

UNIVERSITY OF SARGODHA, SARGODHA
NOTIFICATION



No. UOS/Acad/623

Date: 27.12.2018

On the recommendations of Academic Council made in its meeting dated 27.12.2017, the Syndicate in its 3/2017 meeting held on 30.12.2017 has endorsed the following recommendations of the Board of Faculty of Engineering and Technology after the provision of vetted copies of the course codes and credit hours by the Director Academics:

1. Revision in scheme of studies and course curriculum for B.Sc Civil Engineering, fall 2018.
2. Revision of scheme of studies and course curriculum for B.Sc Electrical Engineering, fall, 2013, 2014 & 2018.
3. Revision in scheme of studies for M.Sc Electrical Engineering, fall, 2014 & 2015.
4. Change in nomenclature of M.Sc Electrical Engineering with specialization in power Engineering / M.Sc Electrical Engineering with specialization in Communication Engineering program to be named as M.Sc Electrical Engineering
5. Revision in scheme of studies and course Curriculum for B.Sc Mechanical Engineering, fall, 2018.
6. Revision in scheme of studies and course Curriculum for M.Sc Mechanical Engineering, fall 2015.
7. Revision in scheme of studies and course curriculum for BS Civil Engineering Technology, fall 2013.
8. BS Civil Technology program to be re-named as BS Civil Engineering Technology
9. Revision in scheme of studies and course curriculum for BS Civil Engineering Technology, fall 2018 and onward.
10. Revision in scheme of studies and course curriculum for BS Electrical Engineering Technology, fall 2013.
11. BS Electrical Technology program to be re-named as BS Electrical Engineering Technology
12. Revision in scheme of studies and course curriculum for BS Electrical Engineering Technology, fall 2018.
13. Revision in scheme of studies and course curriculum for BS Mechanical Engineering Technology, fall 2013.
14. BS Mechanical Technology program to be re-named as BS Mechanical Engineering Technology
15. Revision in scheme of studies and course curriculum for BS Mechanical Engineering Technology, fall 2018.

Further, the House agreed to the request of the Principal, College of Engineering & Technology to withdraw item at Sr. No. 07.

Eng. Dawood
24/12

Amjad Hussain Janjua
21/12/18
(AMJAD HUSSAIN JANJUA)
Deputy Registrar (Acad)

Distribution:

- Principal, University College of Engineering & Technology
- Controller of Examinations
- All Principals of Affiliated College concerned

C.C:

- Dean, Faculty of Engineering & Technology
- Secretary to the Vice-Chancellor
- P.A to Registrar

Department of Technical Education
Scheme of Studies for BS Electrical Engineering Technology
Fall 2018 Onward

Semester-I

Course Code	Course	Credit Hours	Contact Hours
MATH-111	Applied Mathematics-I	3(3+0)	3
CS-112	Computer Applications	2(1+1)	4
ENG-113	Communication Skills-I	3(3+0)	3
ET-114	Applied Physics	4(3+1)	6
ET-115	Engineering Drawing	2(1+1)	4
ISL-116	Islamic Studies	2(2+0)	2
Total:		16	22

Semester-V

Course Code	Course	Credit Hours	Contact Hours
ET-311	Microprocessor Theory and Interfacing	4(3+1)	6
ET-312	Power and Industrial Electronics	4(3+1)	6
ET-313	Switchgear and Protective Devices	4(3+1)	6
ET-314	Tele-Communication Technology	4(3+1)	6
ET-315	Industrial and Environmental Safety	2(2+0)	2
Total:		18	26

Semester-II

Course Code	Course	Credit Hours	Contact Hours
ET-121	Basic Electronics	4(3+1)	6
MATH-122	Applied Mathematics-II	3(3+0)	3
ENG-123	Communication Skills-II	2(2+0)	2
ET-124	Linear Circuit Analysis	4(3+1)	6
ET-125	Basic Mechanical Technology	4(3+1)	6
Total:		17	23

Semester-VI

Course Code	Course	Credit Hours	Contact Hours
ET-321	Power System Protection	4(3+1)	6
ET-322	Control Technology	4(3+1)	6
ET-323	High Voltage Technology	4(3+1)	6
ET-324	Power Distribution and Utilization	3(2+1)	5
PK. ST-325	Pakistan Studies	2(2+0)	2
Total:		17	25

Semester-III

Course Code	Course	Credit Hours	Contact Hours
MATH-211	Applied Mathematics-III	3(3+0)	3
ET-212	Network Analysis	4(3+1)	6
ET-213	Digital Electronics	4(3+1)	6
ET-214	Power Generation and Utilization	4(3+1)	6
ET-215	Electrical Machines-I	4(3+1)	6
Total:		19	27

Semester-VII

Course Code	Course	Credit Hours	Contact Hours
ET-421	Supervised Industrial Training	16(0+16)	40
Total:		16	40

Semester-IV

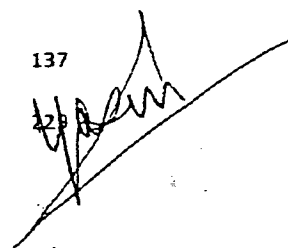
Course Code	Course	Credit Hours	Contact Hours
ET-221	Instrumentation and Measurement	4(3+1)	6
ET-222	Electrical Machines-II	4(3+1)	6
ET-223	Power Transmission	4(3+1)	6
ET-224	Data and Computer Communication	4(3+1)	6
MS-225	Total Quality Management	2(2+0)	2
Total:		18	26

Semester-VIII

Course Code	Course	Credit Hours	Contact Hours
ET-421	Supervised Industrial Training	16(0+16)	40
Total:		16	40

Total Credit Hours: 137

Total Contact Hours: 23



UNIVERSITY OF SARGODHA
~~University College of Engineering and Technology~~

Course Curriculum
BS Electrical Engineering Technology
Fall 2018 Onward

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MATH-111

Applied Mathematics-I

3(3+0)

Theory Cr Hrs, 3

Lab Cr Hrs, 0

Objectives:

1. To review the knowledge and practice the skills acquired in diploma Courses
2. To understand the concept and use of differential equations
3. To learn different methods to solve differential equations

Course Outlines:

Real numbers and real line, Functions and their graphs, Rate of change and limits.

