GEETHANJALI INSTITUTE OF SCIENCE AND TECHNOLOGY
(AUTONOMOUS)
NELLORE–524137(A.P)

B.TECH Electrical and Electronics Engineering
Course Structure(RG22)

Semester-5 (Theory-5,Lab-2, SC -1, MC-1)							
Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	PCC	22A0222T	Power Electronics & Drives	3	0	0	3
2	PCC	22A0435T	Digital Signal Processing	3	0	0	3
3	PCC	22A0221T	Electrical Power Transmission System	3	0	0	3
4	PEC		**Professional Elective-I**:	3	0	0	3
5	OEC		**Open Elective-I** :	3	0	0	3
6	PCC (Lab)	22A0225P	Electrical Measurement & Instrumentation	0	0	3	1.5
7	PCC (Lab)	22A0442P	Digital Signal Processing Lab	0	0	3	1.5
8	SC	22A0226P	**Skill Advanced Course:** Mat lab applications in electrical engineering Lab	1	0	2	2
9	MC	22A0031M	**Mandatory Course:** Intellectual Property Rights & Patents	2	0	0	0
10	AC		**Audit Course NCC/NSS activities**	0	0	2	0
11	PC	22A0227P	**Community Service 2 Months (Mandatory) after second year (to be evaluated during V Semester)**	0	0	0	1.5
			Total credits				**21.5**

Professional Elective:

Sl. No.	Category	Course Code	Course Title
1	**Professional Elective-I:**	22A0220T 22A0223T 22A0224T	1. Electrical Measurement & Instrumentation 2. Renewable Energy Sources 3. Introduction of Programmable Logic Controller

Open Elective Course – I

S.No	Course Code	Course Name	Offered by the Dept.
1	22A0149T	Building Materials	CE
2	22A0430T	Principles Of Communication Systems	ECE
3	22A0512T	Database Management Systems	CSE
4	22A0321Ta	Automobile Engineering	ME
5	22A0334Tc	Fundamentals Of Drone Technology	

Category	Credits
Professional Core Courses(PCC)	12
Professional Elective Courses(PEC)	3
Open Elective Courses (OEC)	3
Skill Advanced Course (SC)	2
Summer Internship	1.5
Total	**21.5**

BOS Chairman **Dean of Academics** **Principal**

POWER ELECTRONICS AND DRIVES					
Course Code	**L:T:P**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0222T	**3:0:0**	**3**	**CIE:30 &SEE:70**	**3 Hours**	**PCC**

Course Objectives:

Student will be able to

- To understand the basic principles of all industrial drives.
- To understand the basic concepts of control of dc motors.
- To analyze Speed-torque characteristics.
- To understand the performance of induction motor.
- To understand the performance of synchronous motor.

Syllabus		**Total Hours:48**
Unit-I	**INTRODUCTION TO INDUSTRIAL DRIVES**	**10Hrs**

Electrical Drives, Advantages of Electrical drives, Parts of Electrical Drives, Choice of electrical Drives, Fundamental torque equation, multi-quadrant operation, Components of load torques, Nature and classification of load torques, Braking of DC motor-Dynamic braking, plugging and regenerative braking

Unit-II	**CONTROL OF DC MOTORS BY SINGLE PHASE CONVERTERS**	**10Hrs**

Controlled Converter Fed DC Motor Drives 1-phase half and fully controlled converter fed separately and self-excited DC motor drive – Output voltage and current waveforms – Speed-torque expressions – Speed-torque characteristics — Principle of operation of dual converters and dual converter fed DC motor drives -Numerical problems.

Unit -III	**CONTROL OF CHOPPER-FED DC MOTORS**	**8Hrs**

Single quadrant, Two quadrant and four quadrant chopper fed dc separately excited and series excited motors, Continuous current operation, Output voltage and current wave forms, Speed torque expressions, Speed-torque characteristics, Problems on Chopper fed D.C Motors, Closed loop operation.

Unit -IV	**CONTROL OF INDUCTION MOTOR**	**10Hrs**

Closed loop operation of induction motor drives ,Static rotor resistance control-rotor resistance variation in slip ring Induction motor using a chopper, Slip power recovery scheme, Static Kramer Drive - performance and speed torque characteristics, Advantages, Doubly fed Induction Generator-Principle of operation -Applications, Numerical problems

Unit -V	**CONTROL OF SYNCHRONOUS MOTORS**	**10Hrs**

Separate control & self-control of synchronous motors, Operation of self-controlled synchronous motors by VSI & CSI, Load commutated CSI fed Synchronous Motor, Operation, Waveforms, Speed-torque characteristics, Applications, Advantages and Numerical Problems, Closed-loop control operation of synchronous motor drives, Variable frequency control, Cyclo-converter, PWM.

Course Outcomes(CO):

On completion of this course, student will be able to

- Analyse DC motor drive fed from phase controlled converters
- Understand DC motor drive fed from Chopper.
- Apply AC voltage Controller fed to Induction motor.
- Analyse Induction motor fed from VSI and CSI.
- Analyse Synchronous motor drive fed from VSI, CSI & Cyclo converter.

Textbooks:

1. G K Dubey, “Fundamentals of Electrical Drives”, Narosa Publications, 2nd Edition, 2008.
2. B K Bose, “Modern Power Electronics & AC Drives”, PHI learning, 1st Edition, 2010.

Reference Books:

1. Vedam Subramanyam, “Electric Drives— Concepts and Applications”, Tata Mc Graw Hill Publications, 4th Edition, 2011.
2. N.K De and P.K. Sen, “Electric Drives”, Prentice Hall of India Publications, 9th Edition, 2006.
3. MD Singh and KB Khanchandani, “Power Electronics”, Tata – McGraw-Hill Publishing company, 3rd Edition, 2008.

DIGITAL SIGNAL PROCESSING
(Common to ECE and EEE)

Course Code	L:T:P	Credits	Exam marks	Exam Duration	Course Type
22A0435T	3:0:0	3	CIE:30& SEE:70	3 Hours	PCC

Course Objectives:

The objectives of the course are to make the students learn about:

- To describe discrete time signals and systems.
- To teach importance of FFT algorithm for computation of Discrete Fourier Transform.
- To expose various implementations of digital filter structures.
- To present FIR and IIR Filter design procedures.
- To outline need of Multi-rate Processing

Syllabus		Total Hours: 48Hrs
Unit-I	**INTRODUCTION TO DISCRETE TIME SIGNALS AND SYSTEMS**	**10Hrs**

Introduction to digital signal processing, review of discrete-time signals and systems, analysis of discrete-time linear time invariant systems, frequency domain representation of discrete time signals and systems, analysis of linear time-invariant systems in the z-domain, pole-zero stability.

Unit-II	**DISCRETE FOURIER TRANSFORM & FAST FOURIER TRANSFORM ING**	**9Hrs**

Discrete Fourier Transform - Introduction, Discrete Fourier Series, properties of DFS, Discrete Fourier Transform, Inverse DFT, properties of DFT, Linear and Circular convolution, convolution using DFT.

Fast Fourier Transform - Introduction, Fast Fourier Transform, Radix-2 Decimation in time and Decimation in frequency FFT, Inverse FFT (Radix-2).

