SCHEME OF EXAMINATION
& SYLLABUS

of

Diploma in Electrical Engineering

UNDER

FACULTY OF ENGINEERING &TECHNOLOGY

Diploma in Electrical Engg.(3yrsProgramme)

SEMESTER-I						
CodeNo.	**Paper**	**Credits**	**External Marks**	**Practical**	**Internal Marks**	**Total Marks**
DIEE101	Communication Skills-I	3	70		30	100
DIEE102	Applied Mathematics-I	3	70		30	100
DIEE103	Applied Physics–I	3+1	70	50	30	150
DIEE104	Applied Chemistry-I	3+1	70	50	30	150
DIEE105	Engineering Drawing-I	3+1	70	50	30	150
DIEE106	Computer fundamentals and Applications	2+1	50	50		100
DIEE107	Workshop Practice-I	1		50		50
	Total	**22**	**400**	**250**	**150**	**800**

Semester-II						
CodeNo.	**Paper**	**Credits**	**External Marks**	**Practical**	**Internal Marks**	**Total Marks**
DIEE201	Communicationskills–II	3	70		30	100
DIEE202	AppliedMaths-II	3	70		30	100
DIEE203	AppliedPhysics -II	3+1	70	50	30	150
DIEE204	AppliedChemistry-II	3+1	70	50	30	150
DIEE205	BasicElectrical Engineering	3+1	70	50	30	150
DIEE206	EngineeringDrawing-II	3+1	70	50	30	150
	Total	**22**	**420**	**200**	**180**	**800**

Semester-III						
CodeNo.	**Paper**	**Credits**	**External Marks**	**Practical**	**Internal Marks**	**Total Marks**
DIEE301	Electrical&Electronics Engg Material	3+1	70	50	30	150
DIEE302	Fundamentalof Electrical Engg	3+1	70	50	30	150
DIEE303	Basic Electronics	3+1	70	50	30	150
DIEE304	ElectricalEnggDesign& Drawing-I	3+1	70	50	30	150
DIEE305	ComputerProgramming& Application	3+1	70	50	30	150
DIEE306	ElectricalWorkshop Practice-I	1		50		50
	Total	**21**	**350**	**300**	**150**	**800**
Semester-IV						
CodeNo.	**Paper**	**Credits**	**External Marks**	**Practical**	**Internal Marks**	**Total Marks**
DIEE401	ElectricalMachine-I	3+1	70	50	30	150
DIEE402	ElectricalMeasurementsand Measuring Instruments	3+1	70	50	30	150
DIEE403	ElectronicsDevices&Circuits	3+1	70	50	30	150
DIEE404	ElectricalEnggDesign& Drawing-II	3+1	70	50	30	150
DIEE405	Estimating&Costing in ElectricalEngg	3+1	70	50	30	150
DIEE406	ElectricalWorkshopPractice-II	1		50		50
	Total	**21**	**350**	**300**	**150**	**800**

Semester-V						
CodeNo.	**Paper**	**Credits**	**External Marks**	**Practical**	**Internal Marks**	**Total Marks**
DIEE501	ElectricalMachines-II	3+1	70	50	30	150
DIEE502	Power-I	3	70		30	100
DIEE503	IndustrialElectronics& ControlofDrives	3+1	70	50	30	150
DIEE504	PCMaintenance&Repair	3	70		30	100
DIEE505	DigitalElectronics& Microprocessor	3+1	70	50	30	150
DIEE506P	IndustrialTraining	2				150
	Total	**20**	**350**	**150**	**150**	**800**
Semester-VI						
CodeNo.	**Paper**	**Credits**	**External Marks**	**Practical**	**Internal Marks**	**Total Marks**
DIEE601	Utilization of Electrical Energy	3	70		30	100
DIEE602	Installation of Maintenance of Electrical equipment	3+1	70	50	30	150
DIEE603	Power-II	3+1	70	50	30	150
DIEE604	EnergyManagement	3+1	70	50	30	150
DIEE605	Entrepreneurship Development&Management	3	70		30	100
DIEE606	MajorProject Work	6	100		50	150
	Total	**24**	**450**	**150**	**200**	**800**

SEMESTER-I

DIEE101

COMMUNICATIONSKILL-I

UNIT-I

Passagefor Comprehension:-

ReferenceBooks

1. CommunicationSkillforTeachingStudentsBook-I.M/sSomaliaPublications.Pvt.Ltd., Bhopal.
2. LivingEnglishStructure–W.S.Allen
3. PracticalEnglishGrammar(ExercisesIbyThomson&Martinet)
4. EnglishconversationpracticebyGrantTaylor.

DIEE102

APPLIEDMATHEMATICS-I

UNIT-I

Algebra-

DeterminantsandMatrices-expansion

Determinants and Matrices-expansion of determinants(upto third order)using sarrusRank, expansion method and pivotal condensation method. Properties of determinants ,solutions of equations (up to 3 unknowns)byCramers‟srule.Definitionofmatrix,addition,subtractionandmultiplicationofmatrices(up to third order).inverse of a matrix by Adjoint method and elementary row transformations. Solution of equations(up to 3 unknowns)by Matrix method

UNIT-II

Logarithm

generalpropertiesoflogarithms

Partialfractions

(linearfactors,repeatedlinearfactors,nonreduciblequadraticfactors)
Toresolveproperfractionintopartialfractionwithdenominatorcontainingnonrepeatedlinearfactorsto resolve improper fraction into partial fraction

UNIT-III

Trigonometry

Trigonometric ratios of any angle relation between degree andradian
Fundamentalidentitiesexamplesbasedonfundamentalidentitiesfactorization
Anddefactorizationformulaeinversetrigonometrieratiosvalueofinversetrigonometricratios

UNIT-IV

Vectors

Definition of vector and scalar quantities. addition and subtraction of vectors. Dot product and cros productoftwovectors.Thumbrule,Anglebetweentwovectors,applicationofdotandcrossproductin engineering problems

Circle

Equationofcircleinstandardformcentreradiusformdiameterform General
equation of circle

UNIT-V

ComplexNumbers

Definition,RealandImaginarypartsofacomplexnumber,polarandCartesianrepresentation of a complex number and conversion from one to the other, conjugate of a complex number,modulesandargumentofacomplex number.

ReferenceBooks:-

- MathematicsforPolytechnicVolumeI,TTTIPublication
- AppliedMathematics,EEBPublication,Bhopal
- DifferentialCalculus,ByGorakhPrasad
- IntegralCalculus,ByGorakhPrasad
- CoordinateGeometry,By.S.L.Loney

DIEE103

APPLIEDPHYSICS-I

UNIT-I Units and DIEEnsions: Physical quantities, Fundamental and derived units, Systems of units (FPS, CGS, MKS and SI units) , DIEEnsions and DIEEnsional formulae of physical quantities (area, volume, velocity, acceleration, momentum, force, impulse, work, power, energy, surface tension, coefficient of viscosity and strain) Principle of homogeneity , DIEEnsional equations and their applications,conversionfromoneunittoanotherunitfordensity,force,pressure,work,power,energy, velocity, acceleration , Limitations of DIEEnsional analysis

UNIT-II

Force and Motion: Scalar and vector quantities – examples, addition and multiplication (scalar product and vector product) of vectors. Force,resolution and compositionofforces – resultant, parallelogramlaw of forces. Equilibrium of forces, Lami‟s theorem. Newton‟s Laws of motion – concept of momentum, Newton‟s laws of motion and their applications, determination of force equation from Newton‟s second law of motion; Newton‟s third law of motion conversion of momentum, impulse and impulsive forces, simplenumericalproblemsbasedonthirdlaw.Projectile,horizontalandobliqueprojectionsandequation of trajectory . Derivation of time of flight, maximum height and horizontal range , Circular motion, Relationbetween linearand angular velocityand linear acceleration and angular acceleration, Centripetal force (derivation) and centrifugal force, Banking of roads

UNIT-III

Work, Power and Energy: Work: definitions and its SI units, Work done in moving an object on horizontal and inclined plane (incorporating frictional forces). Power: definitions and its SI units, calculation of power in simple cases. Energy: Definitions and its SI units: Types: Kinetic energy and Potentialenergy,withexamplesandtheirderivation,Principleofconservationofmechanicalenergy(for freely falling boDIEEs), transformation of energy from one form to another

Properties of Matter: Elasticity, definition of stress and strain , Different types of modulus of elasticity. Explanationofstress–straindiagram.Pressure–itsunits,gaugepressure,absolutepressure,atmospheric pressure, Bourdon‟s pressure, manometers and barometer gauges. Surface tension – its units, measurement of surface tension by capillary tube method, applications of surface tension, effect of temperature and impurity on surface tension . Fluid motion, stream line and turbulent flow, Reynolds number. Viscosity and coefficient of viscosity; derivation of terminal velocity; effect of temperature on viscosity.

UNIT-IV

Wavesandvibrations:Generationofwavesbyvibratingparticles,Wavemotionwithexamples,Typesof wave motion, transverse and longitudinal wave motion with examples . Velocity, frequency and wave length of a wave (relationship $v = \eta\lambda$). Sound and Light waves. Simple harmonic motion: definition, expression for displacement, velocity, acceleration, time period, frequency in S.H.M. Vibration of cantilever and beam, determination of time period of a cantilever. Free, forced and resonant vibrations with examples

RotationalMotion:Definitionsoftorque,momentofinertia,radiusofgyration,Derivationofrotational kinetic energy and angular momentum, Conservation of angular momentum (qualitative). Theorems of

parallelandperpendicularaxes

Gravitationandsatellites:Kepler‟slawofplanetarymotion,Newton‟slawofgravitation,Escape velocity (derivation), Satellites, Geo-stationary satellite

UNIT-V

Temperature and its measurement: Principles of measurement of temperature and different scales of temperature,DifferencebetweenheatandtemperatureonthebasisofK.E.ofmolecules,Bimetallicand Platinumresistancethermometer:theirmeritsanddemerits,Pyrometers –Disappearingfilamentoptical pyrometer

Transfer of Heat: Modes of transfer of heat (conduction, convection and radiation with examples) Coefficient ofthermal conductivity, determination of thermal conductivityof good conductor (Searle‟s method)andbadconductor(Lee‟sdiscmethod),PropertiesofheatradiationStefan‟slaw,Kirchhoff‟s law, Wien‟s law, Planck‟s black body radiation law, Prevost‟s theory of heat exchange

LISTOF PRACTICALS

1. Tofindthethicknessofwireusingascrewgauge
2. Tofindvolumeofsolidcylinderandhollowcylinderusingavernier caliper
3. Todeterminethethicknessofglassstripandradiusofcurvatureofaconcavesurfaceusinga spherometer
4. Tofindthesurfacetensionofaliquidbycapillaryrisemethod
5. Todetermineandverifythetimeperiodofcantileverbydrawinggraphbetweenload(w)and depression (D)
6. TodeterminetheatmosphericpressureataplaceusingFortin‟sBarometer
7. Todeterminethecoefficientoflinearexpansionofametalrod
8. TofindthecoefficientofthermalconductivityofcopperusingSearle‟sconductivityapparatus

Tofindthecoefficientofthermalconductivityofbakelitesheet(badconductor)byLee‟sDiscMethod

RECOMMENDED BOOKS

1. AppliedPhysicsVol.I,TTTIPublicationTataMcGrawHill, Delhi
2. BasicAppliedPhysicsbyRKGaur;DhanpatRaiPublications
3. ComprehensivePracticalPhysics -VolumeIand IIbyJNJaiswal;LaxmiPublishers
4. NumericalProblemsinPhysics-Volume IandIIbyRSBharaj;TataMcGrawHill
5. SimpleCourseinElectricityandMagnetismbyCLArora;SChandandCo,NewDelhi
6. FundamentalPhysics-Volume IandIIbyGomberandGogia;PardeepPublications,Jalandhar
7. ATextBookofOpticsbySubramanianandBrij Lal
8. PhysicsLaboratoryManualbyPKPalanisamy,ScitechPublications
9. FundamentalsofPhysicsbyResnickandHalliday,AsianBooksPvt.Ltd.,New Delhi
10. ConceptsinPhysicsbyHCVerma;BhartiBhawanLtd.,NewDelhi
11. AppliedPhysicsVol.I&IIH.C.Saxena&PrabhakarSingh
12. AppliedPhysicsVol.I&IID.Halliday&R.Rasnick
13. EngineeringPhysics–BVNRao
14. PrinciplesofPhysics–K.K. Mohindroo
15. BasicPrinciplesofPhysics–BrijLalSubramanyam.

DIEE104

APPLIEDCHEMISTRY-I

UNIT-I

Language of Chemistry: Definition of symbol, formula, valency and chemical equation. Writing of the chemical formula of a simple chemical compound. Calculation of percentage composition of a chemical compound,Essentialsofachemicalequation,balancingofachemicalequationbyHitandTrialmethod.