Differential Calculus: The derivatives as a function, Differential Rules, The derivative as a rate of change, Derivatives of algebraic functions, Derivatives of exponential functions, Derivatives of trigonometric functions, The chain rule and parametric equations, Implicit differentiation, Inverse functions and their derivatives, Derivatives of inverse trigonometric functions, Derivatives of hyperbolic functions, Findings of horizontal and normal tangents, Extreme values of functions, The mean value theorem:

Integral Calculus: Basic integration formulas, Integration by parts, Indefinite integrals and the substitution rule, Integration of rational functions by partial fractions, Improper integrals, The definite integral, Substitution and area between curves, Volume by slicing and rotation about an axis, Volume by cylindrical shells, length of plane curves, Area of surface of revolution.

Complex numbers, addition, multiplication, subtraction and division of complex numbers and complex plane.

Text Book:

1. Thomas G. B. and Finney R. L. "Calculus and Analytic Geometry" (13th edition)
2. Kreyszig E. "Advanced Engineering Mathematics", John Wiley and Sons, USA (10th edition)
3. Cohen H. L. "Mathematics for Scientists and Engineers", Prentice-Hall, UK.

CS-112

Computer Applications

2(1+1)

Theory Cr Hrs, 1

Lab Cr Hrs, 1

Objectives:

To enable students to comprehend fundamentals of computer essentials

Course Outlines:

Basic Computer Organization: Major building blocks; their functions & inter connections.

Number Systems: Number conversion, Data Representation & Data structure. Processed operation, Memory & I/O of a computer

Languages: High level & Low Level Languages, Compilers interpreters, operating systems, computer programming.

Application Packages: Word processors, Data Bases, Spread Sheets.

Computer Networking Fundamentals

Recommended Books:

1. Charles Parker, "Computers today and tomorrow"
2. Tucker A. B. "Fundamentals of Computing", McGraw Hill Book Company

ET-114 Applied Physics 2(2+1)

Theory Cr Hrs, 2

Lab Cr Hrs, 1

Objectives:

To enable students to cover basic requirements of Physics

Course Outlines:

Basics of Mechanics, Moment of inertia, simple harmonics motion.

Electrostatics And Magnetism: Coulombs Law, Electrostatic potential energy of discrete charges, continuous charge distribution, Gauss's Law, Electric field around conductors, dielectrics, dual trace oscilloscope, magnetic fields, Hall effect

Semiconductor Physics, Semiconductor materials, Insulation and Conduction in different materials. Illumination

Practical work will be based on above theory.

Recommended Book:

David Halliday, R. Resnick. "Physics" (Latest Edition)

ET-125 Basic Mechanical Technology 3(2+1)

Theory Cr Hrs, 2

Lab Cr Hrs, 1

Objectives:

To enable students to grasp necessary mechanical technology skills

Course Outlines:

Stress, strain, stress-strain relationships, tensile test theory of simple bending.

Shearing distributions in various sections. Bending moment and shearing force.

Deflection of beams, torsion of bars of circular cross-section

Introduction to pure bending and torsion

Overview of design of shafts, pulleys, fly wheels, bearing and couplings.

Power transmission by belts, spur-gears and friction clutches

List of Practical's:

1. Study of Universal Testing Machine (UTM).
2. Perform tensile test on UTM for a mild steel specimen.
3. Verification of Hook's Law and determination of Modules of Elasticity.

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 Department of Technical Education
 BS Electrical Engineering Technology

4. Determination of Modules of Rigidity for circular shaft.
5. ~~Determination of central deflection of rectangular section simply supported and fixed ended beams.~~
6. Verification of Bending moment and shearing force principles.
7. Determine the co-efficient of V shaped leather belt in contact with a cast iron pulley.
8. Determine mechanical advantage, velocity ratio and Mechanical efficiency of simple Gear Train.

Recommended Books:

1. Crustar Nieman, "Machine elements design and calculations in Mechanical Engineering", Springer International(Latest edition)
2. F. P. Beer and Johnston, "Mechanics of Materials", McGraw-Hill Book Co. (Latest SI version)
3. T. Beven. "Theory of Machines"
4. F.L. Singer, "Strength of Materials" (Latest SI version)

ET-115 Engineering Drawing 2(1+1)

Theory Cr Hrs, 1

Lab Cr Hrs, 1

Objectives:

To enable students to learn and develop engineering drawing skills

Course Outlines:

Mechanical Drawing: Use of drafting instruments. Basic drafting techniques, drawing and lettering, dimensioning, projections and section of solids, Orthographic projections, Isometric views with particular reference to piping and ducting, Practice of assembly drawing.

Civil Drawing: Plan, Elevations (front, left and right) and details of buildings, elements of perspective drawings.

Electrical Drawing: Electric substation equipment layout, Schematic Diagrams of substations, lighting and power distribution boards, Electrical Symbols and one line diagrams of a typical power system.

Recommended Book:

1. Mitchel & Spencer, "Technical Drawing" (Latest Edition)

ET-121 Basic Electronics 4(3+1)

Theory Cr Hrs, 3

Lab Cr Hrs, 1

Objectives:

To enable students to understand fundamentals of Electronic principles and devices.

Course Outline:

Semiconductor Diodes: Conduction in Solids; Donors and acceptors, Impurities, Simple Diode Circuits, Biasing and applications
 Rectifiers and power supplies, special purpose diode, Zener diodes
 Bipolar Junction Transistor (BJT) and field effect transistors (FET); JFET, MOSFET, Construction, Biasing and working as amplifiers
 Operational amplifiers and relevant circuits such as summer, integrator, differentiator etc.

List of Practical's:

1. Study and plot the characteristics of semiconductor diodes
2. Perform half-wave and full-wave rectification
3. DC non-regulated power supply
4. Regulated power supply using zener diode
5. Perform biasing of a BJT and determine Q-Point
6. Study and plot the characteristics of a BJT transistor for all configurations
7. Study and plot the characteristics of a junction field effect (JFET) and Metal oxide field effect transistor (MOSFET)
8. Study and observe the input / output parameters of operational amplifier
9. Use operational amplifier in inverting and non-inverting configuration
10. Use operational amplifier as summer, integrator and differentiator

Recommended Books:

1. Paynter, "Introductory Electronics"
2. Elder, R.L. Boylestod, "Electronic Devices and Circuit Theory"
3. A.P. Malvino, "Electronic Principals" (Latest Edition)
4. Thomas Floyd, "Electronic Devices" (Latest Ed.)

ISL-116

Islamic Studies

2(2+0)

Theory Cr Hrs, 2

Lab Cr Hrs, 0

Objectives:

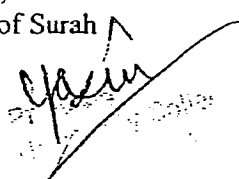
1. To provide Basic information about Islamic Studies
2. To enhance understanding of the students regarding Islamic Civilization
3. To improve Students skill to perform prayers and other worships
4. To enhance the skill of the students for understanding of issues related to faith and religious life

Detail of Courses:**Introduction to Quranic Studies:**

Basic Concepts of Quran, History of Quran, Uloom-ul -Quran.

