduction, liquidcrystals, types of LCD's,TN, STN, TFT, Power requirements, LCD working, Principle of operation of TN display, Construction of TN display, Behaviour of TN liquid crystals, Viewing angle, colour balance, colour TN display, limitatons, advantages, disadvantages, applications.

Unit III (10 Lectures)

LED and DMD :Introduction to LED Television , comparison with LCD and Plasma TV's, schematic of DMD, introduction to Digital Micro Mirror device, Diagram of DMD, principle of working, emerging applications of DMD.

Microwave Ovens and Air Conditioners: Microwaves, Transit Time, Magnetron, Waveguides, Microwave Oven, Microwave Cooking. Air conditioning, Components of air conditioning systems, all water Air conditioning systems, all air conditioning Systems, Split air conditioner.



Unit IV (11 Lectures)

Microphones: Introduction, characteristics of microphones, types of microphone: carbon, movingcoil, wireless, crystal, introduction to tape recorder.

Loudspeaker: Introduction to ideal and basic loudspeaker, loudspeaker construction types of loudspeaker: Dynamic and permanent magnet, woofers, tweeters, brief introduction to baffles, equalisers.

Text Books :

1. Consumer Electronics by S. P. Bali, Pearson Education.

2. Complete Satellite and Cable T.V by R.R Gulati, New Age International Publishers Reference Books:

1. Monochrome and ColourTelevision by R. R. Gulati, New Age International Publishers **Note:**

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Course outcomes: At the end of the course, students will demonstrate the ability to:

- 1. Identify and explain basic working of electronics products like TV, Microphone, loudspeaker, AC, Microwave ovens.
- 2. Learn various components of composite video signal and differentiate between line, brightness, saturation and to design the lower power consumption device, the primary challenge is how to minimize overall cost.
- 3. Acquire ability to design different display screen so that effect of radiations on eyes will be reduced.
- 4. Understand the general importance of product safety to consumers & producers will reduce the various adverse impacts of these devices on common man.