UNIT-II

ChemicalBonding:Electronicconceptofvalency,Elementaryaccountofelectrovalent,covalentand coordinate bond formationon the basis of the electronic concept of valency with the help of suitable examples to each

UNIT-III

Water:Hardandsoftwater,typesofhardnessanditscauses,disadvantagesofhardnessofwater(i)in industrial use (ii) in boilers for steam generation. Methods to remove hardness of water (i) Clark‟s Process (ii) Permutit Process (iii) Soda Lime process (iv) Ion-Exchange process. Simple numerical problems related to soda lime process. Definition of degree of hardness of water and the systems to express the degree of hardness of water. Simple numerical problems related to finding the degree of hardness on differentscales. Qualities of waterusedfordrinkingpurposes, treatment ofriverwaterto make it fit for town supply

UNIT-IV

Solutions:Conceptofhomogenoussolution,briefintroductionoftheterms(i)Ionization(ii)Acidity(iii) Basicity(iv)equivalentweightandgramequivalentweightwithsuitableexamplesStrengthofasolution (i)Normality(ii)Molarity(iii)Molarityasappliedinrelationtoasolution.Simplenumericalproblems related to volumetric analysis, Definition of pH, and different industrial applications of pH

UNIT-V

Electrolysis: Definition of the terms: Electrolytes, Non-electrolytes conductors and non-conductors with suitable examples. Faraday‟s Laws of Electrolysis. Simple numerical problems based upon the laws of electrolysis,Differentindustrialapplicationsof,,Electrolysis‟.Elementaryaccountof(i)leadacidbattery and (ii) Ni-Cd battery with special reference to their reaction mechanisms.

LISTOF PRACTICALS

1. Volumetricanalysisandstudyof apparatus usedtherein. Simple problems on volumetric analysis equation
2. Preparationofstandardsolutionofoxalicacidorpotassiumdichromate
3. Determinethestrengthofagivensolutionofsodiumhydroxidewiththehelpofastandard solution of oxalic acid
4. DeterminethestrengthofsolutionofHClwiththehelpofasolutionofNaOHandan intermediate solution of standard oxalic acid
5. FindtheamountofchloridesinmgperliterinasampleofH_2Owiththehelpofasolutionof $AgNO_3$
6. Determinethedegreeoftemporaryhardnessofwaterby‟Hehner‟smethod
7. EstimatetheamountofCuinasampleof$CuSO_4$usingastandardsolutionof $Na_2S_2O_3$

8. Estimationofamountofironinhematiteorevolumetrically
9. Estimationoftotalalkalinityofwater volumetrically
10. Determineconductance,pHofwatersampleusingconductancebridgeandpHmeter

RECOMMENDEDBOOKS

1. ChemistryinEngineeringbyJ.C.KuriacoseandJ.Rajaram;TataMcGraw-HillPublishing Company Limited, New Delhi
2. Engineering Chemistry byDr.S.RabindraandProf. B.K.Mishra;KumarandKumarPublishers (P)Ltd.Bangalore-40
3. "ATextBookofAppliedChemistry-I"bySSKumar;TataMcGrawHill, Delhi
4. "ATextBookofAppliedChemistry-I"bySharmaandOthers;TechnicalBureauofIndia, Jalandhar
5. EngineeringChemistrybyJainPCandJainM
6. ChemistryofEngineeringbyAggarwalCV
7. ChemistryforEnvironmentalEngineersbySwayerandMcCarty,McGrawHill,Delhi
8. ProgressiveAppliedChemistry–IandIIbyDr.G.H.Hugar;EaglePrakashan,Jalandhar
9. EngineeringChemistrybyO.P. Agrawal.
10. PhysicalChemistrybyGlosstone.
11. OrganicChemistrybySarkarand Rakshit.
12. EngineeringChemistrybyM.M.UppalRevisedbyS.C. Bhatia.
13. ModernTextBookofAppliedChemistrybyP.C.Jain,Dr.G.C.SaxenaandDr.A.K.Goswami.

DIEE105

ENGINEERINGDRAWING-I

UNIT-I

1. Introduction

- Introductiontodrawingequipments,instrumentsandtheir uses
- PlanningofdrawingsheetasperI.S.696 –1972
- Indianstandardpracticesoflayingoutandfoldingof drawing
- Differenttypesoflinesusedinengineeringdrawing
- Standardpracticeforwritingsinglestrokeverticalandinclinedcapitalandlowercasesletters (practice to be done on sketch book)
- Standardpracticeofwritingnumerals(practicetobedoneonsketchbook)

2. DIEEnsioningtechniquesandstandardconventions

- IdentificationandrepresentationofvarioussymbolsusedinMechanicalandElectricalDrawing
- DrawingIdentificationandrepresentationofvarioussymbolsofbuildingelements,materialsand sanitary fittings
- Principles,systemandarrangementofDIEEnsioning
- PracticeproblemsofcurrentmethodofDIEEnsioning
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UNIT-II

1. Formassociatedwithengineeringcurves

- TypesofengineeringcurvesMethodofconstructionofEngineeringCurves
- PracticeproblemsofdrawingvariousEngineeringCurves.
- ImportanceofscaleinEngineeringdrawing
- Typesofscales-plain,diagonal etc.
- Practicalproblemsforconstructingvarioustypesofscale.

2. Orthographicprojectionofpoints,linesandplanes

- Definitionsofvarioustermsassociatedwithorthographicprojections.
- Planesof projections
- Conceptof Quadrants
- Firstandthirdanglemethodof projection
- ProjectionoflineindifferentpositionswithrespectstoH.P.V.P.andX-Yline
- Projectionofplanesindifferentpositionwithrespecttoreferenceplanes
- Practiceproblemsonprojectionofpoints,linesand planes.

UNIT-III

1. Projectionsofsimplemachinepartsandcomponents

- Procedurefordrawingprojectionsandsectionalviewsofsimplemachinecomponents
- Practiceproblemsofsketchinganddrawingtheprojectionsandsectionsofsimplemachine components.

2. Projectionsofsolids

- Typesofsolidsandassociatedterminology
- Positionofsolidwithrespecttoreference planes
- Drawingprojectionsofsolidindifferentpositionwithrespecttoreferenceplanes
- Practiceproblemstodrawprojectionsofsolidindifferentpositions.

UNIT-IV

1. Sectionof solids

- Conceptofsectioningplanes
- Auxiliaryplanesandtrueshapeof section
- Practiceproblemsfordrawingprojectionsandsectionofsolids**.**

2. Developmentofsurfaces

- Conceptandimportanceofsurfacedevelopmentinengineeringfield
- Developmentofsurfacesforthefollowing
- Cube
- Cylinder
- Prism
- ConeandFrustumcone
- Practiceproblems.

UNIT-V

1. Isometricprojections8

- Limitationsoforthographicprojections
- Definitionsofthetermsaxonometric,oblique,Isometricanddiametricprojections
- Procedureforpreparingisometricoblique
- Isometricviewofgeometricalsolidsandsimplemachineparts
- Practiceproblems.

2. BasicsofCAD

- ComputerhardwareandsoftwarerequirementforCAD
- Co-ordinatesystems
- Set upfora CADdrawing
- Drawingobjectslike-Line,Circle,Arc,Ellipse,RegularPolygons,Polylines,Donutsetc.
- EditingCommandslike-Move,Copy,Rotate,Scale,Fillet,Chamfer,Trim,Extend,Array, Mirror etc.
- BasicDIEEnsioning,geometricDIEEnsioningandtolerance
- UseCADcommandsforsimpleorthographicandisometricdrawings

InstructionalStrategies

- LectureMethod
- Demonstrationanduseofinstrumentusedin drawing.
- Classroompracticesfordifferenttypical exercises.
- Useofcomputerfordevelopingdrawing
- OHPTransparenciesforcomplicateddrawingobjects

ListofPracticals

- ProblemsonScalesandLetterings(Onesheet)
- ProblemsonCurves(Onesheet)
- SimpleOrthographicProjections-OneforFirstAngleandOneforThirdAngleProjection(Two sheets)
- Orthographicprojectionswithsections(Onesheet)
- Isometricprojectionfortwoobjects(Onesheet)
- ProjectionofPointsandLines(Onesheet)
- ProjectionofPlanes(Onesheet)
- ProjectionofSolids(Twosheets)
- SectionofSolids(Twosheets)
- Developmentofsurface(Twosheets)
- UseCADfororthographicprojection(Fiveproblems)
- UseCADforisometricprojection(Threeproblems)

ReferenceBooks

1. I.S.696.(Latestrevision),BIS, India
2. EngineeringDrawing,N.D.Bhatt,CharoterPublisher,Anand
3. EngineeringDrawing&MachineDrawing,R.K.Dhawan,Kumar
4. EngineeringDrawing,R.B.Gupta,SatyaPrakashan,Delhi
5. GeometricalDrawing,P.S.Gill,ketson& Sons

DIEE106

ComputerFundamentalsandApplications

UNIT-I

1. INTRODUCTIONTOCOMPUTERS

GenerationsOfComputer-

-First,Second,ThirdandFourth generation.

Classification&applicationsofcomputers-

- Micro,Mini,MainframesandSuper-Computers.
- Applicationsofcomputers.

2. MICROCOMPUTER

Structure&WorkingOfMicroComputers

- CentralProcessingUnit.
- MemoryUnit.
- Input&Output Devices.

EvolutionOfMicro-Computers

- Comparativestudyw.r.t.Micro-processor,clockspeed,databus,Registersize,storagecapacity, peripheral interface of PC to Pentium-IV computer systems.

UNIT-II

1. DATAREPRESENTATION

Data Representation

-Bit,byte,Nibble,Word,DoublewordCodes:ASCII,BinaryCodedDecimal(BCD)EBCDIC, GREY and EXCESS 3 code

.**Number Systems**

-Typesofnumbersystems-Binary,Octal,Decimal,Hexadecimal.

ConversionsOf NumberSystemsAndItsOperations

-Binaryaddition,subtraction

.-BCDaddition, subtraction.

-1'scomplementand2'scomplementmethodsofsubtractionFloatingpointarithmetic.

UNIT-III

1. COMPUTERLANGUAGES

ClassificationAndCharacteristicsOfLanguages

-Machinelanguage.

-Assemblylanguage.

-Highlevellanguage.

-Hardware,SoftwareAndFirmwareComputerHardwareClassificationOfSoftware

2. INTRODUCTIONTODOSOPERATINGSYSTEMS

- **Micro-SoftDiskOperatingSystem(Ms-Dos)**
  -Systemfiles:BIOS,COMMAND.COM,CONFIG.SYS,Autoexec.batfile.
- **MS-DOSCommands**

-InternalCommands –dir,cd,md,rd,del,ren,date,time, vol.
AndcopyExternalcommands–attrib,format,edit,find,diskcopy,backup&restore.

UNIT-IV

1. INTRODUCTIONTOWINDOWSOPERATINGSYSTEMS

WindowsOperatingSystem

-ConceptofWindows-Arranging,Moving,Resizing,Opening,andClosingofwindows
.-Folder/FileManagement-Search,copy,deleteandrenamefilesandfoldersWindows Accessories: Notepad, Word Pad, Pad.

2. COMPUTERAPPLICATIONSSOFTWARE.

- **WordProcessingSoftware**
  MS Word
- **DataAnalysisSoftware**
  MSExcelIntroductiontoElectronicSpreadsheet.
- **PresentationSoftware**
  MSPower Point

UNIT-V

1. INTERNETAPPLICATIONS

IntroductionToInternet-DifferentServicesOfInternet

-www
-Email
-Chat(textual/voice)
-BulletinBoards
-Videoconferencing
-FTP(uploadinganddownloadingfiles)

WEB-SITEACCESSANDINFORMATIONSEARCH

-Browsersandsearchengines.

2. INTERNETCONNECTIVITY

Internet Connectivity

-InternetServiceProvider(ISP)
-Internetaccounts:Shellaccount,TCP/IPISDNandLeasedLine
-Accountanditsfeatures.

HardwareRequired

-MODEMandTerminal Adapters.
-Systemsoftware:O.S.Loader,Linker,Interpreter,CompilerandAssemblerApplication Software.

ListofExperiments/Demonstrations/Tutorials

- StudyOfInputAndOutputDevices
- StudyOfStorage Devices
- PracticeOnInternalAndExternalMs-DosCommands
- PracticeOnWindows95/98/2000

StartingWindows,Exploringthedesktop,Arrangingwindows,MyComputer,Thestartbutton,Creating

Shortcuts,Practiceonmovingandsizingof windows.
Study of file organization: creating, copying, moving, renaming and deleting. -Practice on WindowsAccessories–Notepad,WordPadandPaint.Editingdocument&formattingtext, Previewing and printing document/Image file. -Practice on Windows Explorer.
Recyclebin,Shuttingdownwindows.

PRACTICEONMS-WORD

Createandformatdocument,

EditandModifytext-changingfontsizetypeandstyle.