Study of Selected Text of Holly Quran:

Verses of Surah Al-Baqra Related to Faith (Verse No-284-286), Verses of Surah Al-Hujrat Related to Adab Al-Nabi (Verse No-1-18), Verses of Surah Al-Mumanoon Related to Characteristics of faithful (Verse No-1-11), Verses of Surah al-Furqan Related to Social Ethics (Verse No.63-77), Verses of Surah Al-Inam Related to Ihkam (Verse No-152-154).



Study of Selected Text of Holy Quran:

Verses of Surah Al-Ihzaab Related to Adab al-Nabi (Verse No.6,21,40,56,57,58.), Verses of Surah Al-Hashar (18,19,20) Related to thinking, Day of Judgment, Verses of Surah Al-Saf Related to Tafakar, Tadabar (Verse No-1,14).

Seerat of Holy Prophet (S.A.W) –I:

Life of Muhammad Bin Abdullah (Before Prophet Hood), Life of Holy Prophet (S.A.W) in Makkah, Important Lessons Derived from the life of Holy Prophet in Makkah.

Seerat of Holy Prophet (S.A.W) –II:

Life of Holy Prophet (S.A.W) in Madina, Important Events of Life Holy Prophet in Madina. Important Lessons Derived from the life of Holy Prophet in Madina.

Introduction To Sunnah:

Basic Concepts of Hadith, History of Hadith, Kinds of Hadith, Uloom –ul-Hadith, Sunnah & Hadith, Legal Position of Sunnah.

Selected Study from Text of Hadith Introduction To Islamic Law & Jurisprudence:

Basic Concepts of Islamic Law & Jurisprudence, History & Importance of Islamic Law & Jurisprudence, Sources of Islamic Law & Jurisprudence, Nature of Differences in Islamic Law, Islam and Sectarianism.

Islamic Culture & Civilization:

Basic Concepts of Islamic Culture & Civilization, Historical Development of Islamic Culture & Civilization, Characteristics of Islamic Culture & Civilization, Islamic Culture & Civilization and Contemporary Issues.

Islam & Science:

Basic Concepts of Islam & Science, Contributions of Muslims in the Development of Science, Quranic & Science.

Islamic Economic System:

Basic Concepts of Islamic Economic System, Means of Distribution of wealth in Islamic Economics, Islamic Concept of Riba, Islamic Ways of Trade & Commerce.

Political System of Islam:

Basic Concepts of Islamic Political System, Islamic Concept of Sovereignty, Basic Institutions of Govt. in Islam

Islamic History:

Period of Khlaft-E-Rashida, Period of Ummayyads, Period of Abbasids.

Social System of Islam:

Basic Concepts of Social System of Islam, Elements of Family, Ethical Values of Islam.

Reference Books:

1. Hameed ullah Muhammad, "Emergence of Islam", IRI, Islamabad
2. Hameed ullah Muhammad, "Muslim Conduct of State"
3. Hameed ullah Muhammad, "Introduction to Islam"
4. Hussain Hamid Hassan, "An Introduction to the Study of Islamic Law", leaf Publication Islamabad, Pakistan.
5. Ahmad Hasan, "Principles of Islamic Jurisprudence", Islamic Research Institute, International Islamic University, Islamabad (1993)
6. Mir Waliullah, "Muslim Jrisprudence and the Quranic Law of Crimes", Islamic Book Service (1982)

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7. H.S. Bhatia, "Studies in Islamic Law, Religion and Society", Deep & Deep Publications-New Delhi (1989)
8. Dr. Muhammad Zia-ul-Haq, "Introduction to Al Sharia Al Islamia", Allama Iqbal Open University, Islamabad (2001)

ET-215**Electrical Machines-I****4(3+1)****Theory Cr Hrs, 3****Lab Cr Hrs, 1****Objectives:**

To enable students to comprehend principles and working of DC machines and transformers

Course Outlines:

Electromagnetic Induction and Basic Concepts in Rotating Machines: Introduction to magnetic circuits, magnetically induced e.m.f. and force, AC operation of magnetic circuits, Hysteresis and Eddy current losses. Magnetic fields in rotating machines, generated voltages, torque.

DC Generators: Constructional features and principle of operation, EMF equation, excitation types, load and no-load characteristics, commutation, armature reaction.

DC Motors: Principle of operation, back e.m.f., torque equation, types of DC motors, speed-torque characteristics, speed control, applications.

Transformers: Principle of operation, constructional features of single and three phase transformers, EMF equation, transformer on no-load and load, three phase transformer connections, auto- transformers.

Testing of DC Machines and Transformers: Losses and efficiency, testing of DC machines and different types of tests

List of Practical's:

1. Running of DC motor as generator action.
2. Speed control of DC motor by armature control.
3. Speed control of DC motor by field control.
4. No load saturation characteristics of separately excited DC generator.
5. Speed/voltage characteristics of self-excited DC generator.
6. Speed/torque characteristics of DC motor.
7. Determination of BHP of motor by brake test.
8. Determination of torque and efficiency by dynamo meter.
9. Regenerative or Hopkinsons test.
10. Determination of efficiency of a single phase transformer by open and short circuit tests.

Recommended Books:

Stephen J. Chapman., "Electrical Machinery Fundamentals"

Year

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ET-124 Linear Circuit Analysis 4(3+1)

Theory Cr Hrs, 3
Lab Cr Hrs, 1

Objective:

To enable students to understand electric circuits and learn basic circuit solving skills

Course Outline:

Electrical Elements and Circuits: Resistance, inductance, and capacitance, laws of resistance, Ohm's law, Kirchoff's laws, DC node voltage and loop current methods of analysis of resistive network calculations, current and voltage divider

Network Theorem: Superposition, Thevenin, Norton, reciprocity and maximum power transfer theorems

A.C. Fundamentals: Periodic function, RMS, effective, average and maximum values of current and voltage for periodic wave forms, study of simple circuits using instantaneous values of current and voltages, introduction to three phase system.