Unit -III	**IIR FILTERS**	**10Hrs**

IIR Filters-Introduction to digital filters, Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital filters from analog filters by Impulse invariant and bilinear transformation methods , Frequency transformations, Basic structures of IIR Filters - Direct form-I, Direct form-II, Cascade form and Parallel form realization.

Unit -IV	**FIR FILTERS**	**10Hrs**

FIR Filters-Introduction, Characteristics of FIR filters with linear phase, Frequency response of linear phase FIR filters, Design of FIR filters using Fourier series and windowing methods (Rectangular, Triangular, Raised Cosine, Hanging, Hamming, Blackman), Comparison of IIR & FIR filters, Basic structures of FIR Filters – Direct form, Cascade form, Linear phase realizations.

Unit -V	**MULTI RATE DIGITAL SIGNAL PROCESSING**	**9Hrs**

Multi rate Digital Signal Processing: Decimation, Interpolation, Sampling rate conversion by a rational factor; Frequency domain characterization of Interpolator and Decimator; Applications.

Course Outcomes(CO):

After the completion of the course students will able to:

- Understand the basic concepts of discrete time signals and systems.
- Formulate difference equations for the given discrete time systems
- Apply FFT algorithms for determining the DFT of a given signal
- Compare FIR and IIR filter structures
- Design digital filter (FIR & IIR) from the given specifications
- Understand the concept of multi rate DSP and applications of DSP

Textbooks:

- Digital Signal Processing, Principles, Algorithms, and Applications, John G. Proakis, Dimitris G. Manolakis, Pearson Education, 2007.
- Discrete Time Signal Processing, A.V.Oppenheim and R.W. Schaffer, PHI.

Reference Books:

- Digital Signal Processing – A practical approach, S.K.Mitra, 2nd Edition, Pearson Education, New Delhi, 2004.
- Digital Signal Processing, Schaum's Outline series, MH Hayes, TATA Mc-Graw Hill, 2007.

Fundamentals of Digital Signal Processing using Matlab, Robert J. Schilling, Sandra L. Harris, Thomson, 2007.
Web References:
https://www.youtube.com/watch?v=MS3qJq2jvu0

ELECTRICAL POWER TRANSMISSION SYSTEM					
Course Code	**L:T:P**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0221T	**3:0:0**	**3**	**CIE:30& SEE:70**	**3 Hours**	**PCC**

Course Objectives:

The objectives of the course are to make the students learn about:
Calculate the capacitance of Transmission lines, Learning the Mathematical Solutions to estimate regulation and efficiency of all types of lines. Learning the Types of insulators. Understand the Grading of Cables

Syllabus		**Total Hours: 48Hrs**
Unit-I	**TRANSMISSION LINE PARAMETERS**	**10Hrs**

Types of conductors - calculation of resistance for solid conductors - Calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR & GMD, symmetrical and asymmetrical conductor configuration with and without transposition. Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines.

Unit-II	**MODELING OF TRANSMISSION LINES**	**10Hrs**

Classification of Transmission Lines - Short, medium and long line and their model - representations - Nominal-T, Nominal-Pie and A, B, C, D Constants. Mathematical Solutions to estimate regulation and efficiency of all types of lines- Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations – Representation of Long lines – Equivalent T and Equivalent – π, Numerical Problems. – Surge Impedance and surge Impedance loading - wavelengths and Velocity of propagation – Ferranti effect, Charging current.

Unit -III	**PERFORMANCE OF TRANSMISSION LINES**	**8Hrs**

Types of Insulators, String efficiency and Methods for improvement, Numerical Problems – Voltage Distribution, Calculation of string efficiency, Capacitance grading and Static shielding. Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference. Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems - Stringing chart and sag template and its applications

Unit -IV	**POWER SYSTEM TRANSIENTS**	**10Hrs**

Types of System Transients - Travelling or Propagation of Surges - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of lines with different types of conditions - Open Circuited Line, Short Circuited Line, T-Junction.

Unit -V	**UNDERGROUND CABLES**	**10Hrs**

Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core belted cables, Numerical Problems. Grading of Cables - Capacitance grading, Numerical Problems, Description of Inter-sheath grading.

Course Outcomes(CO):

At the end of studying the course, the student should be able to:

- Understand the transmission line parameters.
- Model a given transmission line.
- Understand the design of transmission line and Insulators.
- Estimate the performance of a given transmission line.
- Analyze the effect of over voltage on transmission line.
- Analyze underground cables and cable performance.

Textbooks:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarthy, Dhanpat Rai & Co Pvt. Ltd.
2. Electrical power systems - by C.L.Wadhwa, New Age International (P) Limited, Publishers,1998.

Reference Books:

1. Power system Analysis-by John J Grainger William D Stevenson, TMC Companies, 4th edition
2. Power System Analysis and Design by B.R.Gupta, Wheeler Publishing.
3. Power System Analysis by Hadi Saadat – TMH Edition..
4. Modern Power System Analysis by I.J.Nagaraj and D.P.Kothari, Tata McGraw Hill, 2nd Edition.
5. Transmission of Electric Power by S. Sivanagaraju.

OnlineLearningResources:

- **https://onlinecourses.nptel.ac.in/noc21_ee13/preview**

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION
(Professional Elective-I)

Course Code	L:T:P	Credits	Exam marks	Exam Duration	Course Type
22A0220T	3:0:0	3	CIE:30 &SEE:70	3 Hours	PEC

Course Objectives:

The objectives of the course are to make the students learn about:

- To study the principle of operation and working of different types of instruments for measurement of Electrical Quantities.
- To study the working principle of operation of different types of instruments for measurement of power and power factor.
- To understand the principle of operation and working of various types of bridges for measurement of parameters –resistance, inductance, capacitance and frequency.
- To understand the principle of operation and working of transducers.

Syllabus — **Total Hours: 48Hrs**

Unit-I	MEASURING INSTRUMETS	9Hrs

Classification – Ammeters and Voltmeters – PMMC, Dynamometer, Moving Iron Types – Expression for the Deflecting Torque and Control Torque – Errors and their Compensation, Extension of range – Numerical examples

Digital Voltmeters-Successive Approximation, Ramp, and Integrating Type.

Unit-II	MEASUREMENT OF POWER, POWER FACTOR AND ENERGY	10Hrs

Single Phase Dynamometer Wattmeter, LPF and UPF, Double Element and Three Elements, Expression for Deflecting and Control Torques; P.F. Meters: Dynamometer and Moving Iron Type – 1-ph and 3-ph Power factor Meters. Single Phase Induction Type Energy Meter – Driving and Braking Torques – Errors and their Compensation, Three Phase Energy Meter – Numerical examples

Unit -III	INSTRUMENT TRANSFORMERS, POTENTIOMETERS, AND MAGNETIC MEASUREMENTS	10Hrs

INSTRUMENT TRANSFORMERS

Current Transformers and Potential Transformers – Ratio and Phase Angle Errors – Methods for Reduction of Errors-Design Considerations.