AutoText,AutoComplete,AutoCorrect,grammarandspellchecker,Findandreplaceoftext. Open

save and print a document.

Insert,modifytable.

PRACTICEONMICROSOFTEXCEL

Create,save&formatworksheet

Open and save worksheet file.

Edit & modify data.

Use formula and functions.

Splitwindowsandfreezepans.

Create,edit,modify,printworksheet/charts.

PRACTICEONPOWERPOINT

Create,edit,insert,move,slides.

Open and save presentation.

Insertpicture,slidelayout,actionbutton.

Present slide show.

PRACTICEONINTERNET

IdentificationoftypeofAccount.Connectingto internet.

Dial up access
Web browsing
Searchingwebsites
Email services
Creatingemailaccounts&Receivingandsendingmails

ReferenceBooks

1. IntroductiontoComputers,IindEdition1998,PeterNorton'sTataMcGrawHillsPublishing
2. TheABCsofMs-Office97,IstEdition,GayHart Davis
3. ComputerOrganizationandarchitecture,IVth–Edition1996,WilliamStalling
4. StructuredcomputerOrganization,IIIrd–Edition1997,AndrewsTanenbaumPrenticeHallof India Pvt. Ltd, N. Delhi
5. Teachyourself……windows95,Ist –Edition1995,ALStevensComerBPBPublication,N. Delhi
6. TheInternetBook,II–Edition200,DouglasE.PrenticeHallofIndiaPvt.Ltd,N. Delhi

DIEE107

WORKSHOPPRACTICE-I

1Measurement,Identificationanduseofthevariousmeasuringtools&instruments.

- Linearmeasurementsandmeasuringdevices.
- Angularmeasurementsandmeasuringdevices
- Othermeasuringtoolssuchassurfaceplate,Surfacegauge,plateSafetyindifferentshopof workshops.

2. Woodworking(carpentry shop)

- 2.1Identificationofcarpentrytoolsandtheiruses.
- 2.2Performvariouswoodworkingoperations.

3. Fittingshop.

Identificationofvarioustoolsusedandtheoperationsperformedinfittingshop.
Performvariousfittingoperations.
Markingofjobasper DIEEnsior.
Sawing.
Chipping.
Filling.
Taping.
Reaming.
Drilling.
SmithyShip
identificationofvarioustoolsandequipmentsused&theiruse.
PerformVarioussmithyoperations.
Upsetting.
Drawingdown.
Bending
Settingdown.
Welding.
Cutting.
Punching.
Fullering.

4.Sheetmetal.

Identificationanduseofthevarioustools.
Performvarioussheet-metaloperations.
Shearing
Bending
Drawing
Squeezing.
Markingon sheet
Snipping.
Grooving

5 WeldingShop

Identificationanduseofthevarioustoolsandequipments.
Performthearcweldingandgasweldingoperations.
PerformthesolderingandBrazingoperations.

6 Machineshop

Identificationanduseofthevarioustoolsandequipments.
Classificationoflatheandoperationoflathe.
Plane turning

COMMUNICATIONSKILLS- II

DIEE201

CourseObjective-

Language is the most commonly used and effective medium of self-expression in all spheres of humanlife – personal, social and professional. A student must have a fair knowledge of English language and be able to pursue the present course of study and handle the future jobs in industry. The objective of this course is to assist the diploma holders to acquire proficiency, both in spoken (oral) and written language. At theend ofthecourse,the student will be ableto develop comprehension,improve vocabulary, develop grammatical ability, enhance writing skills, correspond with others, enhance skills in spoken English.

DETAILEDCONTENTS

Unit-I

ProseText Book

ThefollowingsixchaptersofABookofEnglishpublishedbyMcmillionIndia Uncle

Podger Hangs a Picture

Subash Chandra Bose

A Pair of Mustachios

Guru Gobind Singh

WithThePhotographer

SirJagdishChandraBose

Therewillbeonegeneralquestionfromoneofthesesix chapters.

Precisewriting(selectedfromtheprescribed6chaptersofProseTextBook)

Unit-II Grammar

- Antonymschangeofwordsintodifferentpartsofspeech
- Correspondence

Businessletterssuchas:

Registration as supplier

Floatingquotationsandtenders

Quarryforproductspecification,priceandotherdetailsetcfromafirm/Company

Covering letter for quoting prices against a quotation/tender

Placingsupplyorder

- Note-Making
- InterviewSkills

Unit-III

Officialletterssuchas:

- Lettertoeditorforplacinganadvertisementinthenewspaperforpurchase/sellingofgoods
- Letter to General Manager, Telephone Department for restoring a dead telephone/shifting a telephone Letter to Municipal Commissioner for improving water supply/ sanitation system in your locality
- LettertoStateElectricityBoardforrepairofstreetlighting/correctionofbills etc.
- Lettertothesupplierforrectifyingorreplacingadefectivemachinery/itemofpurchase
- Letter to Registrar, State Board of Technical Education for allowing to improve grades/marks in diploma examination

Unit-IV

- Report Writing
- Draftingatechnicalreportofavisittoafactory,constructionsite,modernoffice, etc.
- Reportwritingoncurrentgeneralthemes/topicsrelatedtoeconomy,industry,social issues
- Elementsofperiodicalprogressreport
- InspectionNote
- Writeaninspectionnoteafterinspectingtechnical/industrialgoods
- Writeaninspectionnoteaftervisitingaconstructionsiteorproductionshop
- Writing“Preface”and“acknowledgement”ofaprojectreportAparagraphoncurrent topics/themes

Technology

Science

Economy

Politics

Social

General

- Drafting
- Pressnotes

- Memos/circulars
- Notices(lostandfound:obituary/auction,etc)
- Telegrams
- Pressreleases
- Agendaandminutesofthemeeting
- Personalresume/curriculumvitae

Unit-V

CommunicationTechniques

- Importanceofcommunication
- Typesofcommunication–verbalandnon-verbal
- Onewayandtwo-waycommunication
- Processofcommunication–horizontal,vertical,upward,downward
- Essentialsofgood communication
- Levelofcommunication–interandintrapersonal,grouptoperson,groupto group
- Methods of effective oral, written and non-verbal communication, Horizons– tone, frequency,rate, volume, depth
- Barriertocommunicationandovercomingbarriers
- Listeningskill
- Useofaudiovisualaidsforeffective communication

ReferenceBooks

Essentials of Business Communication by Pal and Rorualling; Sultan Chand and Sons

TheEssenceofEffectiveCommunication,LudlowandPanthon;PrenticeHallofIndia

New Design English Grammar, Reading and Writing Skills by AL Kohli (Course A and course B), Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh,

New Design English Reading and Advanced Writing Skills for Class XI and XII by MK Kohliand ALKohli; Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh,

APracticalEnglishGrammarbyThomsonandMarlinet

SpokenEnglishbyVSasikumarandPVDhamija;TataMcGrawHill

English Conversation Practice by Grount Taylor; Tata McGraw Hill

DevelopingCommunicationSkillsbyKrishnaMohanandMeeraBanerji;MacMillanIndiaLtd.,Delhi

BusinessCorrespondenceandReportWritingbyRCSharmaandKrishnaMohan;TataMcGrawHill Publishing Company Ltd. New Delhi

CommunicationSkillsbyMs.RDattaRoyandKKDhir,VishalPublication,Jalandhar

CourseOutcome–

1. Studentswillbebetterequippedintheskillsessentialforeffectivecommunication.
2. Thiscoursewillinstructstudentsaboutthein-depthknowledgeofcareeroriented

DIEE 202

APPLIEDMATHEMATICS– II

RATIONALE

Applied Mathematics forms the backbone of engineering discipline. Basic elements of differential calculus,integralcalculus,differentialequationsandcoordinategeometryhavebeenincludedin the curriculum as foundation course and to provide base for continuing education to the students.

DETAILEDCONTENTS

Unit:I

Functionandlimit

Function–definitionofvariableconstantintervalsuchasopenclosedsemiopenetc Definition

of function value of a function and types of functions

Limit–definitionoflimitlimitsofalgebraictrigonometricexponentialandlogarithmicfunction

Unit: II

Differentiation

Definitionofdifferentiation

Differentiationbyfirstprincipleofxn,(ax+b)n,Sinx,cosx,tanx,secx,,cosecxandcot x,ex,ax,log x.Differentiationofafunctionofafunctionandexplicitandimplicitfunctions

Differentiation of sum, product and quotient of different functions

Unit: III

IntegralCalculus

Integrationasinverseoperationofdifferentiation

Simpleintegrationbysubstitution,bypartsandbypartialfractions

Evaluationofdefiniteintegrals(simpleproblems)byexplainingthegeneralpropertiesofdefinite integrals

Unit: IV

Statistics

measuresofcontroltendency.Mean,median,Mode

Measure of Dispersion mean, Standard deviation

Meandeviationvarianceandcoefficientofvariationcomparisonof Two

sets

Unit:V

DifferentialEquation

Definitionofdifferentialequation

Order of differential equation

Explanation of order and degree

Solutionofdifferentialequationoffirstorderandfirstdegree

ReferenceBooks:

1. HigherEngineeringMathematicsbyBSGrewal
2. EngineeringMathematicsbyBSGrewal
3. EngineeringMathematicsvol.IIbySKohliandOthers,IPH, Jalandhar
4. EngineeringMathematicsbyIshanPublication
5. AppliedMathematicsVol.IIbySSSabharwalandOthers;EagleParkashan,Jalandhar
6. EngineeringMathematicsbyIBPrasad
7. AppliedMathematicsVol.IIbyDrRDSharma
8. AdvancedEngineeringMathematicsbyABMathurandVPJagi;KhannaPublishers,Delhi
9. HigherEngineeringMathematicsbyBSGrewal;KhannaPublishers,Delhi
10. EngineeringMathematicsbyCDassChawla;AsianPublishers,NewDelhi

DIEE 203

APPLIEDPHYSICS–II

RATIONALE

Applied physics includes the study of a large number of diverse topics related to things that go in the worldaroundus.Itaimstogiveanunderstandingofthisworldbothbyobservationand predictionofthe way in which objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content.

DETAILEDCONTENTS

Unit:I

Applicationsofsoundwaves.

- Acousticsofbuildings–reverberation,reverberationtime,echo,noise,coefficientofabsorption of sound,methods to control reverberation time
- Ultrasonic‟s–production(magnetostrictionandpeizo-electric)andtheirengineeringapplications

Unit: II

Principleofoptics

- Introduction:reflectionoflight,imageformationinmirrors(convexandconcave),refractionand refractiveindex, image formation in lenses, lens formulae (thin lens only), power of lens, total internal reflection
- Defectsinimageformationbylensesandtheircorrection
- SimpleandcompoundmicroscopeastronomicalandGalileotelescope,magnifyingpowerand its calculation (in each case)
- Overheadprojectorandslideprojector

Unit: III

Electrostatics

- Coulombslaw,unitcharge
- Gauss‟sLaw
- Electricfieldintensityandelectricpotential
- Electricfieldofpointcharge,chargedsphere(conductingandnon-conducting),straightcharged conductor, plane charged sheet
- Capacitance,typesofcapacitors,capacitanceofparallelplatecapacitor,seriesandparallel combination of capacitors
- Dielectricanditseffectoncapacitors,dielectricconstantanddielectricbreakdown

Unit: IV

Electricity

- Ohm‟slaw
- Resistanceofaconductor,specificresistance,seriesandparallelcombinationof resistors,effect of temperature on resistance
- Kirchhoff‟slaws,Wheatstonebridgeprincipleanditsapplications
- Heatingeffectofcurrentandconceptofelectric power
- Semiconductor physics
- Energybands,intrinsicandextrinsicsemiconductors,p-njunctiondiodeandits characteristics
- Diodeasrectifier–halfwaveandfullwaverectifier,semiconductortransistorpnp andnpn (concept only)

Unit:

VModernPhysi

cs

- Lasers:conceptofenergylevels,ionizationandexcitationpotentials;spontaneousandstimulated emission; lasers and its characteristics, population inversion, types of lasers, helium – neon and ruby lasers and applications
- Fiberoptics:Introduction,opticalfibermaterials,types,lightpropagationand applications
- Superconductivity:Phenomenonofsuperconductivity,effectofmagneticfield,criticalfield, type I and type II super conductors and their applications)
- Energysources–conventionalandnon-conventional(wind,water,solar,bio,nuclearenergy), only elementary idea

LISTOF PRACTICALS

1. ToverifyOhm‟slaw
2. Toverifylawofresistancesinseriesandin parallel
3. Todeterminethemagnifyingpowerofacompoundmicroscope
4. Todeterminethemagnifyingpowerofanastronomicaltelescope
5. Toconvertagalvanometerintoanammeterofagiven range
6. Toconvertagalvanometerintoavoltmeterofagivenrange
7. TofindthewavelengthofaHe-Nelaser
8. Tofindthefrequencyofatuningforkbyasonometer
9. Tostudycharacteristicsofapnjunctiondiode

Reference books:

1. AppliedPhysicsVol.II,TTTIPublicationTataMcGrawHill,Delhi
2. BasicAppliedPhysicsbyRKGaur;DhanpatRaiPublications
3. ComprehensivePracticalPhysics-VolumeIandIIbyJNJaiswal;LaxmiPublishers
4. NumericalProblemsinPhysics-VolumeIandIIbyRSBharaj;TataMcGraw Hill
5. SimpleCourseinElectricityandMagnetismbyCLArora;SChandandCo,NewDelhi
6. FundamentalPhysics-VolumeIandIIbyGomberandGogia;PardeepPublications, Jalandhar
7. ATextBookofOpticsbySubramanianandBrij Lal
8. PhysicsLaboratoryManualbyPKPalanisamy,ScitechPublications
9. FundamentalsofPhysicsbyResnickandHalliday,AsianBooksPvt.Ltd.,NewDelhi
10. ConceptsinPhysicsbyHCVerma;Bharti BhawanLtd.,New Delhi

DIEE204

APPLIEDCHEMISTRY-II

RATIONALE

The role of Chemistry and chemical products in every branch of engineering is expanding greatly. Now a day‟s various products of chemical industries are playing important role in the field of engineering with increasing number of such products each successive years. The strength of materials, the chemical compositionofsubstances,theirbehaviourwhensubjectedtodifferent treatmentandenvironment,andthe laws of heat and dynamic energy have entered in almost every activity of modern life. Chemistry is considered as one of the core subjects for diploma students in engineering and technology for developing in them scientific temper appreciation of chemical properties of materials, which they have to handle in their professional career. Effort should be made to teach this subject through demonstration and with the active involvement of students.