Phasor Quantities: Phasors; representation of phasors by "j" notation, complex expression for current, voltage and impedance, solution of simple RL, RC and RLC series and parallel circuits. Resonance in series and parallel RLC circuits

List of Practical's:

1. Demonstration of Ohm's law, Kirchoff's voltage and current laws
2. Demonstration of Superposition, Thevenin and Norton theorems with DC sources
3. Study of phase displacement using oscilloscope
4. Draw phasor diagrams for RL, RC and RLC circuits
5. Determine power factor for inductive and capacitive loads
6. Calculation and demonstration of RMS, average and peak values of a periodic waveform using signal generator and oscilloscope
7. Determine active and reactive power for single phase circuits
8. Determine active and reactive power for three phase circuits
9. Demonstration of series and parallel resonance in R, L and C circuits

Recommended Books:

1. Hughs, "Electrical Technology"
2. Floyd, "Circuit Analysis"
3. W. Hayt, "Engineering of Circuit Analysis"

PK. ST-325 Pakistani Studies 2(2+0)

Theory Cr Hrs, 2
Lab Cr Hrs, 0

Objective:

1. Develop vision of historical perspective, government, politics,
- Department of Technical Education, BS Electrical Engineering Technology, Fall 2018

contemporary Pakistan, ideological background of Pakistan.

2. Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

Course Outline:

Historical Perspective:

Ideological rationale with special reference to Sir Syed Ahmed Khan, Allama Muhammad Iqbal and Quaid-i-Azam Muhammad Ali Jinnah, Factors leading to Muslim separatism, People and Land (Indus Civilization, Muslim advent, Location and geo-physical features).

Government and Politics in Pakistan Political and constitutional phases:
1947-58, 1958-71, 1971-77, 1977-88, 1988-99, 1999 onward

Contemporary Pakistan:

Economic institutions and issues, Society and social structure, Ethnicity, Foreign policy of Pakistan and challenges, Futuristic outlook of Pakistan.

Recommended Books:

1. Burki, Shahid Javed. State & Society in Pakistan, The Macmillan Press Ltd 1980.
2. Akbar, S. Zaidi. Issue in Pakistan's Economy. Karachi: Oxford University Press, 2000.
3. S.M. Burke and Lawrence Ziring. Pakistan's Foreign policy: An Historical analysis. Karachi: Oxford University Press, 1993.
4. Mehmood, Safdar. Pakistan Political Roots & Development. Lahore, 1994.
5. Wilcox, Wayne. The Emergence of Bangladesh, Washington: American Enterprise, Institute of Public Policy Research, 1972.
6. Mehmood, Safdar. Pakistan Kayyun Toota, Lahore: Idara-e-Saqafat-e-Islamia, Club Road, nd.
7. Amin, Tahir. Ethno - National Movement in Pakistan, Islamabad: Institute of Policy Studies, Islamabad.
8. Ziring, Lawrence. Enigma of Political Development. Kent England: WmDawson & sons Ltd, 1980.
9. Zahid, Ansar. History & Culture of Sindh. Karachi: Royal Book Company, 1980.
10. Afzal, M. Rafique. Political Parties in Pakistan, Vol. I, II & III. Islamabad: National Institute of Historical and cultural Research, 1998.
11. Sayeed, Khalid Bin. The Political System of Pakistan. Boston: Houghton Mifflin, 1967.
12. Aziz, K.K. Party, Politics in Pakistan, Islamabad: National Commission on Historical and Cultural Research, 1976.
13. Muhammad Waseem, Pakistan Under Martial Law, Lahore: Vanguard, 1987.
14. Haq Noor ul, "Making of Pakistan: The Military Perspective", Islamabad: National Commission on Historical and Cultural Research, 1993.

MATH-122

Applied Mathematics-II

3(3+0)

Theory Cr Hrs, 3

Lab Cr Hrs, 0

Objective:

To develop an understanding of the knowledge/skill of Mathematics and to apply these in engineering problems.

Course Outline:

Differential equation; Basic concepts and ideas, geometrical interpretation of first and second order differential equations, separable equations, equations reducible to separable form, exact differential equations, integrated factors, Linear first order differential equations, Bernoulli's differential equation. Families of curves, orthogonal trajectories and applications of differential equations of first order to relevant engineering systems. Homogeneous linear differential equations of second order, homogeneous equations with constant coefficients, the general solutions, initial and boundary value problems, D- operator, complementary functions and particular integrals. Real, complex and repeated roots of characteristic equations. Cauchy equation, non-homogeneous linear equations. Applications of higher order linear differential equations. Ordinary and regular points and corresponding series solutions. Concept of sequence and series.

Recommended Books:

1. C.R. Wiley, "Advanced Engineering Mathematics 6th Edition", McGraw- Hill Education
2. Erwin Kreyszig, "Advanced Engineering Mathematics 10th Edition", John Wiley & Sons

ET-222

Electrical Machines – II

4(3+1)

Theory Cr Hrs, 3

Lab Cr Hrs, 1

Objective:

To enable students to understand principles and working of single and three phase AC machines.

Course Outline:

Alternators: Construction, principle of operation, armature reaction, voltage regulation, synchronization and parallel operation

Single Phase Motors: Universal, shaded pole, split phase, repulsion motors, speed control, starting methods

SYNCHRONOUS MOTORS: Construction, principle of operation, characteristics, applications

THREE PHASE INDUCTION MOTORS: Construction, working principle, types, equivalent circuits, starting methods, speed control and applications.

List of Practical's:

1. Study the effect of field excitation on the generation of voltage by an alternator.
2. Draw the load characteristic curve of an alternator.
3. Study the parallel operation of alternators using dark lamp and bright lamp methods.
4. Study the effect of applied voltage on an induction motor at no load.
5. Study the speed/torque characteristic of the single phase induction motor.

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 Department of
 Electrical Engineering Technology

6. Study the speed/torque characteristic of 3-phase induction motor.
7. ~~To carry out no load test of 3-phase induction motor.~~
8. Observe the changes in power factor and current with excitation of 3-phase synchronous motor.
9. Observe the effect of increasing load on power factor, armature current and speed of 3-phase synchronous motor.

Recommended Books:

Stephen J. Chapman, "Electrical Machinery Fundamentals"

ET-213 Digital Electronics 4(3+1)

Theory Cr Hrs, 3

Lab Cr Hrs, 1

Objective:

To enable students to understand and develop digital electronic circuits

Course Outline:

Number Systems, Decimal to Binary conversions, Binary Arithmetic, Boolean algebra.

Switching devices, logic gates, AND, OR, NOT, NAND, NOR, XOR, XNOR gate circuits; Modular implementation of combinational logic circuits. K-maps & truth tables

Different logic families: TTL, Emitter Coupled Logic, NMOS, CMOS.

Combinational logic circuits: adders, comparator, encoder, decoder, multiplexer, de-multiplexer, A/D and D/A converter.

Components of sequential circuits: Flip flops, their characteristics and transition tables for sequential circuit design, registers, and counters.