POTENTIOMETERS

DC Potentiometers: Principle and Operation of D.C. Crompton's Potentiometer –Standardization – Measurement of unknown Resistance, Currents and Voltages. A.C. Potentiometers: Polar and Coordinate types- Standardization

MAGNETIC MEASUREMENTS

Determination of B-H Loop Methods of Reversals - Six Point magnetic measurement Method

Unit -IV	D.C & A.C BRIDGES	10Hrs

D.C BRIDGES

Method of Measuring Low, Medium and High Resistances – Sensitivity of Wheatstone's Bridge – Kelvin's Double Bridge for Measuring Low Resistance, Measurement of High Resistance – Loss of Charge Method.

A.C BRIDGES

Measurement of Inductance - Maxwell's Bridge, Anderson's Bridge.

Measurement of Capacitance and Loss Angle – DeSauty Bridge. Wien's Bridge – Schering Bridge – Numerical Examples

Unit -V	CRO & SENSORS	9Hrs

CRO

Cathode Ray Oscilloscope- Cathode Ray Tube-Time Base Generator-Horizontal and Vertical Amplifiers – Applications of CRO – Measurement of Phase, Frequency, Current and Voltage-Lissajous Patterns.

SENSORS

Capacitive and Inductive displacement sensors, Electromagnetism in sensing.

Course Outcomes(CO):

At the end of studying the course, the student should be able to:

- Able to Understand the working of various instruments and equipments used for the measurement of various electrical engineering parameters like voltage, current, power, phase etc.
- Able to analyze the varieties of problems and issues coming up in the vast field of electrical measurements.
- Able to solve the varieties of problems and issues coming up in the vast field of electrical measurements.
- Analyse the different operation of extension range ammeters and voltmeters, DC bridge for measurement of parameters
- Analyse the different operation of extension range ammeters and voltmeters AC bridge for measurement of parameters
- Understand The Effectiveness Of Transducere

Textbooks:

1. Electrical Measurements and measuring Instruments by E.W. Golding and F.C.Widdis, fifth Edition, Wheeler Publishing.
2. Modern Electronic Instrumentation and Measurement Techniques by A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.

A.K.Sawhney, "A course in Electrical and Electronic Measurements and Instrumentation", Dhanpat Rai & Co.,201

Reference Books:

1. 1Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co.Publications.
2. Electrical and Electronic Measurements and instrumentation by R.K.Rajput, S.Chand.
3. Electrical Measurements by Buckingham and Price, Prentice – Hall
4. Electrical Measurements by Forest K. Harris. John Wiley and Sons
5. Electrical Measurements: Fundamentals, Concepts, Applications by Reissland, M.U, New Age International (P) Limited, Publishers.

Electrical and Electronic Measurements by G.K.Banerjee, PHI Learning Private Ltd, New Delhi–2

RENEWABLE ENERGY SOURCES
(Professional Elective-I)

Course Code	L:T:P	Credits	Exam marks	Exam Duration	Course Type
22A0223T	3:0:0	3	CIE:30& SEE:70	3 Hours	PEC

Course Objectives:

The objectives of the course are to make the students learn about:
It introduces solar energy its radiation, collection, storage and application. It also introduces the Wind energy, Biomass energy, Geothermal energy and ocean energy as alternative energy sources.

Syllabus — **Total Hours:48**

Unit-I	PRINCIPLES OF SOLAR RADIATION	10Hrs

Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

Unit-II	SOLAR ENERGY COLLECTION AND APPLICATIONS	10Hrs

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

Unit -III	WIND AND BIO-MASS ENERGY	8Hrs

Sources and potentials, horizontal and vertical axis wind mills, performance characteristics Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, and economic aspects.

Unit -IV	GEOTHERMAL AND OCEAN ENERGY	10Hrs

Resources, types of wells, methods of harnessing the energy, potential in India Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants and their economics

Unit -V	DIRECT ENERGY CONVERSION	10Hrs

Direct Energy Conversion: Direct Energy Conversion (DEC), Need for DEC, Types of DEC - Fuel Cells, working of hydrogen fuel cell Magneto Hydro Dynamic Energy Conversion (MHD elementary treatment only), Working Principle, Advantages and Disadvantages

Course Outcomes(CO):

At the end of studying the course, the student should be able to:

- Understand the energy scenario and the consequent growth of the power generation from renewable energy sources.
- Estimate the solar energy, Utilization of solar energy, Principles involved in solar energy collection and conversion of it to electricity generation
- Understand the concept of Wind and Biomass energy resources and their classification, types Plants-applications
- Acquire the knowledge on Geothermal energy and it's harnessing methods
- Illustrate ocean energy and explain the operational methods of their utilization
- Describe the concept of direct energy conversion and their types and working principle

Textbooks:

1. Non-Conventional Energy Sources by G.D. Rai, Khanna Publishers
2. Renewable Energy Resources – Twidell & Wier, CRC Press(Taylor & Francis)

Reference Books:

1. Renewable energy resources by Tiwari and Ghosal, Narosa.
2. Renewable Energy Technologies by Ramesh & Kumar, Narosa.
3. Non-Conventional Energy Systems by K Mittal, Wheeler
4. Renewable energy sources and emerging technologies by D.P.Kothari,K.C.Singhal,

Online Learning Resources:

- **https://onlinecourses.nptel.ac.in/noc21_ee13/preview**

INTRODUCTION OF PROGRAMMABLE LOGIC CONTROLLER
(Professional Elective-I)

Course Code	L:T:P	Credits	Exam marks	Exam Duration	Course Type
22A0224T	3:0:0	3	CIE:30 &SEE:70	3 Hours	PEC

Course Objectives:

The objectives of the course are to make the students learn about:

- PLC and its basics, architecture, connecting devices and programming
- Implementation of Ladder logic for various Industrial applications
- Designing of control circuits for various applications
- PLC logic and arithmetic operations.

Syllabus		Total Hours: 48Hrs
Unit-I	**INTRODUCTION TO PLC BASICS**	**10Hrs**

PLC Basics: PLC System, I/O Modules and Interfacing, CPU Processor, Programming Equipment, Programming Formats, Construction of PLC Ladder Diagrams, Devices Connected To I/O Modules. PLC Programming: Input Instructions, Outputs, Operational Procedures, Programming Examples Using Contacts and Coils. Drill Press Operation.

Unit-II	LOGIC GATES AND IT'S APPLICATIONS	10Hrs

Digital Logic Gates, Programming in the Boolean Algebra System, Conversion Examples. Ladder Diagrams for Process Control: Ladder Diagrams & Sequence Listings, Ladder Diagram Construction and Flowchart for Spray Process System

Unit -III	REGISTERS	9Hrs

PLC Registers: Characteristics of Registers, Module Addressing, Holding Registers, Input Registers, Output Registers. PLC Functions: Timer Functions & Industrial Applications, Counter Function & Industrial Applications, Arithmetic Functions, Number Comparison Functions, Number Conversion Functions.

Unit -IV	DATA HANDLING FUNCTIONS	9Hrs

Data Handling Functions: SKIP, Master Control Relay, Jump, Move, FIFO, FAL, ONS, CLR & Sweep Functions and Their Applications. Bit Pattern and Changing a Bit Shift Register, Sequence Functions and Applications, Controlling of Two-Axis & Three Axis Robots With PLC, Matrix Functions.