DETAILEDCONTENTS

Unit: I

Metallurgy

- A brief introduction of the terms: Metallurgy (types), mineral, ore, gangue or matrix, flux, slag, concentration(methodsofconcentratingtheores),roasting calcinationsandrefiningasappliedin relation to various metallurgical operations
- Metallurgyof(i)Aluminum(ii)Ironwiththeirphysicalandchemical properties
- Definitionofanalloy,purposesofalloying,composition,propertiesandusesof alloys-brass, bronze, monel metal, magnalium, duralumin, alnico and invar

Unit:II

Fuels

- Definitionofa„Fuel‟,characteristicsofagoodfuelandclassificationoffuelswithsuitable examples
- DefinitionofCalorificvalueofafuelanddeterminationofcalorificvalueofaliquid fuelwiththe help of Bomb calorimeter. Simple numerical problems based upon Bomb-calorimeter method of finding the Calorific values
- Briefdescriptionof„Proximate‟and„Ultimate‟analysisofafuel.Importanceofconductingthe proximate and ultimate analysis of a fuel
- Qualitiesofagoodfuelandmeritsofgaseousfuelsoverthoseofothervarietiesof fuels
- Manufacture,composition,propertiesandusesof(i)Watergas(ii)Oilgas(iii)Biogas

Unit: III

Corrosion

- Meaningoftheterm„corrosion"anditsdefinition
- Theoriesofcorrosioni.e.(i)directchemicalactiontheoryand(ii)electrochemicaltheory
- Preventionofcorrosionby
  1. (a) Alloying

     (b)Providingmetalliccoatings

NomenclatureofCarboxylicacid,Alcohols,Phenols,Aldehydes,KetonesandAmines.

LISTOF PRACTICALS

1. Gravimetricanalysisandstudyofapparatususedthere in
2. Todeterminethepercentagecompositionofamixtureconsistingofavolatileandanonvolatile substances
3. Determinetheviscosityofagivenoilwiththehelpof"Redwood viscometer"
4. Determinetheflashpointofthegivenoilwiththehelpof Abel"sFlashPointApparatus
5. Estimatetheamountofmoistureinthegivensampleofcoal
6. Estimatetheamountofashinthegivensampleofcoal
7. ElectroplatethegivenstripofCuwithNi
8. Confirmationtestofalcohol,aldehydes,carboxylicacid,amine
9. Determinationofcopperinthegivenbrasssolution,orsampleofbluevitriol volumetrically
10. Detectionofmetaliornintherust(solutionofrustinconcentratedHCLmaybe given).

DIEE205

BASICELECTRICALENGINEERING

Unit:I

ApplicationandAdvantagesofElectricity:

- DifferencebetweenACandDC
- Variousapplicationsofelectricity
- Advantagesofelectricalenergyoverothertypesofenergy

BasicQuantitiesofElectricity

- Definitionofvoltage,current,powerandenergywiththeirunits
- Nameoftheinstrumentsusedformeasurementofquantitiesgivenin5.1
- Connectionoftheinstrumentsin5.2inelectriccircuit

Unit: II

VariousTypesofPowerPlants:

- Elementaryblockdiagramofthermal,hydroandnuclearpower stations
- Briefexplanationoftheprincipleofpowergenerationinabovepowerstations

ElementsofTransmissionLine:

- Pictorialdiagramofathree-phasetransmissionanddistributionsystemshowingtransformers, supports, conductors, insulators and earth wire etc.
- Brieffunctionofaccessoriesoftransmission lines
- Earthingoflines,substationandpowerstation -needandpractices adopted

Unit: III

DistributionSystem:

- Distinctionbetweenhighandlowvoltagedistributionsystem
- Identificationofthreephasewires,neutralwiresandtheearthwireonalowvoltagedistribution system
- Identificationofthevoltagebetweenphasesandbetweenonephaseandneutral
- Distinctionbetweenthreephaseandsinglephasesupply

SupplyfromthePolestotheDistributionBoard:

- Arrangementofsupplysystemfrompoletothedistribution board
- Functionofserviceline,energymeter,mainswitch,distributionboard

Unit: IV

DomesticInstallation:

- Distinctionbetweenlightandfancircuitsandsinglephasepowercircuit,subcircuits
- Variousaccessoriesandpartsofinstallation,identificationofwiringsystems
- Commonsafetymeasuresand earthing
- IntroductiontoBIScodeofsafetyandwiringinstallation

Unit:V

ElectricMotorsandPumps:

- Definitionandvariousapplicationofsinglephaseandthreephase motors
- Connectionandstartingofthreephasemotorsbystardelta starter
- Conversionofhorsepowerinwattsor kilowatts
- Typeofpumpsandtheir applications

ListofPractical's

1. Useof Megger:

   Objective:Tomakethestudentsfamiliarwithdifferentusesofmegger

2. Connectionofathreephasemotorandstarterincludingfusesandreversingofdirectionofrotation.

   Objective: Students may be made familiar with the equipment needed to control a three-phase motor.Thestudentsmustexperiencethatbychanginganytwo phases,thedirectionofrotationis reversed.

3. Connectionofalamp,ceilingfan,socketoutlet,geyser,floorgrinder,voltagestabilizeretc.

   Objective:Studentsmaybemadefamiliarwiththedifferenttypesofequipmentandcircuitsused in the domestic installations

4. Troubleshootinginathree-phase motor

   Note:Theteachermaycreateanyoneofthefollowingfaults

   (a) Loose connections

   (b) Blownfuse

   (c) Trippedoverloadprotection

   (d) Incorrectdirectionofrotation

(e) Single phasing

(f) Burntwindingtobesimulatedbyalooseconnectionbehindaterminal box.

Objective:Thestudentsmustbeabletodetectthemostcommonfaults,whichmayoccurina three-phase motor, using meggar wherever necessary

5. Troubleshootinginadomesticwiringsystem.

Note:Theteachermayintroduceafaultintheexistingwiringsystemofaclassroomorworkshoplike

(a) blownfuse

(b) loose connection

(c) faultycomponents/accessoriesetc.

Objective:Studentsmustbeabletodetect commonfaultswhichmayoccurinadomesticwiring system

6. Treatmentofelectricshock

Note:Theteachermaygiveademonstrationhowanelectricshockmustbe treated.

Objective:Studentsmustbetrainedtotreatthepersonssufferingfromanelectricshock

7. StudyofadistributionBoard

Note: Studentsmaybeaskedtostudythedistributionboardintheinstitutionandnotedownall accessories.

Objective:Studentsmustbemadefamiliarwiththedistributionboard

8. Connectionsandreadingdownanenergy meter

Objective:Studentsmaybeaskedtoconnectanenergymetertoaloadandcalibrate reading

9. Demonstrationinelectricalmachinelaboratory

Objective:Studentsmaybe showndifferenttypesofelectricalmachinesandtheirstartersand should be told that the three phase induction motors are most commonly used.

10. Studyofsubmersiblemotorpumpset:

Objective:Totelluseofthesetinwatersupplyandirrigation works.

Referencebooks:

1. ElectricalTechnology,FifthEditonbyEdwardHughes,LongmanPublishers

2. ElectricalTechnologybyBLTheraja,SChandandCo,New Delhi

3. BasicElectricalandElectronicsEngineeringbySKSahdev;DhanpatRaiandSons,NewDelhi

4. ExperimentsinBasicElectricalEngineeringbySKBhatacharya,KMRastogi;NewAge International

(P) Ltd.; Publishers New Delhi

5. PrinciplesofElectricalEngineeringbyBRGupta,SChandandCo,New Delhi

6. ElectricalEngineeringbyDRArora;IshanPublications,Ambala

7. BasicElectricalEngineeringbyPSDhogal,TataMcGrawHill,New Delhi61

8. BasicElectricalEngineeringbyJBGupta;SKKatariaandSons,NewDelhi

9. ExperimentsinBasicElectricalEngineeringbyGPChalhotra,KhanaPublishers,NewDelhi

10. BasicElectricalEngineeringbyT.S.Anand,NorthPublications,Jalandhar.

DIEE206

EngineeringDrawing-II

RATIONALE

Drawing is said to be the language of engineers and technicians. Reading and interpreting engineering drawing is their day-to -day responsibility. The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation

Note:1. Firstangleprojectionistobe followed
2. Minimumof15sheetstobepreparedbyeachstudent
3. SP46–1988shouldbe followed
4. Instructionsrelevanttovariousdrawingsmaybegivenalongwithappropriatedemonstration, before assigning drawing practice to the students

DETAILEDCONTENTS

Unit-I

DetailandAssemblyDrawing

Principleandutilityofdetailandassemblydrawings

Wooden joints i.e. corner mortice and tenon joint, Tee halving joint, Mitre faced corner joint, Tee bridle joint, Crossed wooden joint, Cogged joint, Dovetail joint, Through Mortice and Tenenjoint, Corner and Through halving joint, Closed Mortise and Tenon joint

Threads

Nomenclatureofthreads,typesofthreads(metric),singleandmultiplestartthreads

FormsofvariousexternalthreadsectionssuchasV,squareandacmethreads,BA,BSW and Knuckle, Metric, Seller Thread, Buttress Threads

Simplifiedconventionsoflefthandandrighthandthreads,bothexternalandinternalthreads

Unit-II

LockingDevices

Locknuts,castlenuts,splitpinnuts,sawnnuts,slottednut

NutsandBolts

Different views of hexagonal and square nuts; Different views of hexagonal and square nuts; Assembly of hexagonal headed, square headed, square headed with square neck bolts with hexagonal and square nuts and washers. Foundations bolts

–Ragbolt andLewisbolt

Screws,StudsandWashers

Drawing various types of machine screws

Drawingvarioustypesofstudsandsetscrews

Unit-III

KeysandCotters

Varioustypesofkeysandcottersandtheirpracticalapplicationandpreparationofdrawingof various keys and cotters showing keys and cotters in position

Cotter joints (i) sleeve and cotter joint (ii) gib and cotter joint (iii) knuckle joint (iv) Spigot andsocket joint

RivetsandRivetedJoints

Typesofstructuralandgeneralpurposerivetheads

Caulking and fullering of riveted joints

Types of riveted joints – lap, butt (single riveted, double riveted lap joint, single cover plate and double cover plate), chain and zig – zag riveting

Unit-IV

WeldedJoints

Variousconventionsandsymbolsofweldedjoints(IS696)

Practicalapplicationsofweldedjointssayjointsonsteelframes,windows,doorsand furniture

Couplings

Muff or Box coupling, half lap muff coupling

Flange coupling (Protected and non-protected) Flexible coupling

SymbolsandConventions

Civilengineeringsanitaryfittingsymbols

Electrical fitting symbols for domestic interior installations

Buildingplandrawingwithelectricalandcivilengineeringsymbols

Unit-V

DevelopmentofSurfaces

Constructionofgeometricalfiguressuchassquare,pentongon,hexogon

Developmentofsurfacesofcylinder,square,pentagonalandhexazonal,Prism,Concand Pyramid, Sequence pentagonal and hexa pyramid

Interpenetration of

Cylindertocylinder

Cylinder to cone

AUTOCAD

ConceptofAutoCAD,ToolbarsinAutoCAD,coordinatesystem,snap,grid,andorthomode

Drawingcommands–point,line,arc,circle,ellipse\

Editingcommands–scale,erase,copy,stretch,lengthenand explode

Dimensioning and placing text in drawing area

Sectioningand hatching

Inquiryfordifferentparametersofdrawingentity

Note–Practicalsyllabuswillbebasedondetailedsyllabus.