List of Practical's:

1. Study the characteristics of a Transistor as a switch.
2. Construction of a NOT gate using TTL.
3. Construction of AND and OR gates.
4. Construction of NAND and NOR gates.
5. Construction of adder and comparator.
6. Construction of Analog to Digital and Digital to Analog converters.
7. Study the operation and truth tables of S-R, D, JK and T flip-flops.
8. Study of encoder/decoder circuits.
9. Study of multiplexer/de-multiplexer circuits.
10. Study and construction of digital counters.

Recommended Books:

1. T. L. Floyd, "Digital Fundamentals"
2. M. M. Mano, "Digital Circuits and Computer Logic"

ET-214 Power Generation and Utilization

4(3+1)

Theory Cr Hrs, 3

Lab Cr Hrs, 1

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Objective:

To enable students to familiarize with important topics related to power generation and utilization.

Course Outline:

Conventional and non-conventional sources of energy, various types of plants and their efficiencies

Hydroelectric Power Plant: Site selection, plant layout, types of dams and turbines.

Thermal Power Plant: Site selection, plant layout, steam and gas turbines; flue gas, coal and ash flow diagrams.

Nuclear Power Plant: Basic theory of nuclear energy, reactors, shielding, generating station layout, safety and health hazards.

Electrical Energy Utilization: Design techniques for electrical wiring for domestic and industrial applications, Cable selection,

Electrical Heating: Resistive, inductive and dielectric heating, electric furnaces.

Recommended Books:

1. S. L. Uppal, "Electric Power"
2. Soni, Gupta, "A course in Electrical Power"

ENG-113 Communication Skills-I 3(3+0)

Theory Cr Hrs, 3

Lab Cr Hrs, 0

Objectives:

1. To understand the importance and basic concepts of communication
2. To enhance the listening skills and to become active listener
3. To enhance the reading skills and to become active reader
4. To improve the writing skills in general

Description:

This course is based upon lectures, group discussions, case studies and practice sessions

Course Outlines:**Introduction to Communication**

Importance, Theories, Barriers, Components

The Seven C's for Effective Communication**Listening Skills**

Blocks, Thinking and Feeling Notes Taking, Giving Feedback

Reading Skills

Active Reading Techniques, Skimming, General Reading and Careful Reading

Introduction to Writing Skills

Planning, Drafting and Editing Emphasis and Connections

Grammar and Vocabulary

Technical and Business Vocabulary, Constructing Formal Sentences

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Text Book:

1. Murphy H. A., Hildebrandt H. W. and Thomas J.P., "Effective Business Communications", McGraw-Hill, USA (Latest Edition).

Reference Books:

1. T Norman S., "We're in Business", Longman Group Ltd., UK (Latest Edition)
2. Thomson A. J. and Martinet A. V., "A Practical English Grammar", Oxford University Press, UK (Latest Edition)

ET-221 INSTRUMENTATION & MEASUREMENTS 4(3+1)**Theory Cr Hrs, 2****Lab Cr Hrs, 1****Objective:**

1. To understand the basic principles of measurement. To understand the principles of basic component and instruments used in electronics.
2. To understand the basic factors involve in measurement & designing of Electronic Systems.
3. To understand the basic functions & the applications of transducer/sensors.

Course Outline:

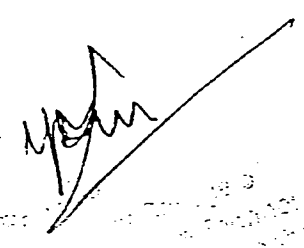
Precision measurements terminologies including resolution, sensitivity, accuracy, and uncertainty; principles of different measurement techniques; instruments for measurement of electrical properties, pressure, temperature, position, velocity, flow rates (mass and volume) and concentration; systems for signal processing and signal transmission; modern instrumentation techniques; static and dynamic responses of instrumentation and signal conditioning; principles of operation, construction and working of different analog and digital meters, oscilloscope, recording instruments, signal generators, transducers and other electrical and non-electrical instruments; types of bridges for measurements of resistance, inductance and capacitance; power and energy meters; high voltage measurements.

Lab Outline:

1. Design, construction and analysis of measurement circuits
2. Measurement of electrical parameters using different lab instruments
3. calibration of measurement instruments
4. Use of simulation and instrumentation languages (Lab VIEW).

Recommended Books:

1. Klaas B. Klaassen and Steve Gee, "Electronic Measurement and Instrumentation".
2. Cooper, W.D, "Electronic Instrumentation and Measurement Techniques".
3. Herrick, "Instruments and Measurements for Electronics".
4. Gregory. B.A., "An Introduction to Electrical Instrumentation".



ET-212 Network Analysis 4(3+1)

Theory Cr Hrs, 3

Lab Cr Hrs, 1

Objective:

To enable students to learn advanced circuit solving skills

Course Outline:

AC Circuit Analysis: Loop and node analyses for AC circuits. Power factor, power factor improvement. Transients in RL, RC and RLC circuits

AC Network Theorems: Superposition, Thevenin, Norton, reciprocity and maximum power transfer theorem.

Poly-Phase Circuits: Star and Delta connections and conversions. Voltage, current and power calculations

Electric Filters: RC low pass and high pass filter circuits, band pass and band stop filters

List of Practical's:

1. Verification of mesh and nodal circuit methods for AC analysis.
2. Observe variation of impedance and current in RLC series circuit with changes in frequency.
3. Study and observe transient response of R, L, C circuits with the help of oscilloscope.
4. Demonstration of Superposition, Thevenin and Norton theorems with AC sources.
5. Demonstration of maximum power transfer theorem with AC sources.
6. Study of Star and Delta connection.
7. Demonstration of RC low pass filter circuits.
8. Demonstration of RC high pass filter circuits

Recommended Books:

1. Boylested, "Introductory Circuit Analysis"
2. Floyd, "Circuit Analysis"
3. W. Hayt, "Engineering of Circuit Analysis"
4. K. Y. Tang, "Circuit Analysis"

ET-223 Power Transmission 4(3+1)

Theory Cr Hrs, 3

Lab Cr Hrs, 1

Objective:

To enable students to familiarize with topics in transmission and distribution

Course Outline:

Transmission Lines: Purpose of transmission, choice of frequency and voltage, parameters of overhead transmission lines, types and calculations of transmission lines. Ferranti, corona and skin effects on transmission lines

Mechanical Design of Overhead Lines: Line supports, sag and tension

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calculations, effect of wind pressure and ice loading, conductor vibration and use of dampers.

Insulators: Insulator material, types of insulators, voltage distribution over insulator string, string efficiency, methods of improving the string efficiency, testing of insulators.