Unit -V	ANALOG PLC	10Hrs

Analog PLC Operation, Types of PLC Analog Modules and Systems, PLC Analog Signal Processing, BCD or Multi bit data Processing, Analog output application examples, PID Modules, PID Tuning, Typical PID Functions, PLC Installation, Troubleshooting and Maintenance.

Course Outcomes(CO):

At the end of studying the course, the student should be able to:

- Understand different types of Devices to which PLC input and output modules are connected
- Understand various types of PLC registers and create ladder diagrams from process control descriptions.
- Use different types PLC functions, Data Handling Function
- Develop a coil and contact control system to operate a basic robot and analog PLC operations
- Implementation of PLC in analogue operations, arithmetic, logic functions.
- Understand the PID module, installation procedure and maintenance

Textbooks:

3. Programmable Logic Controllers- Principles and Applications by John W. Webb & Ronald A. Reiss, Fifth Edition, ELSEVIER Ltd., 2009.

2. Programmable Logic Controllers 5th Edition, William Bolton, Newnes, ELSEVIER Ltd., 2009

Reference Books:

1. Programmable Logic Controllers: An Emphasis on design & application, Kelvin T. Erickson, Dogwood Valley Press,

Web References:

https://www.youtube.com/watch?v=MS3qJq2jvu0

BUILDING MATERIALS (ME, CSE, AI&ML, CS, DS, ECE, EEE)

(Open Elective Course-I)

Course Code	L:T:P	Credits	Exam marks	Exam Duration	Course Type
22A0149T	3:0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

- To identify the traditional materials that are used for building constructions.
- To explain basic concepts of building components such as stair case and masonry
- To know the causes of dampness in structures and its preventive measures
- To understand the building rules, building bye laws and acoustics of building

Syllabus		Total Hours: 48
Unit-I	**MATERIALS**	**9 Hrs**
Traditional materials: Stones- Types of stone masonry -Brick-types of brick masonry- lime Cement –Timber – Seasoning of timber - their uses in building works		
Unit-II	**BUILDING COMPONENTS**	**9 Hrs**
Lintels, Arches and Vaults – Staircases, Lifts – Types. Different types of flooring-Concrete, Mosaic, Terrazo floors; Different types of roofs- Pitched, Flat and Curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs - King and Queen Post Trusses. Doors & Windows- Types and Specifications		
Unit -III	**DAMPNESS**	**10 Hrs**
Dampness and its prevention: Causes of dampness- ill effects of dampness-requirements of an ideal material for damp proofing-materials for damp proofing –methods of damp proofing.		
Unit -IV	**BUILDING PLANNING**	**10 Hrs**
Elements of building planning- basic requirements-orientation-planning for energy efficiency-planningbased on utility-other requirements		
Unit -V	**BUILDING RULES AND BYE-LAWS**	**10 Hrs**
Zoning regulations; Regulations regarding layouts or subdivisions; Building regulations; Rules forspecial type of buildings; Calculation of plinth, floor and carpet area; Floor space index. Building Information System		

Course Outcomes(CO):

On completion of this course, student will be able to:

CO1: To understand the characteristics of different building materials.

CO2: Differentiate brick masonry, stone masonry construction and bonds used in construction of walls of buildings.

CO3: To know about the causes of dampness in buildings and its ill effects.

CO4: To understand the principles of planning in buildings.

CO5: Describe capable of understanding building rules.

CO6: Acquire the knowledge about bye-laws and building elements.

Textbooks:

1. Building Drawing by M.G. Shah, C.M. Kale and S.Y. Patki, Tata McGraw-Hill, New
2. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, ‚Building Construction' - LaxmiPublications (P) Ltd., New Delhi

Reference Books:

1. Building Materials, S. K. Duggal, New Age International Publications.
2. N. Kumaraswamy, A. Kameswara Rao, building planning and drawing, 7th Ed, CharotarE-

resources:

1 http://nptel.ac.in/courses/105104103/

2. http://www.academicpub.org/jwrhe/

3. http://www.peo.on.ca/index.php/ci_id/21843/la_id/1

PRINCIPLES OF COMMUNICATION SYSTEMS
Common to (EEE,CSE, AI&ML, CS, DS)
(Open Elective Course-I)

Course Code	L:T:P	Credits	Exam marks	Exam Duration	Course Type
22A0430T	3:0:0	3	CIE:30 &SEE:70	3 Hours	OEC

Course Objectives:

Student will be able to

- To understand the concept of various modulation schemes and multiplexing.
- To apply the concept of various modulation schemes to solve engineering problems.
- To analyse various modulation schemes.
- To evaluate various modulation scheme in real time applications.

Syllabus	Total Hours: 32
Unit-I	**6Hrs**

Amplitude Modulation: Introduction to Noise and Fourier Transform. An overview of Electronic Communication Systems. Need for Frequency Translation Amplitude Modulation: DSB-FC, DSB-SC, SSB-SC and VSB, Radio Transmitter and Receiver.

Unit-II	8Hrs

Frequency Modulation: Introduction to Angle Modulation, Tone modulated FM Signal, Arbitrary Modulated FM Signal, FM Modulation and Demodulation. Stereophonic FM Broadcasting.

Unit -III	6Hrs

Pulse Modulation: Sampling Theorem- Low pass and Band pass Signals. Pulse Amplitude Modulation and Concept of Time Division Multiplexing and Frequency Division Multiplexing. Pulse Width Modulation. Digital Representation of Analog Signals.

Unit -IV	6Hrs

Digital Modulation: Binary Amplitude Shift Keying, Binary Phase Shift Keying and Quadrature Phase Shift Keying, Binary Frequency Shift Keying. Regenerative Repeater, M-ary and comparison

Unit -V	6Hrs

Communication Systems: Satellite, RADAR, Optical, Micro wave communication, Mobile and Computer Communication (Block diagram approach only).

Course Outcomes(CO):

After the completion of the course students will able to:

1. Understand the concept of various modulation schemes.
2. Understand the concept of Different multiplexing techniques.
3. Apply the concept of various modulation schemes to solve engineering problems.
4. Analyse various modulation schemes.
5. Evaluate various modulation schemes in real time applications.
6. Understand the concept of various Communication systems.

Textbooks:

1. Herbert Taub, Donald L Schilling and Goutam Saha, “Principles of Communication Systems”, 3 rdEdition, Tata McGraw-Hill Publishing Company Ltd., 2008

Reference Books:

1. B. P. Lathi, Zhi Ding and Hari M. Gupta, “Modern Digital and Analog Communication Systems”, 4th Edition, Oxford University Press, 2017.
2. K. Sam Shanmugam “Digital and Analog Communication Systems”, Wiley India Edition, 2008

DATABASE MANAGEMENT SYSTEMS
(Common to CE,EEE,ME and ECE)
(Open Elective Course-I)

Course Code	L:T:P	Credits	Exam Marks	Exam Duration	Course Type
22A0512T	3:0:0	3	CIE: 30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- To teach the role of database management system in an organization.
- To design databases using data modeling and Logical database design techniques.
- To construct database queries using relational algebra and calculus and SQL.
- To explore implementation issues in database transaction.
- To familiarize database security mechanisms.