ReferenceBooks

1. ElementaryEngineeringDrawing(infirstangleprojection)byNDBhatt,CharotarPublishingHouse
2. ATextBookofEngineeringDrawingbySurjitSinghPublishedbyDhanpatRaiandCo.Delhi Engineering Drawing by PS Gill; published by SK kataria and Sons, New Delhi

SEMESTER-III

DIEE301

Electrical&ElectronicsEngg.Material

RATIONALE

A diploma holder in Electrical Engineering will be involved in maintenance, repair and production of electricalequipmentandsystems.Inaddition,hemayberequiredtoprocure,inspectandtestelectrical and electronic engineering materials. Knowledge of various types of materials will be needed in order to execute the above mentioned functions. He may also have to decide for an alternative when a particular material is either not readily available in the market or its cost becomes prohibitive.

DETAILEDCONTENTS

Unit-I

Classification:

Classificationofmaterialintoconducting,semiconductingandinsulatingmaterialsthroughabrief reference to their atomic structures and energy bands

ConductingMaterials

Introduction

Resistanceandfactorsaffectingitsuchasalloyingandtemperatureetc

Superconductor

Classificationofconductingmaterialaslowresistivityandhighresistivitymaterials Low resistance materials

Copper:

Its general properties as conductor, resistivity, temperature coefficient, density, mechanical propertiesofhard-drawnandannealedcopper,corrosion,contactresistance.Applicationinthe field of electrical
engineering.

Aluminium:

General properties at conductor, resistivity, temperature coefficient, density, mechanical propertiesofhardandannealedaluminium,solderability,contactresistance.Applicationsinthe field of electrical
engineering.

Steel:

Generalpropertiesatconductor,resistivity,corrosion,temperaturecoefficient,density, mechanicalproperties,solderability,Applicationsinthefieldofelectricalengineering.

Unit-II

Introductiontohandleconductorsanditsapplications.

Lowresistivitycopperalloys:Brass,Bronze(cadmiumandBeryllium),theirpractical applications with reasons for the same

Applicationsofspecialmetalse.g.Silver,Gold,Platinumetc.

Highresistivitymaterialsandtheirapplicationse.g.,manganin,constantin,Nichrome, mercury, platinum, carbon and tungsten

Superconductorsandtheirapplications

Semi-conductingMaterials

Introduction

Semi-conductorsandtheirproperties

Differentsemi-conductingmaterials(siliconandgermanium)usedinmanufactureofvarious semiconductor devices (i.e. p-type and n-type semiconductors)

Materialsusedforelectroniccomponentslikeresistors,capacitors,diodes,transistors and inductors etc.

Unit-III

Insulatingmaterials;GeneralProperties:

Electrical Properties:

Volumeresistivity,surfaceresistance,dielectricloss,dielectricstrength(breakdownvoltage) dielectric constant

PhysicalProperties:

Hygroscopicity,tensileandcompressivestrength,abrasiveresistance,brittleness

ThermalProperties:

Heat resistance, classification according to permissible temperature rise. Effect of overloading onthelifeofanelectricalappliance,increaseinratingwiththeuseof insulatingmaterialshaving higher thermal stability, Thermal conductivity, Electro-thermal breakdown in solid dielectrics

ChemicalProperties:

Solubility, chemical resistance, weather ability

Mechanicalproperties,mechanicalstructure,tensilestructure

Unit-IV

InsulatingMaterialsandtheirapplications: Plastics

Definitionandclassification

Thermosettingmaterials:

Phenol-formaldehyderesins(i.e.Bakelite)aminoresins(ureaformaldehydeandMelamine formaldehyde), epoxy resins – their important properties and applications

Thermo-plasticmaterials: Polyvinylchloride(PVC),polyethelene,silicons,theirimportant properties and applications

Naturalinsulatingmaterials,propertiesandtheirapplications

- MicaandMica products
- Asbestosandasbestosproducts
- Ceramicmaterials(porcelainandsteatite)
- Glassandglass products
- Cotton
- Silk
- Jute
- Paper(dryand impregnated)
- Rubber, Bitumen
- Mineralandinsulatingoilfortransformersswitchgearcapacitors,highvoltageinsulatedcables, insulating varnishes for coating and impregnation
- Enamelsforwindingwires
- Glassfibresleeves

Gaseousmaterials;Air,Hydrogen,Nitrogen,SF6theirpropertiesandapplications

Unit-V

MagneticMaterials:

Introduction-ferromagneticmaterials,permeability,B-Hcurve,magneticsaturation,hysteresis loop (including) coercive force and residual magnetism, concept of eddy current and hysteresis loss, curie temperature, magnetostriction effect.

SoftMagneticMaterials:

Alloyedsteelswithsilicon,highsilicon,alloysteelfortransformers,lowsiliconalloysteelfor electric rotating machines

Coldrolledgrainorientedsteelsfortransformer,Non-orientedsteelsforrotatingmachine

Nickel-iron alloys

SoftFerrites

HardmagneticmaterialsTungstensteel,chromesteel,hardferritesandcobaltsteel,their applications

SpecialMaterials

Thermocouple,bimetals,leadssolderingandfusematerial,mentiontheirapplications

Introductionofvariousengineeringmaterialsnecessaryforfabricationofelectrical

Machinessuchasmotors,generators,transformersetc

Note-Practicalsyllabuswillbebasedondetailed syllabus

ReferenceBooks:

1. ElectricalandElectronicEngineeringMaterialsbySKBhattacharya,KhannaPublishers,NewDelhi
2. ElectronicComponentsandMaterialsbyGroverandJamwal,DhanpatRaiandCo.,NewDelhi
3. ElectricalEngineeringMaterialsbySahdev,UniqueInternationalPublications
4. ElectronicComponentsandMaterialsbySMDhir,TataMcGrawHill,NewDelhi
5. ElectronicEngineeringMaterialsbyMLGupta,DhanpatRai&Sons,New Delhi
6. ElectricalEngineeringMaterialsbyPLKapoor,KhannaPublishers,NewDelhi
7. Electrical&ElectronicsEngineeringMaterialsBRSharmaandOthers,SatyaParkashan,NewDelhi

DIEE302

FundamentalofElectricalEngg

RATIONALE

Foradiplomaholderinelectricalengineering,itbecomesimperativetoknowthefundamentalsof the subject in order to grasp the knowledge of the field. This subject will provide knowledge of fundamental concepts of electricity, magnetism and various principles related to it.

DETAILEDCONTENTS

Unit-I

ApplicationsandAdvantagesofElectrical Energy

Different forms of energy

Advantagesofelectricalenergy

DifferencebetweenACand DC

Uses of electrical energy

BasicElectricalQuantities

Basicconceptofcharge,current,voltage,resistance,power,energyandtheirunits

Conversion of units of work, power and energy from one form to another

Unit-II

Batteries

Basicideaaboutprimaryandsecondarycells

workingprinciple,constructionandapplicationsofLeadacidbatteryandNickelCadmium cells, Silver Oxide Cells

Chargingmethodsusedforleadacidaccumulator

Care and maintenance of lead acid battery

Groupingofcellsinseriesandparallel(simplenumericalproblems).

Unit-III

DCCircuits

Ohm‟slaw,resistancesinseriesandparallel

Kinchhofflawsandtheirapplicationsinsolvingelectricalnetworkproblems Network theorems such as theorem and Newton theorem

Star-deltatransformation

Magnetismand Electromagnetism:

Introductiontoelectromagnetism,Magneticfieldaroundastraightcurrentcarryingconductorand a solenoid and methods to find its direction, force between two parallel current carrying conductors.

Forceonaconductorplacedinthemagnetic field

Series magnetic circuits, simple problems

Conceptofhysteresis,hysteresisloopandhysteresis loss.

Unit-IV

ElectromagneticInduction:

Faraday'sLawsofelectromagneticinduction
Lenz's law
Fleming's Right and Left Hand Rule
Principleofselfandmutualinduction
Principleofselfandmutuallyinducede.m.f.andsimpleproblems Inductances in series and parallel

Energystandinamagneticfield

Conceptofeddycurrents,eddycurrentloss

Unit-V

ACFundamentals

Conceptofalternatingcurrentandvoltage,equationofinstantaneousvalues Representation of alternating sinusoidal quantities by vectors
Phasoralgebra(addition,subtraction,multiplicationanddivisionofcomplexquantities) AC through pure resistance, inductance and capacitance

Conceptofsusceptance,conductanceandadmitance

AlternatingvoltageappliedtoRL,RCandRLCseriesandparallelcircuits(impedance triangle, phasor diagram and their solutions)
Powerinpureresistance,inductance,capacitance,RL,RC,RLCcircuits
Active and reactive components of current and their significance
Powerfactoranditspracticalsignificance
Resonance in series and parallel circuits

J-notationanditsapplicationinsolvingproblemsinaccircuits

Polyphasesystems

Advantagesof3phaseoversinglephasesystem

Staranddeltaconnections(relationshipbetweenphaseandlinevoltages,phaseandlineccurrents Power in 3 phase circuits

Measurementofpowerandpowerfactorofa3phaseloadbytwowattmeterMethod

LIST OFPRACTICALS

1. (a)Determinationofvoltage-currentrelationshipinadccircuitunderspecificphysical conditions and to draw conclusions (to verify ohm's law)

(b)Filamentlamp

- Measuretheresistanceofacoldlampfilamentwiththehelpofcalculations.
- Measurethecurrentdrawnbythelampatdifferentvoltagesfromzeroto220voltsand the resistance of lamp at different voltages, plot a graph between current and voltage

2. (a)ToverifythatRt=R1+R2+….whereR1,R2 etc.areresistancesconnected in series

(b)Toverify1111

--= -- +-- + ----------+ --

RtR1R2Rm

WhereR1,R2etc.areresistancesconnectedin parallel

3. VerificationofKirchhoff'scurrentandvoltagelawsappliedtoDCcircuits
a) Toconstructacircuitarrangementconsistingofresistancesinseries,
parallel combination
b) Identificationofnodepointsinthecircuit
c) Toseethatalgebraicsumofcurrentsatnodepointiszero
d) Toseethatalgebraicsumofemfsandvoltagedropsinaclosedloopiszero
4. Tofindratioofinductancevaluesofacoilhavingair/ironcorerespectivelyandtoseetheeffect of
introduction of a magnetic core on coil inductance
5. ToconstructanRLandRCcircuitandto measure
a) Impedanceofthecircuit
b) Phaseanglebetweenvoltageandcurrent
c) Constructimpedancetriangle
6. MeasurementofpowerandpowerfactorofasinglephaseRLCcircuit.TocalculateKVAand KVAR
7. Measurementofpowerandpowerfactorofa3-phasecircuitby using2-wattmetermethodusing
induction motor as a load and to calculate KVA and KVAR
Note:Theresultsshouldbeverifiedanalytically also.

ReferenceBooks:

1. ElectricalSciencebyVKMehta,SChand&Co.,NewDelhi
2. ElectricalSciencebySahdev,UniqueInternationalPublication,Jalandhar
3. ElectricalEngineeringbyDRArora,IshanPublications,Ambala
4. ElectricalSciencebyJBGupta,SKKataria&Sons,New Delhi
5. ElectricalTechnologybyBLTheraja,SChand& Co.,NewDelhi
6. ElectricalSciencebyTrilokSingh,SKKataria,NewDelhi
7. ElectricalSciencebyS.Chandhni,RChakrabartiandPKChattopadhyay.NarosaPublishing House Pvt. Ltd., New Delhi
8. BasicElectricalEngineeringbyMoolSingh,GalgotiaPublicationPvt.Ltd.,NewDelhi
9. BasicElectricalEngineeringbyPSDhogal,TataMcGrawHill,NewDelhi
10. PrinciplesofElectricalEngineeringyBRGupta,SChand&Co.,New Delhi
11. HandbookofElectricalEngineeringbySLBhatia,KhannaPublishers,NewDelhi
12. ElectricalPowerSystembySChanniSingh,McGrawPublishing Co.

DIEE303

Basic Electronics

RATIONALE

At present electronics gadgetsarebeingextensivelyused in manufacturingprocess inindustries, powersystemoperations,communicationsystems,computersetc.Evenforanelectricaldiploma holder, it is absolutely necessary to take a basic understanding of electronics components, their function and applications. This understanding should facilitate in operation and maintenance equipments which are electronically controlled.

Inthiscourse,topicslikeelectronicscomponents,semi-conductorphysics,rectifiers,andamplifiers have been included. The remaining topics are included in electronic devices and circuits.