DC and AC Distributors: Pointed and uniform AC and DC distributors, distributors fed at one and both ends, ring mains, stepped mains, unbalanced loading of three-phase AC distributors.

Underground Cables: Cable resistance, inductance and capacitance, methods of cable installation, voltage drop and power loss, types of cables used in industries, cable fault localization.

Static Substation: Substation location and layout, classification of substations, bus bar arrangement, grounding of star neutral point.

List of Practical's:

1. Determine the phase sequence of 3-phase source.
2. Observe the flow of real and reactive power in a 3-phase transmission line with known passive loads.
3. Observe the voltage regulation at receiving end of a 3-phase transmission line as function of type of load.
4. Study of various types of insulators used in transmission and distribution systems.
5. Study of voltage distribution along a model of string of suspension insulators.
6. Study of various poles and towers used for transmission and distribution systems.
7. Design of cables for various loads.
8. Prepare a layout scheme for a substation.
9. Visit of substation for familiarization with substation equipment.

Recommended Books:

1. AT Starr, "Transmission and Distribution"
2. Turan Gonan, Transmission and Distribution.

ENG-123 Communication Skills-II 2(2+0)

Theory Cr Hrs, 2

Lab Cr Hrs, 0

Course Outline:

Communication Environment: Organizational Structure, International Communication, Nondiscriminatory Communication, Communication Channels.

Communication and Technology: Presentation Graphics and Word Processing, Fax, E-mail, Internet and Voice Mail, CD-ROM and Online Databases, Teleconferencing, Audio Visual Aids.

Presentation Skills: Defining objective, audience analysis, style and tone, credibility, opening, closing and main ideas, use of Audio Visual Aids.

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Meetings and Interviews: Participating in Meetings, Chairing a Meeting, Asking and Answering Questions in Meetings, Preparing Resumes, Preparing for Interviews, Asking and Answering Questions in Interviews.

Letters and Memos: Formats, Positive and Negative Messages, Persuasive Communication, Requests.

Technical Report Writing: Introduction and Importance, General Formats, Short and Long Reports, Proposals, Quoting References.

Recommended Books:

1. Murphy H. A., Hildebrandt, H. W. and Thomas J.P., "Effective Business Communications", McGraw Hill USA
2. Morrissey G.L., Sechrest T.L. and Warman W.B., "LOUD AND CLEAR", Addison-Wesley Publishing Company, USA
3. Beebe S.A. and Beebe S.J., "PUBLIC SPEAKING", Allyn and Bacon, USA.

MS-225

Total Quality Management

2(2+0)

Theory Cr Hrs, 2

Lab Cr Hrs, 0

Objective:

To enable students to develop quality management skills

Course Outline:

Introduction to Quality:

Quality concepts, types and aspects, Significance of quality.

Commitment and Leadership:

Commitment and Policy, Creating or changing the culture, effective leadership.

Quality Planning:

Flow charting, process charting, purchase planning, planning for JIT.

Design for Quality:

Innovation, Quality Function Deployment and the House of Quality.

Quality Related Costs:

Prevention, Appraisal and Failure Costs, Models for Quality Costing.

Quality Measurement:

Significance, Methods, Tools and Techniques for Quality Improvement,

Basic Tools, Advanced Tools.

Quality Management System (ISO 9000 series):

Significance, Documentations, Implementation and Certification, Audits, Expected Problems.

Environmental Management System (ISO 14000 series):

Significance, Documentations, Implementation and Certification, Audits, Expected Problems.

Recommended Books:

1. Oakland J. S., "TOTAL QUALITY MANGEMENT", Bulterworth Heinemann Ltd. UK.
2. ISO 9000 series of standards
3. ISO 14000 series of standards

4. Feigenbaum, "TOTAL QUALITY CONTROL", McGraw Hill Book Co., USA.
5. Gillow H. S. and Gillow S. J., "TOTAL QUALITY MANGEMENT IN ACTION", Prentice Hall UK

ET-311 Microprocessor Theory and Interfacing 4(3+1)

Theory Cr Hrs, 2

Lab Cr Hrs, 1

Objective:

To enable students to learn essential theory and application of microprocessors

Course Outline:

Microprocessor Fundamentals:

Introduction, simplified CPU organization and instruction set, Bus systems

Microprocessor Architecture And Programming Techniques:

Structure of Intel 8086/88 microprocessor and its architecture, pin diagram and functions, data sheet descriptions, Interrupts, 8086/88 Instruction set, programming techniques, Assembly language programming of Intel microprocessor

Interfacing the Microprocessors:

Interfacing concepts, Interfacing of Microprocessor with RAM & ROM, Basic of I/O Interfacing with I/O ports (serial and parallel), Memory Map and Address Decoding, D/A & A/D interfaces, Study of CD – ROM, controllers

Microprocessor Controlled Systems:

Closed loop control systems, temperature monitoring and control system, washing machine controller, diesel generator set controller, stepper motor controller

List of Practical's:

1. Study of 8086/88 processor, its instruction set and pin layouts.
2. Execute Data transfer group of instructions.
3. Execute Arithmetic group of instructions.
4. Execute I/O instructions.
5. Execute Logic group of instructions.
6. Execute Shift and rotate instructions.
7. Execute Transfer of control instructions
8. Use ADC/DAC with 8086/88.
9. Interface a printer with 8086/88.

Recommended Books:

1. Daglas V. Hall., Microprocessing Interfacing.
2. Berry B. Bari., Intel Microprocesses.

ET-312 Power and Industrial Electronics 4(3+1)

Theory Cr Hrs, 3

Lab Cr Hrs, 1

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Objective:

To enable students to learn use of Power Electronic devices and their industrial applications

Course Outline:**Introduction:**

Introduction to power semiconductor devices, power diodes, power transistors, power MOSFET, Insulated Gate Bipolar Transistor (IGBT) and their characteristics, diodes with RC, RL, LC and RLC loads.

Thyristors: Principle of operation, characteristics, two transistor model of SCR, thyristor types, ratings, protection and cooling, thyristor turn-on and turn-off, series and parallel operation of thyristors, thyristor firing circuits.

Thyristor Converters:

AC voltage controllers, controlled rectifiers, inverters, DC link converters, DC choppers, cyclo-converters.

Industrial Electronics:

Electromechanical Control relay, Solid state relay, timing and latching relays, relay logic, Magnetic contactor, solenoids, magnetic motor starters, solid state contactors, hydraulic & pneumatic actuators. Sensors and transducers based systems and interfacing of microcontrollers.