Syllabus		Total Hours:48
Unit -I	**Introduction to Database concepts and Modeling**	**10Hrs**

Conceptual Modeling Introduction: Introduction to Data bases, Purpose of Database Systems, View of Data, Data Models, Database Languages, Database Users, Database Systems architecture.

The Entity-Relationship Model: Overview of Database Design, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Conceptual Design with the ER Model.

Unit -II	Relational Model, Relational Algebra	9Hrs

Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations,Enforcing Integrity constraints, querying relational data, Logical data base Design, Views.

Relational Algebra: Introduction to Relational algebra, selection and projection, set operations,renaming, joins, division.

Unit -III	SQL	10Hrs

SQL: Basic form of SQL Query, DDL, DML queries, Views in SQL, Joins, Nested & Correlatedqueries, Operators, predefined functions, Aggregate Functions.

PL/SQL: Introduction, Functions & Procedures, Triggers, Cursors.

Unit -IV	Normalization	9Hrs

Relational database design: Introduction, Functional Dependencies (FDs), Normalization for relational databases: 1NF, 2NF, 3NF and BCNF, Basic definitions of Multi Valued Dependencies, 4NF and 5NF.

Unit -V	Transaction Management &Concurrency Control and Recovery	10Hrs

Transaction Management: Transaction processing, Transaction Concept, Transaction States,Implementation of Atomicity and Durability, Concurrent Executions.

Concurrency Control: Lock-Based Protocols, Timestamp- Based Protocols, Validation-BasedProtocols, Multiple Granularities.

Recovery: Failure Classification, Recovery and Atomicity, Log-Based Recovery.

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, 6th Edition,Tata McGraw-Hill Publishing Company,2017.
2. Raghu Ramakrishnan, Database Management System, 3rd Edition, Tata McGraw-HillPublishing Company, 2014.

Reference Books:

1. Peter Rob, A.Ananda Rao, Corlos Coronel, Database Management Systems (for JNTU),Cengage Learning, 2011.
2. Hector Garcia Molina, Jeffrey D. Ullman, Jennifer Widom, Database System Implementation,1st Edition, Pearson Education, United States, 2000.
3. E. Ramez and Navathe, Fundamental of Database Systems, 7th Edition, Pearson Education
4. R.P. Mahapatra & Govind Verma, Database Management Systems, Khanna Publishing House,2016.
5. Carlos Coronel and Steven Morris, Database Systems: Design, Implementation, andManagement, 12th edition, Cengage Learning,2016.
6. John V. ,Absolute beginner's guide to databases, Petersen, QUE

Web Resources:

1. https://www.coursera.org/learn/database-management
2. https://www.coursera.org/learn/sql-data-science
3. https://www.w3schools.com/sql/
4. https://www.youtube.com/watch?v=fHAfc7Hjq28&list=PLWPirh4EWFpGrpcMfZ6UcdI786 QdtSxV8
5. https://www.youtube.com/watch?v=HwmEcudlv44&list=PL4OCRJojkV1jN-Ed6RkQpWfBvqe0utRd6
6. http://www.w3schools.in/dbms/
7. https://www.geeksforgeeks.org/dbms/
8. https://www.javatpoint.com/dbms-tutorial
9. https://www.edureka.co/blog/dbms-tutorial/

Course Outcomes (CO):

On completion of this course, student will be able to:

CO1: Understand the Basic Concepts of Database languages, Relational model, SQL.

CO2: Choose the specific Data models for large enterprise database design.

CO3: Analyze the data efficiently through SQL instructions.

CO4: Apply Normal forms on database for eliminating the redundancy.

CO5: Demonstrate the Basic Concepts of transaction management techniques.

CO6: Apply concurrency control techniques for Database recovery.

Automobile Engineering

(Open Elective Course-I)

Course Code	L:T:P	Credits	Exam marks	Exam Duration	Course Type
22A0321Ta	3:0 :0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

Impart the knowledge of vehicle structure and its components.

1. Demonstrate various components of petrol engines and diesel engines.
2. Trains about the various electrical system, circuits, and testing of automobiles.
3. Explain the concepts of steering, suspension and braking system in automobile.

Syllabus **Total Hours:5 2**

UNIT - I	Introduction to vehicle structure and engine components	12 Hrs

Vehicle construction - Chassis and body - Specifications - Engine - Types - Construction - Location of engine - Cylinder arrangement - Construction details - Cylinder block - Cylinder head - Cylinder liners - Piston – piston rings - Piston pin - Connecting rod - Crankshaft - Valves. Lubrication system - Types - Oil pumps - Filters. Crankcase ventilation

UNIT - II	Ignition and fuel supply systems	10 Hrs

Ignition system - Coil and Magneto - Spark plug - Distributor – Electronic ignition system - Fuel system - Carburetor - Fuel pumps - Fuel injection systems - Mono point and Multi point – Unit Injector – Nozzle types - Electronic Fuel Injection system (EFI) – GDI, MPFI, DTSI.

UNIT - III	Steering and suspension system	10 Hrs

Principle of steering - Steering Geometry and wheel alignment - Steering linkages – Steering gearboxes - Power steering - front axle - Suspension system - Independent and Solid axle – coil, leaf spring and air suspensions - torsion bar - shock absorbers.

UNIT - IV	Wheels, Tyres and Braking System	10 Hrs

Wheels and Tyres - Construction - Type and specification - Tyre wear and causes - Brakes - Needs – Classification –Drum and Disc Mechanical - Hydraulic and pneumatic - Vacuum assist – Retarders – Anti-lock Braking System(ABS).

UNIT - V	VAutomobile electrical systems and advances in automobile engineering	10 Hrs

Battery-General electrical circuits- Active Suspension System (ASS) - Electronic Brake Distribution (EBD) – Electronic Stability Program(ESP), Traction Control System (TCS) - Global Positioning System (GPS), Hybrid vehicle, Fuel Cell.

Course Outcomes(CO):

After successful completion of this course, the student will be able to

1. Identify different parts of automobile
2. Explain the working of various parts like engine and brakes
3. Describe the working of steering and the suspension systems.
4. Summarize the wheels and tires
5. Outline the future developments in the automobile industry

Textbooks:

1. Kirpal Singh, Automobile Engineering, Vol.1&2, Standard Publications, 13/e, 2020.
2. William.H.Crouse, Automotive Mechanics, 10/e , McGraw-Hill, 2006.
3. David A. Corolla, Automotive Engineering: Powertrain, Chassis System and Vehicle Body, Butterworth-Heinemann Publishing Ltd, 2009.
4. Richard Stone, Jeffrey K. Ball, Automotive Engineering Fundamentals" SAE International, 2004.