DETAILEDCONTENTS

Unit-I

Introduction

Briefhistoryofdevelopmentofelectronics

Active and passive components

Conceptofcurrentandvoltagesources,constantvoltageandcurrentsources,theirgraphical representation.

Conversion of voltage source into current source and vice-versa

Differencebetweenactualvoltagesourceandconstantvoltagesource

Semi-conductorTheory

Atomicstructure,crystalinestructure

Energybandtheoryofcrystals,energybandstructureofinsulator,semiconductorandconductor, generation and recombination. Energy band structure of Silicon and Germanium

SiliconversusGermaniumformobilityandconductivity Concept of intrinsic and extrinsic semiconductors

Effectoftemperatureonintrinsicandextrinsicsemiconductors

Unit-IISemiconductorDiodes

PNJunction,mechanismofcurrentflowinPNjunction,driftanddiffusioncurrents,depletion layer, potential barrier, effect of forward and reverse biasing and a PN junction. Concept of junction capacitance in forward and reverse biased conditions. Breakdown mechanism

Idealdiode,Semiconductordiodecharacteristics,staticanddynamicresistance

Useofdiodeashalfwaveandfullwaverectifiers(centretappedandbridgetype),relation between DC output and AC input voltage, rectifier efficiency

Conceptofripples,filter circuits –shuntcapacitor,seriesinductor,andpie(π)filtersand their applications

Dioderatings/specifications

Varioustypesofdiodessuchaszenerdiode,varactordiode,schottkydiode,lightemittingdiode, tunnel diode, photo diode; their working characteristics and applications

Zenerdiodeandits characteristics

Useofzenerdiodeforvoltagestabilization

Unit-III

Bi-polarTransistors

Conceptofjunctiontransistor,PNPandNPNtransistors,theirsymbolsand mechanism of current flow

Transistorconfigurations:commonbase(CB),Commonemitter(CE)andcommon collection (CC), current relation and their input/output characteristics; comparison of the three configurations

TransistorBiasingandStabilization

Transistorbiasing,itsneed,operatingpointandneedofstabilizationofoperatingpoint.

Differencebetweencircuits,limitations,simpleproblemstocalculateoperatingpointin different biasing circuits. Use of thevenin theorem to determine operating point

Effect of temperature on the operating point of a transistorConceptofh-parametersofatransistor

Useofdatabooktoknowtheparametersofagiventransistor

Unit-IV

Single-StageTransistorAmplifiers

Single stage transistor amplifier circuit in CE configuration, function of each component

Workingofsinglestagetransistoramplifier,physicalandgraphicalexplanation, phase reversal Concept of DC and AC load line

Voltage gain of single stage transistor amplifier using characteristics of the device Concept of input and output impedance

AC equivalent circuit of single stage transistor amplifiers Calculation of voltage gain using AC equivalentcircuitFrequencyresponseofasingle stage transistor amplifier

Unit-V

Multi-StageTransistorAmplifiers

Needofmulti-stagetransistoramplifiers–differenttypesofcouplings,their purpose and applications.

Knowledge of various terms such as voltage gain, current gain, power gain, frequency response, decibel gain and band width

RCcoupledtwo-stageamplifiers,circuitdetails,working,frequencyresponse, applications

Loading effect in multistage amplifiers

Elementary idea about direct coupled amplifier, its limitations and applications

Transformercoupledamplifiers,itsfrequencyresponse.Effectofco-efficientof coupling on frequency response. Applications of transformer coupled amplifiers

FieldEffectTransistor(FET)

Construction,operation,characteristicsandapplicationsofaNchannelJFETandP channel JFET

JFET as an amplifier

Construction,operation,characteristicsandapplicationsofaMOSFETindepletion enhancement mode

ComparisonbetweenBJT,JFETandMOSFET

LISTOF PRACTICALS

1.a)Identificationandtestingofelectroniccomponentssuchasresistor,inductor,capacitor, diode,

transistoranddifferenttypesofswitchesusedinElectronic circuits

b)Measurementofresistancesusingmultimeterandtheircomparisonwithcolourcodevalues

2. V-IcharacteristicsofaSemiconductordiodeandtocalculateitsstaticanddynamicresistance

3. a)V-Icharacteristicsofazenordiodeandfindingitsreversebreakdown voltage

b) FabricationofazenordiodevoltagestabilizercircuitusingPCB

4. Observationofinputandoutputwaveshapesofahalf-waverectifierandverificationof relationship

betweendcoutputandacinputvoltage

5. Observationofinputandoutputwaveshapesofafullwaverectifierandverificationand

relationship between dc and ac input voltage

6. Observationofinputandoutputwaveshapesofafullwaverectifierwith(i)shuntcapacitor) (i)series inductor (i) ∧ filter circuits

7. PlottinginputandoutputcharacteristicsofatransistorinCBconfiguration

8. PlottinginputandoutputcharacteristicsofatransistorinCEconfiguration

9. Measurementofoperatingpointincaseof(i)fixedbiasedcircuit(i)potentialdividerbiasing circuit

andtoobservetheeffectoftemperaturevariationontheoperatingpoint.

10. Tomeasurethevoltagegainandbandwidthbyplottingfrequencyresponsecurveofasingle stage

amplifier using CE configuration at different loads

1. Tostudytheeffectofcouplingcapacitoronlowercutoffrequencyanduppercutoffrequency by

plottingfrequencyresponsecurveofatwostageRCcoupledamplifier

12.ToplotV-IcharacteristicsofaFET

ReferenceBooks:

1. BasicElectronicsandLinearCircuitsbyNNBhargava,TataMcGrawHill,NewDelhi
2. AnalogElectronicsbyBPArora,IshanPublications,Ambala
3. ElectronicPrinciplesbySKSahdev,DhanpatRai&Co.,New Delhi
4. ElectronicDevicesandCircuitsbyRBoylestead
5. ElectronicDevicesandCircuitsbyRaviRaj Dubey
6. AnalogElectronicsbyJCKarhara,KingIndiaPublication,New Delhi
7. ElectricalDevicesandCircuitsbyRamaReddy,NarosaPulishingHousePvt.Ltd.,NewDelhi

DIEE304

ElectricalEnggDesign&Drawing-I

RATIONALE

Apolytechnicpass-outinelectricalengineeringissupposedtohaveabilityto:

i) Read,understandandinterpretengineeringdrawings

ii) Communicateandcorrelatethroughsketchesanddrawings

iii) Prepareworkingdrawingsofalternativepanels,transmissionanddistribution

Thecontentsofthissubjecthasbeendesignedtodeveloprequisiteknowledgeandskillsofelectrical drawings in the students of diploma in electrical engineering.

DETAILEDCONTENTS

Unit-I

SimplelightandAlarm Circuits

Onelampcontrolledbytwoswitches(staircasecircuit)

Twolampscontrolledbythreeswitches(doublestaircase circuit) Circuit using master switch

Fluorescenttubecontrolledfromoneswitch

One bell controlled by one push button

Unit-II

Twoordinarybells(fordayandnight)usedatadistantresidence Nos. of bells controlled by separate switches

Bell response circuit using one bell and one relay

Bellresponsecircuitofanoffice(forthreerooms)

Traffic light control system for two road crossing

Unit-III

Designanddrawwiringcircuitofatworoomsetforlightandfancircuit To draw Installation plan and wiring diagram of two room house Conductor size calculation

Listofmaterialrequiredwithcostbydoingmarketsurvey

Descriptionofvariousteststotestthewiringinstallationbeforecommissioning

Unit-IV

OrthographicProjectionofSimpleElectricalparts

Kit kat fuse base

Kitkatfusecarrier

Bus bar post

Pintypeandshackletypeinsulator

Unit-V

Engineeringtranslator Stay insulators

M.C.B.

E.L.C.B.

Bobbinofasmall transformer/choke

Note-Practicalsyllabuswillbebasedondetailed syllabus.

ReferenceBooks:

1. ElectricalEngineeringDesignandDrawingsbySurjitSingh,KhannaPublishers,NewDelhi
2. ElectricalEngineeringDesignandDrawingsbySKBhattacharya,SKKatariaandSons,New Delhi
3. ElectricalEngineeringDesignandDrawingsbyUbhi&Marwaha,IPH,NewDelhi
4. ElectricalDesignandDrawingbySKSahdev,UniqueInternationalPublications,Jalandhar

DIEE305

ComputerProgramming&Application

RATIONALE

Computers play a very vital role in present day life, more so, in the professional life of diploma engineers. With the extensive use of Information Technology in large number of areas, the diploma engineers should be well conversed with these environments. In order to enablethestudentstousethecomputerseffectivelyinproblemsolving,thiscourseoffersthe modern programming languages like C along with exposition to various engineering applications of computers.

DETAILEDCONTENTS

Unit-I

Information Storage and Retrieval

Need for information storage andretrievalCreatingdata base file

Querying database file on single and multiple keys Ordering the data on a selected key

Programmingaverysimpleapplication

Unit-II

ProgramminginC

Basic structureof C programs

Executing a C program

Constants,variables,anddatatypes

Operators and expressions

Unit-III

ManagingInput-Outputoperationslikereadingacharacter,writingacharacter, formatted input, formatted output through print, scan, getch, putch statements etc. Decision making and branching using IF. ..... else, switch, go to statements Decision making and looping using do-while, and for statements

Unit-IV

Arrays-onedimensionalandtwo dimensional

File

Computers Application Overview Commercial and business data processing application Engineering computation

Unit-V

CAD,CAM,CAE,CAI

TypicalApplications:

Studentswillberequiredtomakeasmallprogrammeforanalysisofcircuitsdesign in Electrical Engineering components or any other area.

Useofvarioussoftwareavailableinthefieldofelectrical engineering

LISTOF PRACTICALS

1. ProgrammingexerciseonexecutingaC Programs.
2. ProgrammingexerciseoneditingaC program.
3. Programmingexerciseondefiningvariablesandassigningvaluestovariables
4. Programmingexerciseonarithmeticandrelationoperators
5. Programmingexerciseonarithmeticexpressionsandtheirevaluation
6. Programmingexerciseonreadingacharacter
7. Programmingexerciseonwritingacharacter
8. Programmingexerciseonformattinginputusingprint
9. Programmingexerciseonformattingoutputusingscan
10. ProgrammingexerciseonsimpleIFstatement
11. ProgrammingexerciseonIF…ELSEstatement
12. ProgrammingexerciseonSWITCHstatement
13. ProgrammingexerciseonGOTOstatement
14. ProgrammingexerciseonDO-WHILEstatement
15. ProgrammingexerciseonFORstatement
16. Programmingexerciseononedimensional arrays
17. Programmingexerciseontwodimensionalarrays
18. DemonstrationofApplicationsoftwaretoElectricalEngineeringbranchsuchas:

MATLAB, PSIM,

19. MULTISIM,PSPICEinElectricalEngineering

ReferenceBooks:

1. ProgramminginCbySachaumSeries,McGrawHills
2. The essentials of Computer Organizing and Architecture by Linda Null and Julia Labur, Narosa Publishing House Pvt. Ltd., New Delhi
3. ProgramminginCbyKerningLanandRiechiePrenticeHallofIndia,NewDelhi
4. ProgramminginCbyBalaguruSwamy,TataMcGrawHill,New Delhi
5. LetusC–YashwantKanetkar,BPBPublications,NewDelhi
6. VijayMukhiSeriesforCandC++
7. ElementsofCbyMHLewin,KhannaPublishers,New Delhi
8. ProgramminginCbyRSubburaj,VikasPublishingHousePvt.Ltd.,Jangpura,New Delhi
9. ProgramminginCbyKrisAJansa,GalgotiaPublicationsPvt.Ltd.,Daryaganj,New Delhi
10. ProgramminginCbyBP Mahapatra,KhannaPublishers,NewDelhi

DIEE306

ElectricalWorkshopPractice-I

RATIONALE

Anelectricaldiplomaholderwillberequiredtoinspect,testandmodifytheworkdonebyskilledworkers working under him. In addition, many a times, it will become necessary for him to demonstrate thecorrect method and procedure of doing a job. In order to carry out this function effectively in addition to conceptual understanding of the method or procedure he must possess appropriate manual skills. The subject aims at developing special skills required for repairing, fault finding, wiring in electrical appliances and installations.