Programmable Logic Controller:

Introduction to PLC, ladder logic diagram and programming of PLC, computer controlled machine interfacing of PLC.

List of Practical's:

1. Study the characteristics of an SCR.
2. Study the characteristics of power transistors.
3. Single phase half-wave controlled rectifier with resistive load.
4. Single phase full-wave controlled rectifier with resistive load.
5. Single phase rectifier with inductive load.
6. Three- phase half-controller rectifier.
7. Three-phase full-controller rectifier.
8. Generation of a pulse width modulation waveform.
9. Study of different types of relays.
10. Study of PLCs.

Recommended Books:

1. B. W. Williams, "Power Electronics"
2. Chute, "Electronics in Industry"
3. M. Birmingham, K. Brown, "Programmable logic controllers"
4. M. H. Rashid, "Power Electronics"

MATH-211 APPLIED MATHEMATICS-III 3(3+0)

Theory Cr Hrs, 3

Lab Cr Hrs, 0

Objectives:

1. To review the knowledge and practice the skills acquired in diploma Courses

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2. To understand the concept of matrices and determinants
3. To understand the concept and use of partial differential equations and their applications

Course Outlines:

1. Linear Algebra: Basic concepts of matrices and determinants, addition, subtraction, multiplication, linear system of equations and their solutions, Gauss elimination technique, Row reduced Echelon form, Rank of the matrices, Inverse of matrices, Gauss Jordan method, Determinants, Crammers rule, Eigen values and Eigen vectors.
2. Vector differential calculus, Gradient, Divergence, and curl, and concepts of vector integral calculus.
3. Partial Differential equations: Fourier series, Basic concepts of Partial Differential Equations, Wave equation, Heat Equation, Laplace's equation, Poisson Equation and their solutions by using Fourier Series, and Laplace transforms.

Recommended Books:

1. C.R. Wylie, "Advanced Engineering Mathematics 6th Edition", McGraw- Hill Education
2. Erwin Kreyszig, "Advanced Engineering Mathematics 10th Edition", John Wiley & Sons

ET-313 Switch Gear and Protective Devices 4(3+1)

Theory Cr Hrs, 2

Lab Cr Hrs, 1

Objective:

To enable students to familiarize with the use of different switchgear and protective equipment

Course Outline:

Introduction of Switchgear: Switchgear, essential features of switchgear, switchgear equipment, bus bar arrangement, switchgear accommodation, short circuits and short circuit currents

Circuit Breakers: Principle of circuit breakers, arc in circuit breakers, zero current-interruption theory, types of circuit breaker, oil, air blast, SF₆, vacuum circuit breaker, recovery and re-striking voltage, rate of rise of re-striking voltage, rating of circuit breakers

Protective Relays: Purpose and functions of relays, basic requirement of protective relaying, types of relays, electromagnetic attraction relays, induction relays, distance or impedance relays, differential relays

Protection: Protection of alternators and transformers, protection of bus bars and transmission lines, protection against over voltages, neutral grounding

List of Practical's:

1. Study of various types of circuit breakers
2. Study of various types of relays
3. Study of protection system for alternators
4. Study of protection system for transformers

5. Study of protection system for bus bars
6. Study of protection system for transmission lines
7. Visit of Grid station for familiarization with relevant protective devices
8. Visit of Switch yard of a power house for familiarization with relevant protective devices

Recommended Books:

1. V.K. Mehta, R. Mehta, "Principles of Power Systems"
2. The Art and Science of Protective Relaying, Vol I and II

ET-314 Tele-Communication Technology 4(3+1)

Theory Cr Hrs, 3

Lab Cr Hrs, 1

Objective:

To enable students to cover essential topics of Tele-communication systems

Course Outline:

Review of Fourier series, transform and its properties.

Amplitude Modulation: Principle of amplitude modulation. AM transmitter and receiver

Frequency Modulation: Principle of frequency modulation, FM transmitter and receiver, Aerial and wave propagation. Time division multiplexing (TDM), Frequency division multiplexing (FDM), Comparison of FDM and TDM. Digital modulation, Types of digital modulations, effect of sampling and quantization of signals. Digital transmission, AWGN and Inter symbol interference, matched filtering and pulse shaping. Introduction to Satellite System, Earth satellite station, Orbit satellite station

Mobile communication system: Concept of cellular phone, various types of mobile communication systems

Optical fiber: Characteristics, types, sources and detectors

List of Practical's:

1. Generate signals of different frequency from signal generator and observe their superposition using oscilloscope
2. Implement lowpass and highpass filters to separate low frequency signals from high frequency
3. Perform Amplitude modulation and demodulation
4. Perform Frequency modulation and demodulation
5. Demonstrate the effects of sampling and quantization through ADC and DAC
6. Prepare a GSM mobile communication network structure
7. Visit a base transiever station (BTS) site to familiarize with BTS equipment
8. Study optical fiber data sheets and determine signal losses in optical fiber
9. Splicing techniques for optical fiber

Recommended Books:

1. B.P. Lathi, "Communication System"
2. Bruce Carlson, "Communication System"

ET-321

Power System Protection

4(3+1)

Theory Cr Hrs, 3

Lab Cr Hrs, 1

Objectives:

The course presents different types of relays, relaying schemes, circuit breakers and fuses. Topics like discrimination and coordination are also introduced.

Course Outline:

Introduction to protection system, types of faults, effect of faults, fuse as protective device, types of fuses, characteristics of fuses, selection and application of fuses, discrimination and coordination, current transformer and its operation, relay construction, basic relay terminology, electromagnetic relays, thermal relays, static relays and introduction to microprocessor based protective relays, over current protection, distance protection, impedance relay, R-X diagram of impedance relay, operation of impedance relay in different zones, reactance relay, differential protection of transformers, generator protection, bus bar protection, arc voltage, arc interruption, re-striking voltage and recovery voltage, resistance switching, current chopping circuit breaker, classification of circuit breakers, oil circuit breakers, airblast circuit breakers, air break circuit breakers, SFB6B circuit breakers, vacuum circuit breakers, operational mechanism and rating of circuit breakers.

Recommended Books:-

1. S. Rao, "Switchgear and Protection", Khanna Publisher, Latest Edition.
2. Paithanker & Bhide, "Fundamentals of Power System Protection", Prentice Hall, Latest Edition.

ET-224

Data and Computer Communication

4(3+1)

Theory Cr Hrs, 3

Lab Cr Hrs, 1

Objective:

To enable students to develop necessary computer communication and networking skills

Course Outline:

Introduction to computer networks, network topologies, OSI and TCP/IP reference models, the physical layer

Transmission media, data encoding, data communication interfaces, data link layer and its protocols.