Reference Books:

1. Bosch, Automotive Hand Book, 6/e, SAE Publications, 2007.
2. K. Newton and W. Steeds, The motor vehicle, 13/e, Butterworth-Heinemann Publishing Ltd, 1989.
3. Joseph Heitner, Automotive Mechanics Principles and Practices, 2/e, CBS publishing 2004

FUNDAMENTALS OF DRONE TECHNOLOGY

(Open Elective Course-I)

Course Code	L:T:P	Credits	Exam marks	Exam Duration	Course Type
22A0334Tc	3: 0:0	3	CIE:30 SEE:70	3 Hours	OEC

Course Objectives:

The course should enable the students to

- To make the students to understand the basic concepts of UAV drone systems.
- To introduce the stability and control of an aircraft

Syllabus		Total Hours: 50
UNIT-I	**Introduction to Drones**	**10 Hrs**
Introduction to Unmanned Aircraft Systems, History of UAV drones, classification of drones, System Composition, applications		
UNIT-II	**Design of UAV Drone Systems**	**10Hrs**
Introduction to Design and Selection of the System, Aerodynamics and Airframe Configurations, Characteristics of Aircraft Types, Design Standards and Regulatory Aspects-India Specific, Design for Stealth.		
UNIT-III	**Avionics Hardware of Drones**	**10Hrs**
Autopilot, AGL-pressure sensors servos-accelerometer –gyros-actuators- power supply-processor, integration, installation, configuration.		
UNIT-IV	**Communication, Payloads and Controls**	**10Hrs**
Communication, Payloads and Controls: Payloads, Telemetry, Tracking, controls-PID feedback, radio control frequency range, modems, memory system, simulation, ground test-analysis-trouble shooting		
UNIT-V	**Navigation and Testing**	**10Hrs**
Navigation and Testing: Waypoints navigation, ground control software, System Ground Testing,System In-flight Testing, Future Prospects and Challenges		

Course Outcomes(CO):

At the end of studying the course, the student should be able to:

CO1: Understand the Concept of UAV, its components and its known applications. **CO2:** Identify the type of drone and design a drone for a given application/specification.**CO3:** Ability to design UAV drone system

CO4: To understand working of different types of engines and its area of applications.

CO5: To understand static and dynamic stability dynamic instability and control concepts

CO6: To know the loads taken by aircraft and type of construction and also construction materials.

Textbooks:

1. Reg Austin “Unmanned Aircraft Systems UAV design, development and deployment”, Wiley, 2010.
2. Robert C. Nelson, Flight Stability and Automatic Control, McGraw-Hill, Inc, 1998.
3. Kimon P. Valavanis, “Advances in Unmanned Aerial Vehicles: State of the Art and the Road to Autonomy”, Springer, 2007

Reference Books:

1. Paul G Fahlstrom, Thomas J Gleason, “Introduction to UAV Systems”, UAV Systems, Inc, 1998
2. Dr. Armand J. Chaput, “Design of Unmanned Air Vehicle Systems”, Lockheed Martin Aeronautics.

ELECTRICAL MEASUREMENTS & INSTRUMENTATION LAB					
Course Code	**L:T:P**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0225P	**0:0:3**	**1.5**	**CIE:30 &SEE:70**	**3 Hours**	**PCC**

Course Objectives:

1. Calibration of various electrical measuring instruments
2. Accurate determination of inductance and capacitance using AC Bridges
3. Measurement of coefficient of coupling between two coupled coils
4. Measurement of resistance for different range of resistors using bridges

List of Experiments:

Any Eight of the Experiments are to be conducted

1. Calibration & Testing of single phase Energy meter with all accessories
2. Calibration of Dynamo meter type Power factor meter with all accessories
3. Crompton DC Potentio-meter Calibration of PMMC Ammeter & Voltmeter with all accessories
4. Kelvin‟s Double Bridge – Measurement of very low Resistance values –Determination of Tolerance.
5. Measurement of % Ratio Error and Phase Angle of Given C.T. by Comparison.
6. Schering Bridge & Anderson Bridge for measurement of Capacitance andInductance values.
7. Measurement of 3 Phase Reactive Power with Single-Phase Wattmeter.
8. Measurement of Parameters of a Choke Coil Using 3 Voltmeter and 3 Ammeter Methods.
9. Calibration of LPF Wattmeter – by Phantom Testing
10. Measurement of 3 Phase Power with Two Watt Meter Method (Balanced & Unbalanced).
11. Dielectric Oil Testing

Additional Experiments

1. LVDT and Capacitance Pickup – Characteristics and Calibration
2. Resistance Strain Gauge – Strain Measurement and Calibration.

Course Outcomes (CO):

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

- Calibrate various electrical measuring instruments
- Accurately determine the values of inductance and capacitance using AC bridges
- Compute the coefficient of coupling between two coupled coils
- Accurately determine the values of very low resistances

Online Learning Resources/Virtual Labs:

https://www.vlab.co.in/broad-area-electrical-engineering

Reference Book(s):

https://link.springer.com/book/10.1007/978-3-319-31102-9

DIGITAL SIGNAL PROCESSING LAB
(Common to ECE and EEE)

Course Code	L:T:P	Credits	Exam marks	Exam Duration	Course Type
22A0442P	0:0:3	1.5	CIE:30& SEE:70	3 Hours	PCC

Course Objectives:

- Formulate problems and implement algorithms using Assembly language.
- Develop programs for different applications.
- Interface peripheral devices with 8086 and 8051.
- Use Assembly/Embedded C programming approach for solving real world problems

List of Experiments :(Conduct all experiments).

Note: Any TWELVE of the experiments are to be conducted.

1. Generate the following standard discrete time signals.
   i)Unit Impulse ii) Unit step iii) Ramp iv) Exponential v) Saw tooth
2. Generate sum of two sinusoidal signals and find the frequency response (magnitude and phase).
3. Implement and verify linear and circular convolution between two given signals.
4. Implement and verify autocorrelation for the given sequence and cross correlation between two given signals.
5. Compute and implement the N-point DFT of a given sequence and compute the power density spectrum of the sequence.
6. Implement and verify N-point DIT-FFT of a given sequence and find the frequency response (magnitude and phase).
7. Implement and verify N-point IFFT of a given sequence.
8. Design IIR Butterworth filter and compare their performances with different orders (Low Pass Filter /High Pass Filter)
9. Design IIR Chebyshev filter and compare their performances with different orders (Low Pass Filter /High Pass Filter).
10. Design FIR filter (Low Pass Filter /High Pass Filter) using different window techniques (rectangular, hamming and Kaiser)
11. Design and verify Filter (IIR and FIR) frequency response by using Filter design and Analysis Tool.
12. Compute the Decimation and Interpolation for the given signal.
13. Real time implementation of an audio signal using a digital signal processor.
14. Compute the correlation coefficient for the two given audio signals of same length using a digital signal processor.

Course Outcomes (CO):

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

- Implement various DSP Algorithms using MATLAB.
- Implement DSP algorithms with Digital Signal Processor.
- Analyze andobservemagnitude and phase characteristics (Frequency response Characteristics) of digital IIR-Butterworth filters.
- Analyze andobserve magnitudeand phase characteristics (Frequency response Characteristics) of digital IIR- Chebyshev filters.
- Analyze andobservemagnitudeandphase characteristics (Frequency response Characteristics) of digital FIR filters using window techniques.
- Analyze and implement various digital filters.

Reference Book(s):

- Stephen J. Chapman, "MATLAB Programming for Engineers", Cengage, November 2012

- **Online Learning Resources/Virtual Labs:**
- https://www.vlab.co.in

MATLAB APPLICATIONS IN ELECTRICAL ENGINEERING LAB					
Course Code	**L:T:P**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0226P	**1:0:2**	**2**	**CIE:30& SEE:70**	**3 Hours**	**SC**

Course Objectives:

This course will enable students to:

1. Understand the basic concepts of Electrical Engineering.
2. Analyze various Electrical engineering applications through MATLAB/PSPICE.
3. Develop real time models using MATLAB/PSPICE.