DETAILEDCONTENTS

1. Studyofelectricalsafetymeasuresandshocktreatment
2. Wirejointing
   - Straightmarriedjoint
   - Technology-joint
   - Western union joint Britania joint
   - Twistsleevejoint
   - Bolted type joint

3. Fillingofthimblesandcrimpingofthimbles(usinghydraulicandhandcrimp)
4. Typesofwiringandtomakedifferentlightcontrolcircuitsinthefollowingtypesofwiring Casing caping (PVC) wiring
   Conduitwiring(surface/concealed)

5. Wiringof main distributionboard with four outgoingcircuits for light andfan loads including main switch and fuses (only internal connection)

6. Construction of an extension board with two 5Asockets, one 15Asocketcontrolled bytheir respective switches, a fuse and indicator
7. Wiringof a switch boardcontainingat least two switches, onefan regulator andone 5A socket controlled by their respective switches using (i) tumbler switches (ii) flush type switches

11. Wiringofaseriestest lampboardandtouseitforfindingout simplefaults
12. Testingofdomesticwiringinstallationusingmeggar
13. Faultfindingandrepairofatubelightcircuit
14. Wiringandtestingofalarmandindicatingcircuitsusingrelay,pushbuttonsandbells(simplesingle phase circuits)
15. Assemblyofa4-waydistributionboardusingMCB,mainswitchandELCB
16. Repairandmaintenanceofdomesticelectricappliances,i.e.electriciron,geyser,fan,heatconverter, washing machine, desert room cooler, room heater, electric kettle, electric oven, electric furnace etc.

SEMESTER-IV

DIEE401

ElectricalMachine-I

RATIONALE

Electrical machines is a subject where a student will deal with various types of electrical machines which are employed in industries, power stations, domestic and commercial appliances etc. After studying this subject, an electrical diploma holder must be competent to repair and maintain these machinesandgivesuggestionstoimprovetheirperformance.Practicalaspectsofthesubjectwillmake the students capable of performing various tests on the machines as per latest BIS specifications

DETAILEDCONTENTS

Unit-I

IntroductiontoElectricalMachines

Definitionofmotorandgenerator

Torquedevelopmentduetoalignmentoftwofieldsandtheconceptoftorqueangle

Electro-magnetically induced emf

Elementaryconceptofanelectricalmachine

Comparison of generator and motor

Generalisedtheoryofelectricalmachines

Unit-II

DCMachines

Mainconstructionalfeatures,Typesofarmaturewinding

Functionofthecommutatorformotoringandgenerationaction Factors determining induced emf equation

Factorsdeterminingtheelectromagnetictorque

Significance of types of machines

Significanceofbacke.m.f.,therelationbetweenbackemfandTerminalvoltage

Performance and characteristics of different types of DC motors

Speedcontrolofdcshunt/seriesmotors

Unit-III

Needofstarter,threepointdcshuntmotorstarterand4 pointstarter Applications of DC motors

Faultsindcmachinesandtheirretrospective Losses in a DC machine

DetermineoflosesbySwimburntest

Unit-IV

Transformers(singlephase)

Introduction

Constructionalfeaturesofatransformerandpartsoftransformer Working principle of a transformer

EMF equation

Transformeronno-loadanditsphasordiagram

Transformeronload(includingvoltagedropsanditsphasordiagram)

Transformer–neglectingvoltagedropinthewindings–Ampereturnbalance–its phasor diagram
Mutualandleakagefluxes,leakagereactance
Equivalent circuit
3.10Relationbetweeninducedemfandterminalvoltage,regulationofatransformer
mathematical relation

Unit-V

Lossesina transformer

Opencircuitandshortcircuittest.Calculationforefficiency,conditionformaximum efficiency Cooling of transformer, conservator

Autotransformerconstruction,workingandapplications

Different types of transformers

ThreePhaseTransformers

Constructionofthreephasetransformer

Typesofthreephasetransformeri.e.delta-delta,delta-star,star-deltaandstarstar

Conditions for parallel operation (only conditions are to be studied)

Onloadtapchanger,ON/OFFloadtapchanger

Differencebetweenpoweranddistributiontransformer Cooling of transformer

LISTOF PRACTICALS

1. Measurementoftheangulardisplacementoftherotorofaslip-ringinductionmotoronapplicationof DC to stator of motor winding in sequence and simultaneously to each phase of rotor winding
2. Speedcontrolofdcshuntmotor(i)Armaturecontrolmethod(ii)Fieldcontrolmethod
3. Studyofdcseriesmotorwithstarter(tooperatethemotoronnoloadforamoment)
4. Studyof3pointstarterforstartingD.C.shuntmotor.
5. Toperformopen circuitand shortcircuittest fordetermining: (i)equivalentcircuit (ii) the regulation and(iii)efficiencyofatransformerfromthedataobtainedfromopencircuitandshortcircuittestatfull load
6. Tofindtheefficiencyandregulationofsinglephasetransformerbyactuallyloading it.
7. Checkingthepolarityofthewindingsofathreephasetransformerandconnectingthewindingsin various configurations
8. Findingthevoltageandcurrentrelationshipsofprimaryandsecondaryofathreephasetransformer under balanced load in various configurations conditions such as (a) Star-star (b) Star delta (c) Delta star (d) Delta - Delta configuring conditions.

ReferenceBooks:

1. ElectricalMachinesbySKBhattacharya,TataMcGrawHill,NewDelhi
2. ElectricalMachinesbySKSahdev,UniqueInternationalPublications,Jalandhar
3. ElectricalMachinesbyNagrathandKothari,TataMcGrawHill,New Delhi
4. ElectricalMachinesbySBGupta,SKKatariaandSons,NewDelhi

DIEE402

ElectricalMeasurementsandMeasuringInstruments

RATIONALE

Diploma holders in Electrical Engineering has to work on various jobs in the field as well as intesting laboratoriesandoncontrolpanels,whereheperformsthedutiesofinstallation,operation,maintenance and testing of measuring instruments. Persons working on control panels in powerplants, substations and in industries will come across use of various types of instruments and hasto take measurements.Instruments used to read and observe the general electrical quantities like current, voltage,power,energy,frequency,resistanceetcandtheirwaveshapes,havebeenincorporatedinthis subject.So the technician will know the construction and use of various types of instruments.

DETAILEDCONTENTS

Unit-I

IntroductiontoElectricalMeasuringInstruments:

- Conceptofmeasurementandinstruments
- Electricalquantitiesandinstrumentsfortheirmeasurements
- Typesofelectricalmeasuringinstruments–indicating,integratingandrecordinginstrument
- Essentialsofindicatinginstruments–deflecting,controllinganddampingtorque

AmmetersandVoltmeters(Movingcoilandmovingirontype):

- Conceptofammetersandvoltmetersanddifferencebetweenthem
- ConstructionandworkingprinciplesofmovingIronandmovingcoilinstruments
- Meritsanddemerits,sourcesoferrorandapplicationoftheseinstruments

Unit-II

Wattmeter's(DynamometerType)

Construction,workingprinciple,meritsanddemeritsofdynamometertypewattmeter,sourcesoferror

Energymeter(Inductiontype):

Construction,workingprinciple,meritsanddemeritsofsingle-phaseandthree-phaseenergymeters

- Errorsand compensation
- Simpleproblems
- Constructionandworkingprincipleofmaximumdemandindicators

Unit-III

MiscellaneousMeasuringInstruments:

- Construction, working principle and application of Meggar, Earth tester, Multimeter,Frequency meter (dynamometer type) single phase power factor meter(Electrodynamometertype).Workingprincipleofsynchroscopeandphase sequenceindicator, tong tester (Clamp-on meter)
- InstrumentTransformers:Construction,workingandapplications
  a) CT
  b) PTandtheirratioandphaseangle error

Unit-IV

ElectronicsInstruments:

- CathodeRayOscilloscope:Blockdiagram,workingofCROanditsvariouscontrols. Applications of CRO.
- Digitalmulti-meter(onlyblockdiagram)

LRCmeters.

Unit-V

PowerMeasurementsin3-phasecircuits:

- Threewattmetermethod
- Twowattmetermethod

MeasurementofNon-electricalQuantities(Introductiononly)

- BasicconceptPressuremeasurement,flowmeasurement,levelmeasurement,displacement measurement

MeasurementofTemperature

- Differenttypesofthermometers,thermocouple,resistancetemperaturedetector

PRACTICALS

a) Studyof different meters,suchas: Ammeter, voltmeter,wattmeter&energymeter.
b) .Measurementofelectrical quantities bylow rangemeteralongwith
i. Shunt &multiplier
ii. C.T. &P.T.
c) Measurementofactive&reactivepowerin3-phasebalanceloadcircuitbyonewattmeter method.
d) Measurementofactive&reactivepowerin3-phaseunbalanceloadcircuitbytwo-wattmeter
method.EffectofloadPF.
e) Calibrationofenergymeterat variousP.F. by
(1) Standardenergymeter
(2) Metertestbench
f) Performance of
iii.Phasesequencemeter
iv. P.F.&frequency meter
v. Maximumdemand indicator KVA,KWH &KVAR meter.
g) Measurementoflow&medium resistancebyWheastone bridge.
h) Measurement oflow resistancebyKelvin double bridge.
i) Measurementof earthresistancebyEarth Tester.
j) Measurementofinsulation resistancebyMegger.
k) Useofpotentiometer forthe measurementofResistanceandemf
m) CalibrationofDC voltmeterand ammeter bypotentiometer
n) Useof Multimeter.

ReferenceBooks:

1. ElectricalMeasurementsandMeasuringInstrumentsbyGoldingandWiddis;WheelerPublishing House, New Delhi
2. ElectricalMeasurementsandMeasuringInstrumentsbySKSahdev,Unique InternationalPublications, Jalandhar
3. ACourseinElectricalMeasurementandMeasuringInstrumentsbyAKSawhneyandPLBhatia; Dhanpat Rai and Sons, New Delhi
4. ElectricInstrumentsbyD.Cooper
5. ExperimentsinBasicElectricalEngineeringbySKBhattacharyaandKMRastogi,NewAge International (P) Ltd., Publishers, New Delhi
6. ElectronicsInstrumentationbyUmeshSinha
7. BasicElectricalMeasurementsbyMelvilleB.Staut.

DIEE403

ElectronicsDevices&Circuits

RATIONALE

The purpose of the introduction of electronics in the electrical engineering diploma course hasbeen alreadyexplainedintherationaleofthesubjectBasicElectronicsinthiscoursetopiclikeAmplifiers, Oscillators and Wave Shape Circuits have been dealt with.

DETAILEDCONTENTS

Unit-I

TransistorAudioPowerAmplifier

- Differencebetweenvoltageandpoweramplifier
- ImportanttermsinPowerAmplifiercollectorefficiency,distortionanddissipationcapability
- ClassificationofpoweramplifierclassA,BandC
- ClassAsingle-endedpoweramplifier,itsworkingandcollectorefficiency
- Impedancematchinginapoweramplifierusingtransformer
- Heatsinksinpoweramplifiers
- Push-pullamplifiercircuitdetails,workingandadvantages(nomathematicalderivations)
- Principlesoftheworkingofcomplementarysymmetrypush-pull amplifier

Unit-II

TunedVoltageAmplifier

- Introduction
- Seriesandparalled resonance
- Singleanddoubletunedvoltage amplifiers
- Frequencyresponseoftunedvoltage amplifiers
- Applicationsoftunedvoltageamplifiers

Feedbackin Amplifiers

- Feedbackanditsimportance,positiveandnegativefeedbackandtheirneedA3.2Voltagegain of an amplifier with negative feedback $A = \frac{}{1+AB}$
- Effectofnegativefeedbackonvoltagegain,stability,distortion,bandwidth,outputandinput impedance of an amplifier (No mathematical derivation)
- Typicalfeedbackcircuits
- Effectofremovingtheemitterby-passcapacitoronanordinaryCE transistoramplifier
- Emitterfolloweranditsapplications

Unit-III

SinusoidalOscillators

- SinusoidalOscillators–positivefeedbackinamplifiers
- Differencebetweenanoscillatorandanalternator
- Essentialsofan oscillator
- CircuitdetailsandworkingofLCoscillatorsviz.TunedCollector,HartleyandColpitt‟s oscillators
- R-Coscillatorcircuits,phaseshiftandWeinbridgeoscillatorcircuits
- Introductiontopiezoelectriccrystalandcrystaloscillatorcircuit

Unit-IV

Wave-ShapingandSwitchingCircuits

- ConceptofWave-shaping
- Wave-shapingcircuits
- R-Cdifferentiatingandintegratingcircuits
- Diodeclippingcircuits
- Diodeclampingcircuits
- Applicationofwave-shapingcircuits
- Transistorasaswitch(explanationusingCEtransistorcharacteristics)
- Collectorcoupledastable,monostable,bistablemultivibratorcircuits(explanationusingwave shapes). Brief mention of uses of multivibrators
- Workingandapplicationsoftransistorinvertercircuitusingpowertransistors

Unit-V

WorkingPrinciplesofdifferenttypesofpowersuppliersviz.CVTs,UPS,Stabilizers,SMPS,IC voltage regulator etc.