LAN, Ethernet, wide area networks, routing, hub and switches

Inter-networking, IP protocol and addressing modes, transport Layer, services provided by transport layer, worldwide web

List of Practical's:

1. Study basic network topologies and IP addressing modes.
2. Use hyper terminal to establish a console session between two PCs.

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3. Use of LAN switch to create simple networks.
4. Study and familiarization of Router.
5. Configure a Router for different network scenarios.
6. Perform network operations such as file and printer sharing.
7. Interface serial, parallel and USB ports for data transfer.
8. Study of Wide Area Network (WAN).
9. Understanding World Wide Web (WWW) network structure and IP assignment.
10. Understanding web hosting process on internet.

Recommended Books:

1. W. Stallings, "Data and Computer Communication"
2. M. Kaufmann, "Computer Networks"

ET-322

Control Technology

4(3+1)

Theory Cr Hrs, 3

Lab Cr Hrs, 1

Objective:

To enable students to understand principles and working of control systems

Course Outline:

Introduction to control systems, open and close loop control systems. Principle of feedback systems, Modeling of electrical and mechanical control systems, time and frequency domain analysis, Block diagram, transfer function, unit and impulse response, signal flow graphs, Control system components, gear trains, levers, servo mechanism; study of feedback system for automatic control of physical quantities such as voltage, speed and mechanical position. Industrial application of servo mechanism. Overview of PID controllers. Stability, Routh-Hurwitz stability criteria, compensation techniques, steady state error

List of Practical's:

1. Study of DC servomechanism.
2. Perform speed control of servo motor in open loop configuration.
3. Perform position control of servo motor in open loop configuration.
4. Perform speed control of servo motor in closed loop configuration.
5. Perform position control of servo motor in closed loop configuration.
6. Study of AC Servomechanism.
7. Servomotor control using PID controller.
8. Mini-project – demonstration of feedback control system using micro-controller.

Recommended Books:

1. Norman Nice, "Control Systems"
2. B. Kuo, "Automatic Control Systems"

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ET-323 High Voltage Technology 4(3+1)

Theory Cr Hrs, 3

Lab Cr Hrs, 1

Objective:

To enable students to familiarize with theory and practices in High voltage technology.

Course Outline:

Introduction to high voltage technology, Conduction and Breakdown in gases, liquid dielectrics, breakdown in solid dielectrics, Applications of Insulating materials in power transformers, rotating machines, circuit breakers, cables, Generation of high voltage and currents, measurement of high voltage and currents, Overvoltage phenomenon and insulation coordination in power systems, Testing of high voltage electrical apparatus.

List of Practical's:

1. Study of high voltage testing transformers.
2. Study of Vandegraff generator
3. Observation of corona inception and breakdown voltage in air.
4. Measurement of high voltage by sphere gap and uniform field gap.
5. Measurement of dielectric strength of solid insulation.
6. Measurement of Dielectric strength of insulating liquids.
7. Measurement of Impulse voltage.
8. Flashover along line insulators.

Recommended Books:

1. Naidu, "High Voltage Engineering"
2. Alston, "High Voltage Technology"
3. Dr. Abdullah, "High Voltage"

ET-324 Power Distribution and Utilization 3(2+1)

Theory Cr Hrs, 2

Lab Cr Hrs, 1

Objective:

Students are introduced to the basics of power distribution systems and effective utilization of power in heating and illumination applications.

Course Outline:

Introduction to distribution system, Urban, suburban and rural distribution systems, Primary, secondary and tertiary voltages, Radial and ring main systems, application of distribution transformers, estimation of load, load characteristics, substation switch gears and bus bar arrangements, calculation of voltage drop and regulation in distribution feeders. Grounding and earthing, distribution transformer neutral earthing resistance, earthing practice in L.V. networks, Power Factor: Disadvantages and causes of low power factor, methods for improvement, application of shunt capacitors in distribution network, Batteries & Electrochemical Processes: Main types of batteries and

their working, battery charging, electroplating, electrolysis and electro-metallurgical process. Cathodic protection of poles, gas pipes, oil pipes and water structures, Heating and Welding: Electric heating, resistance, induction and dielectric heating, electric furnaces, microwave heating, electric welding, resistance welding and its types. Fundamentals of Illumination Engineering: Laws, units and terms used, requirements for good lighting, illumination schemes for various situations (street lighting, commercial/industrial lighting, stadium/flood/stage/spot lighting etc.), types of lamps, their working and relative merit.

Recommended Books:

1. M. L. Anand, "A Text Book of Electrical Power", Latest Edition
2. Turan Gonen, "Electrical Power Distribution System", Latest Edition.

ET-315 Industrial and Environmental Safety 2(2+0)

Theory Cr Hrs, 2

Lab Cr Hrs, 0

Objective:

To enable students to develop occupational health and safety awareness skills

Course Outline:

Occupational Health:

Classification of health hazards:

Physical, Chemical and biological

Sources of risk:

Machinery, noise, electrical failure, indoor air, poor ventilation and lighting conditions, radiation, and ergonomics □ Classification of dangerous substances and their toxicity;

Routes of entry:

skin and eyes, lungs and stomach, Occupational exposure limits

Environmental monitoring at the work place:

Measurement techniques, data evaluation and analysis.

Safety Technology:

Importance of safety practices, basic concepts of plant safety, safe machinery, design and guarding, Mechanical handling, Manual handling, Access equipment, transport safety, Chemical safety, electricity and electrical equipment. Firefighting techniques, Construction safety, Demolition, Personal protective equipment

Safety Management Techniques:

Accident prevention, health and safety policy, safe systems of work, first aid provisions, health and safety training, spill response protocols, accident investigation, recording and analysis, communicating safety measures, techniques of inspection, Health and safety regulations at work place.

Recommended Books:

1. Mark Friend, "Fundamentals of Occupational Safety and Health"
2. CIRIA Report 125, "A Guide to the Control of Substances Hazardous to Health in Design and Construction", Thomas Telford Publications, 1993

3. F.A. Patty, "Industrial Hygiene and Toxicology Vol-I: General Principles"

ET-421 Supervised Industrial Training 32(0+32)

Theory Cr Hrs, 0

Lab Cr Hrs, 32

Guidelines:

The students shall undergo Supervised Industrial Training (minimum duration of 32 Credit Hours)

The students are required to submit monthly Progress Report to the institute duly verified by their Industrial supervisor. The institute is responsible to contact with all industrial supervisors to check the student's performance.

At the end of the training, the students are required to submit a detailed report to the institute and undergo viva-voce examinations.

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