List of Experiments:

1. Transient analysis of given electrical network
2. Simulation of 1-phase and 3-phase transformers
3. Study of the dynamics of second **order system**
4. Implementation of buck and boost dc-dc converters
5. Study on the design of PI controllers and stability analysis for a DC-DC buck Converter
6. Sine-PWM techniques for single-phase half-bridge, full-bridge and three-phase inverters
7. Economic Load Dispatch of (i) Thermal Units and (ii) Thermal Plants using Conventional method
8. Transient Stability Analysis of Power Systems using Equal Area Criterion (EAC)
9. Reactive Power Control in a transmission system (Ferranti effect, Effect of shunt Inductor)
10. Fault studies using Zbus matrix
11. Design of virtual PMU
12. Wide area control of Two area **Kundur system**
13. Design using Battery Management system (BMS) using MATLAB
14. Using MATLAB and Simulink design PID Controllers
15. Using MATLAB and Simulink Design and control the speed of a Brushless DC motor using Boost converter
16. Design using MATLAB and Simulink controlling the speed of the electric traction motor and the torque.
17. Design Up counter and down counter using MATLAB Simulink
18. Design a prototype Fuel cell electric vehicle using Simulink Tool and control the speed, Torque ,Voltage
19. Design Up counter and down counter using Stateflow tool
20. Design Algebraic Loop and Limit the algebraic loop & Saturation using Min/Max Simulink
21. Modeling and controlling of different types of DC motor using choppers
22. Design Simulink Model using mathematical equations for second and third order
23. By using electrical and Mechanical equations, design a DC Motor by using Simscape Tool

(Any 10 experiments from the above list)

Course Outcomes (CO):

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

- Understand the basic concepts of Electrical Engineering.
- Apply the concepts to design MATLAB models.
- Analyze various Electrical engineering applications through MATLAB.

Online Learning Resources/Virtual Labs:

1. http://vem-iitg.vlabs.ac.in/
2. https://vp-dei.vlabs.ac.in/Dreamweaver/

INTELLECTUAL PROPERTY RIGHTS & PATENTS					
Course Code	**L:T:P**	**Credits**	**Exam marks**	**Exam Duration**	**Course Type**
22A0031M	**2:0:0**	**0**	**CIE:30 &SEE:70**	**3 Hours**	**MC**

Course Objectives:

Student will be able to

- This course introduces the student to the basics of Intellectual Property Rights, Copy Right Laws, Cyber Laws, Trade Marks and Issues related to Patents. The overall idea of the course is to help and encourage the student for startups and innovations

Syllabus		**Total Hours: 32**
Unit-I	**INTRODUCTION TO INTELLECTUAL PROPERTY**	**6Hrs**

Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics – Types of Intellectual Property – Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement – Regulatory – Overuse or Misuse of Intellectual Property Rights – Compliance and Liability Issues.

Unit-II	**COPYRIGHT FORMALITIES AND REGISTRATION**	**8Hrs**

Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of performers – Copyright Formalities and Registration – Limitations – Infringement of Copyright – International Copyright Law-Semiconductor Chip Protection Act.

Unit -III	**PATENTS**	**6Hrs**

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting – Patent Searching – Patent Cooperation Treaty – New developments in Patent Law- Invention Developers and Promoters

Unit -IV	**TRADE MARK AND REGISTRATION**	**6Hrs**

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Inter parties Proceedings – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law.

Unit -V	**TRADE SECRETS AND AGREEMENTS**	**6Hrs**

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law. Introduction to Cyber Law – Information Technology Act – Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy – International aspects of Computer and Online Crime.

Course Outcomes(CO):

Understand IPR law & Cyber law

1. Discuss registration process, maintenance and litigations associated with trademarks
2. Illustrate the copy right law
3. Enumerate the trade secret law..

Textbooks:

1.Deborah E.Bouchoux: "Intellectual Property". Cengage learning, New Delhi
2. Kompal Bansal &Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western's Special Topics Collections

Reference Books:

1.Prabhuddha Ganguli: ' Intellectual Property Rights" Tata Mc-Graw – Hill, New Delhi
2. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
3. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.
4. M. Ashok Kumar and Mohd. Iqbal Ali: "Intellectual Property Right" Serials Pub.

COMMUNITY SERVICE PROJECT
……Experiential learning through community engagement

Course Code	L:T:P	Credits	Exam marks	Exam Duration	Course Type
22A0227P	0:0:0	1.5	CIE:30& SEE:70	3 Hours	PC

Introduction

- Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development.
- Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.
- Community Service Project is meant to link the community with the college for mutual benefit. The community will benefit with the focused contribution of the college students for the village/ local development. The college finds an opportunity to develop social sensibility and responsibility among students and emerge as a socially responsible institution.

Objectives:

Community Service Project should be an integral part of the curriculum, as an alternative to the 2 months of Summer Internships / Apprenticeships / On the Job Training, whenever there is an exigency when students cannot pursue their summer internships. The specific objectives are;

- To sensitize the students to the living conditions of the people who are around them,
- To help students to realize the stark realities of society.
- To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability
- To make students aware of their inner strength and help them to find new /out of box solutions to social problems.
- To make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.
- To help students to initiate developmental activities in the community in coordination with public and government authorities.
- To develop a holistic life perspective among the students by making them study culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Implementation of Community Service Project

- Every student should put in 6 weeks for the Community Service Project during the summer vacation.
- Each class/section should be assigned with a mentor.
- Specific Departments could concentrate on their major areas of concern. For example, Dept. of Computer Science can take up activities related to Computer Literacy to different sections of people like - youth, women, housewives, etc
- A logbook must be maintained by each of the students, where the activities undertaken/involved to be recorded.
- The logbook has to be countersigned by the concerned mentor/faculty in charge.
- An evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.
- The final evaluation to be reflected in the grade memo of the student.
- By using electrical and Mechanical equations, design a DC Motor by using Simscape Tool
- The Community Service Project should be different from the regular programs of NSS/NCC/Green Corps/Red Ribbon Club, etc.
- Minor project reports should be submitted by each student. An internal Viva shall also be conducted by a committee constituted by the principal of the college.
- Award of marks shall be made as per the guidelines of Internship/apprentice/ on the job training.

Procedure

- A group of students or even a single student could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, to enable them to commute from their residence and return back by evening or so.
- The Community Service Project is a twofold one –
- First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the Village or Ward volunteers, rather, it could be another primary source of data.
- Secondly, the student/s could take up a social activity, concerning their domain or subject area. The different areas, could be like –
    - Agriculture
    - Health
    - Marketing and Cooperation
    - Animal Husbandry
    - Horticulture
    - Fisheries
    - Sericulture
    - Revenue and Survey
    - Natural Disaster Management
    - Irrigation
    - Law & Order
    - Excise and Prohibition
    - Mines and Geology
    - Energy
    - Internet
    - Free Electricity
    - Drinking Water

EXPECTED OUTCOMES

BENEFITS OF COMMUNITY SERVICE PROJECT TO STUDENTS

Learning Outcomes

- Positive impact on students' academic learning
- Improves students' ability to apply what they have learned in "the real world"
- Positive impact on academic outcomes such as demonstrated complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development.
- Improved ability to understand complexity and ambiguity

Personal Outcomes

- Greater sense of personal efficacy, personal identity, spiritual growth, and moral development
- Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills.

Social Outcomes

- Reduced stereotypes and greater inter-cultural understanding
- Improved social responsibility and citizenship skills
- Greater involvement in community service after graduation

Career Development

- Connections with professionals and community members for learning and career opportunities
- Greater academic learning, leadership skills, and personal efficacy can lead to greater opportunity.

Relationship with the Institution

- Stronger relationships with faculty
- Greater satisfaction with college
- Improved graduation rates

BENEFITS OF COMMUNITY SERVICE PROJECT TO FACULTY MEMBERS

- Satisfaction with the quality of student learning
- New avenues for research and publication via new relationships between faculty and community
- Providing networking opportunities with engaged faculty in other disciplines or institutions
- A stronger commitment to one's research.

BENEFITS OF COMMUNITY SERVICE PROJECT TO COLLEGES AND UNIVERSITIES

- Improved institutional commitment.
- Improved student retention
- Enhanced community relations

BENEFITS OF COMMUNITY SERVICE PROJECT TO COMMUNITY

- Satisfaction with student participation
- Valuable human resources needed to achieve community goals.
- New energy, enthusiasm and perspectives applied to community work.
- Enhanced community-university relations.

SUGGESTIVE LIST OF PROGRAMMES UNDER COMMUNITY SERVICE PROJECT

The following the recommended list of projects for Engineering students. The lists are not exhaustive and open for additions, deletions, and modifications. Colleges are expected to focus on specific local issues for this kind of project. The students are expected to carry out these projects with involvement, commitment, responsibility, and accountability. The mentors of a group of students should take the responsibility of motivating, facilitating, and guiding the students. They have to interact with local leadership and people and appraise the objectives and benefits of this kind of project. The project reports shall be placed in the college website for reference. Systematic, Factual, methodical and honest reporting should be ensured.

For Engineering Students

1. Water facilities and drinking water availability
2. Health and hygiene
3. Stress levels and coping mechanisms
4. Health intervention programmes
5. Horticulture
6. Herbal plants
7. Botanical survey
8. Zoological survey
9. Marine products
10. Aqua culture
11. Inland fisheries
12. Animals and species
13. Nutrition
14. Traditional health care methods
15. Food habits
16. Air pollution
17. Water pollution
18. Plantation

19. Soil protection
20. Renewable energy
21. Plant diseases
22. Yoga awareness and practice
23. Health care awareness programmes and their impact
24. Use of chemicals on fruits and vegetables
25. Organic farming
26. Crop rotation
27. Floury culture
28. Access to safe drinking water
29. Geographical survey
30. Geological survey
31. Sericulture
32. Study of species
33. Food adulteration
34. Incidence of Diabetes and other chronic diseases
35. Human genetics
36. Blood groups and blood levels
37. Internet Usage in Villages
38. Android Phone usage by different people
39. Utilisation of free electricity to farmers and related issues
40. Gender ration in schooling lvel- observation.

Complementing the community service project the students may be involved to take up some awareness campaigns on social issues/special groups. The suggested list of programs

Programs for School Children

1. Reading Skill Program (Reading Competition)
2. Preparation of Study Materials for the next class.
3. Personality / Leadership Development
4. Career Guidance for X class students
5. Screening Documentary and other educational films
6. Awareness Program on Good Touch and Bad Touch (Sexual abuse)
7. Awareness Program on Socially relevant themes. Programs

for Women Empowerment

1. Government Guidelines and Policy Guidelines
2. Women's Rights
3. Domestic Violence
4. Prevention and Control of Cancer
5. Promotion of Social Entrepreneurship General

Camps

1. General Medical camps
2. Eye Camps
3. Dental Camps
4. Importance of protected drinking water
5. ODF awareness camp
6. Swatch Bharath
7. AIDS awareness camp
8. Anti Plastic Awareness
9. Programs on Environment
10. Health and Hygiene
11. Hand wash programmes
12. Commemoration and Celebration of important days Programs

for Youth Empowerment

1. Leadership

2. Anti-alcoholism and Drug addiction
3. Anti-tobacco
4. Awareness on Competitive Examinations
5. Personality Development Common

Programs

1. Awareness on RTI
2. Health intervention programmes
3. Yoga
4. Tree plantation
5. Programs in consonance with the Govt. Departments like –
    i. Agriculture
    ii. Health
    iii. Marketing and Cooperation
    iv. Animal Husbandry
    v. Horticulture
    vi. Fisheries
    vii. Sericulture
    viii. Revenue and Survey
    ix. Natural Disaster Management
    x. Irrigation
    xi. Law & Order
    xii. Excise and Prohibition
    xiii. Mines and Geology
    xiv. Energy

Role of Students:

- Students may not have the expertise to conduct all the programmes on their own. The students then can play a facilitator role.
- For conducting special camps like Health related, they will be coordinating with the Governmental agencies.
- As and when required the College faculty themselves act as Resource Persons.
- Students can work in close association with Non-Governmental Organizations like Lions Club, Rotary Club, etc or with any NGO actively working in that habitation.
- And also, with the Governmental Departments. If the program is rolled out, the District Administration could be roped in for the successful deployment of the program.
- An in-house training and induction program could be arranged for the faculty and participating students, to expose them to the methodology of Service Learning.

Timeline for the Community Service Project Activity Duration: 8 weeks

1. **Preliminary Survey (One Week)**
    - A preliminary survey including the socio-economic conditions of the allotted habitation to be conducted.
    - A survey form based on the type of habitation to be prepared before visiting the habitation with the help of social sciences faculty. (However, a template could be designed for different habitations, rural/urban.
    - The Governmental agencies, like revenue administration, corporation and municipal authorities and village secreteriats could be aligned for the survey.

2. **Community Awareness Campaigns (One Week)**
    - Based on the survey and the specific requirements of the habitation, different awareness campaigns and programmesto be conducted, spread over two weeks of time. The list of activities suggested could be taken into consideration.

3. **Community Immersion Programme (Three Weeks)**

    Along with the Community Awareness Programmes, the student batch can also work with

any one of the below-listed governmental agencies and work in tandem with them. This community involvement programme will involve the students in exposing themselves to experiential learning about the community and its dynamics. Programs could be in consonance with the Govt. Departments.

4. Community Exit Report (One Week)

- During the last week of the Community Service Project, a detailed report of the outcome of the 8 weeks' works to be drafted and a copy shall be submitted to the local administration. This report will be a basis for the next batch of students visiting that habitation. The same report submitted to the teacher-mentor will be evaluated by the mentor and suitable marks are awarded for onward submission to the University. Throughout the Community Service Project, a daily logbook need to be maintained by the students batch, which should be countersigned by the governmental agency representative and the teacher-mentor, who is required to periodically visit the students and guide them.