OperationalAmplifier

- Thebasicoperationalamplifier.Thedifferentialamplifier.Theemittercoupleddifferential amplifier. Offset even voltages and currents
- .Basicoperationalamplifierapplications,analogintegratoranddifferentiator
- .Familiarisationwithspecificationsandpinconfigurationof IC 741
- Blockdiagramandoperationof555ICtimer

LISTOF PRACTICALS

1. Tostudytheeffectofcouplingcapacitoronlowercutofffrequencyanduppercutofffrequencyby plotting frequency response curve of a two stage RC coupled amplifier

2. Tomeasure(a)optimumload(b)outputpower(c)signalhandling capacityofapush-pullamplifier
3. Toobservetheeffectofnegativecurrentfeedbackonthevoltagegainofasinglestagetransistor amplifier by removing emitter bye-pass capacitor.

4. Tomeasure(a)voltagegain(b)inputandoutputimpedanceforanemitterfollowercircuit

5. Tomeasurefrequencygenerationin(a)Hartley(b)R-CPhaseShift oscillator

6. ToobservethedifferentiatedandintegratedsquarewaveonaCROfordifferentvaluesofR-Ctime constant

7. Clippingofbothportionofsine-waveusing:a)diodeanddcsourceb)zenerdiodesClampinga sine-wave to: a) Negative dc voltage b) Positive dc voltage

8. Togeneratesquare-wave usinganastablemultivibratorandtoobservethewaveformonaCROand verify the result using p-spice software

9. Toobservetriggeringandworkingofabistablemultivibratorcircuitandobserveitsoutputwave form on a CRO 98

10. Tousetheop-Amp(IC741)asinvertingoneandnon-invertingamplifiers,adder,comparator, integrator and differentiator and verify the result using p-spice software

11. TostudythepinconfigurationandworkingofIC555anditsuseasmonostable andastable multivibrator

12. Torealizetheregulatedpowersupplybyusingthreeterminalvoltageregulator ICssuchas7805, 7905, 7915 etc. and verify the result using p-spice software.

ReferenceBooks:

1. AtextbookofBasicElectronicsandLinear CircuitsbyNNBhargavaandothers,TataMcGrawHill, New Delhi
2. ElectronicsPrinciplesbySKSahdev,DhanpatRaiandCo.,New Delhi
3. ElectronicsPrinciplesbyAlbertPaulMalina,TataMcGrawHill,NewDelhi
4. OperationalAmplifiersandLinearCircuitsbyRamaKantandA.Gaykwad,PrenticeHallofIndia, New Delhi
5. ElectronicDevicesCircuitsbyRamaReddy,NarosaPublishingHousePvt.Ltd.,New Delhi
6. ElectronicDevicesandCircuitsbyMillman&Halkias,McGrawHill,NewDelhi
7. AnalogElectronics –IIbyDRArora,IshanPublication, Ambala
8. ElectronicDevicesandCircuitsbyJCKarhara,KingIndiaPublication,NewDelhi
9. ElectronicDevicesandCircuits-I,EaglePrakashan,Jalandhar

DIEE404

ElectricalEngg.Design&Drawing-II

RATIONALE

Apolytechnicpass-outinelectricalengineeringissupposedtohaveabilityto:
i) Read,understandandinterpretengineeringdrawings
ii) Communicateandcorrelatethroughsketchesanddrawings
iii) Prepareworkingdrawingsofalternativepanels,transmissionanddistribution
Thecontentsofthissubjecthasbeendesignedtodevelopprequisiteknowledgeandskillsofelectrical drawings in the students of diploma in electrical engineering.

DETAILEDCONTENTS

Unit-I

ContractorControlCircuits

DesignofCircuitDrawingofschematicdiagramandpowerwiringdiagramoffollowingcircuits, specification of contactors

- DOLstartingof3-phaseinductionmotor
- RemoteControlof3-phaseinductionmotor
- -phaseinductionmotorgettingsupplyfromselected feeder
- Forwarding/reversingofa3-phaseinductionmotor
- Twospeedcontrolof3-phaseinductionmotor

Unit-II

- Limitswitchcontrolofa3-phaseinduction motor
- Sequentialoperatingoftwomotorsusingtimedelayrelay
- Automaticstardeltastarterfor3-phaseInduction Motor

Earthing

- Purposeof earthing
- Differenttypesofearthing,drawingsofplateandpipeearthing

Unit-III

- Procedureofearthing,testofmaterialsrequiredandcosting
- Methodofreducingearthresistance
- RelevantISspecificationsofearthelectrodeforearthingatransformer,ahighbuilding
- Earthinglayoutofdistributiontransformer

Unit-IV

- Substationearthinglayoutandearthingmaterials
- Keydiagramof11KV,33Kv,66KV,132KVsub-stations

DrawingsofMachineParts

- Endcoverofinductionmotor
- Rotorofasquirrelcageinduction motor

Unit-V

- Fieldcoil ofaDCmotor
- Terminalplateofaninductionmotor
- Motorbody(inductionmotor)asperIS specifications
- Slipringsof3-phaseinductionmotor

ReferenceBooks:

DIEE405

Estimating&CostinginElectrical Engg

RATIONALE

A diploma holder in electrical engineering should be familiar to Indian Standards and relevantElectricity Rules. Preparation of good estimates is a professional job, which requires knowledgeofmaterialsandmethodsandtheprinciplesofeconomics.Thecontentsofthissubjecthas beendesigned keeping in view developing requisite knowledge and skills of estimation and costing instudents of diploma in electrical engineering.

DETAILEDCONTENTS

Unit-I

1. Introduction

Purpose of estimating and costing, proforma for making estimates, preparation of materialsschedule costing, price list, tender document net price list, market survey, overheadcharges, labour charges, electricalpointmethodandfixedpercentagemethod,contingency,profit,purchasesystem,enquiries, comparative statements, orders for supply,paymentofbills.Tenders–itsconstituents,finalizationspecimentender.

Unit-I

Typesofwiring

Electrical, batten, casing-casing and conduit wiring, comparison of different wiring,selection and design of wiring schemes for particular situation (domestic and Industrial).Selection of wires and cables,wiringaccessoriesanduseofprotectivedevicesi.e.MCB,ELCBetc.Useofwire-gaugeand tables.

Unit-III

EstimatingandCosting:

- Domesticinstallations;standardpracticeasperISandIErules.Planningofcircuits,sub-circuits and position of different accessories, electrical layout,preparing estimates including cost as per schedule rate pattern and actual marketrate (single storey and multi-storey buildings)

Unit-IV

- Industrial installations; relevant IE rules and IS standard practices, planning,designing and estimationofinstallationforsinglephasemotorsofdifferentratings,electricalcircuitdiagram, sizing of diagram, starters, preparation of materials lists,estimating and costing exercises on workshop with singe-phase, 3-phase motorload and the light load (3-phase supply system)
- ServicelineconnectionestimatefordomesticandIndustrialloads(over-headandunderground connections)frompoletoenergymeter.Electricalforms:differenttypesoffansandtheirsizes, air-conditioners, exhaust fans, determination of sizeand number of fans for a given situation

Unit-V

- Transmissionanddistributionlines(overheadandunderground)planninganddesigningof lines with different fixtures, earthing etc. based on unit cost calculations
- Substation:Typesofsubstations,substationschemesandcomponents,estimateof11/0.4KV pole mounted substation up to 200 KVA rating.

Note-Practicalsyllabuswillbebasedondetailedsyllabus.

ReferenceBooks:

1. ElectricalEstimatingandCostingbyJBGupta,SatyaPrakashan,New Delhi
2. EstimatingandCostingbySKBhattacharya,TataMcGrawHill,New Delhi
3. EstimatingandCostingbybySurjeetSingh,DhanpatRai&Co.,New Delhi
4. EstimatingandCostingbyQurashi
5. EstimatingandCostingbySLUppal,KhannaPublishers,New Delhi
6. ElectricalEstimatingandCostingbyNAlagappanandBEkambaram,TMH,New Delhi

DIEE406

ElectricalWorkshopPractice-II

RATIONALE

An electrical diploma holder will be required to inspect, test and modify the work done by skilledworkers or artisans working under him. In addition to these persons, many a times, it will becomenecessary for him to demonstrate the correct method and procedure of doing a job. In order tocarryoutthisfunctioneffectivelyinadditiontoconceptualunderstandingofthemethodorprocedure he must possess appropriate manual skills. The subject aims at developing specialskills required for repairing, fault finding, wiring in electrical appliances and installations.

DETAILEDCONTENTS

1. Tocarryoutpipe/plateearthingforasmallhouseand3-phaseinductionmotor.Testingtheearthing using earth test
2. Connectionsofsinglephaseand3-phasemotors,throughanappropriatestarterandtochangetheir direction of rotation
3. Wiring,testingandfaultfindingofthefollowingcontactorcontrolcircuitsoperatingon3-phase supply:
   c) Remotecontrolcircuits
   d) Timedelaycircuits
   e) Interlockingcircuits
   f) Sequentialoperationcontrolcircuits
7. Winding/re-windingofafan(ceilingandtable)andchoke
8. Solderingandde-solderingpractice(solderingandde-solderingofelectroniccomponentsonPCB)
9. Powercablejointingusingepoxybasedjointing
10. Demonstrationoflayingofundergroundcablesatworksite
11. Dismantling/assemblyofstar-delta/DOLstarterandslipringinductionmotorstarter
12. Dismantlingandassemblyofvoltagestabilizers

SEMESTER-V

DIEE501

ElectricalMachines-II

RATIONALE

Electrical machines is a subject where a student will deal with various types of electrical machineswhichareemployedinindustries,powerstations, domesticandcommercialappliancesetc. Afterstudying this subject, an electrical diploma holder must be competent to repair and maintain thesemachines and give suggestions to improve their performance. Explanation of practical aspects ofthesubject will makethestudentscapableofperformingvarioustestsonthemachinesasperlatest BIS specifications

DETAILEDCONTENTS

Unit-I

SynchronousMachines

- Mainconstructionalfeaturesofcommutatorandbrushlessexcitationsystem
- Generationofthreephaseemf
- Productionofrotatingmagneticfieldinathreephasewinding
- ConceptofdistributionfactorandcoilspanfactorandemfequationArmaturereactionon unity, lag and lead power factor
- Operationofsinglesynchronousmachineindependentlysupplyingaload -Voltageregulation by synch-impedance method

Unit-II

- NeedandnecessaryconditionsofparalleloperationofalternatorsSynchronizinganalternator (Synchroscope method) with the bus bars
- Operationofsynchronousmachineasamotor–itsstartingmethods
- Effectofchangeinexcitationofasynchronousmotor
- Causeofhuntingandprevention
- Ratingandcoolingofsynchronousmachines
- Applicationsofsynchronousmachines(asanalternator,asasynchronouscondenser)

Unit-III

InductionMotors

- Salientconstructionalfeaturesofsquirrelcageandslipring3-phaseinductionmotors
- Principleofoperation,slipanditssignificanceandconnectionofsubmersiblemotor (monoblock)
- Lockingofrotorandstatorfields
- Rotorresistance,inductance,emfandcurrent
- Relationshipbetweencopperlossandthemotor slip
- Powerflowdiagramofaninduction motor

Unit-IV

- Factorsdeterminingthetorque
- Torque-slipcurve,stableandunstablezones
- Effectofrotorresistanceuponthetorqueslip relationship

- Doublecagerotormotorandits applications
- Startingof3-phaseinductionmotors,DOL,star-delta,autotransformer
- Causesoflowpowerfactorofinduction motors
- Testingof3-phasemotoronnoloadrotortestandfindefficiency
- Speedcontrolofinductionmotor,conventionalandthyristorized

Unit-V

FractionalKiloWatt(FKW)Motors

- Singlephaseinductionmotors;Constructioncharacteristicsandapplications
- Natureoffieldproducedinsinglephaseinductionmotor
- Splitphaseinductionmotor
- Capacitorsstartandrun motor
- Shadedpole motor
- Reluctancestartmotor
- Alternatingcurrentseriesmotoranduniversalmotors
- Singlephasesynchronousmotor
- Reluctancemotor
- Hysteresismotor

SpecialPurposeMachines

Constructionandworkingprinciple,linearinductionmotor,steppermotor,schrage motor.

LISTOF PRACTICALS

1. Demonstrationofrevolvingfieldset upbya3-phasewoundstator
2. Toplotrelationshipbetweennoloadterminalvoltageandexcitationcurrentinasynchronous generator at constant speed
3. Determinationoftherelationshipbetweenthevoltageandloadcurrentofanalternator,keeping excitation and speed constant
4. Determinationoftheregulationandefficiencyofalternatorfromtheopencircuitandshortcircuit test 111
5. Synchronizationofpolyphasealternatorsandloadsharing
6. Determinationoftheeffectofvariationofexcitationonperformanceofasynchronousmotor
7. StudyofISI/BIScodefor3-phaseinduction motors
8. Performatleasttwotestsona3-phaseinductionmotorasperBIScode
9. Determinationofefficiencyby(a)noloadtestandblockedrotortestonaninductionmotor(b)direct loading of an induction motor (refer BIS code)
10. Determinationofeffectofrotorresistanceontorquespeedcurveofaninductionmotor
11. Tostudytheeffect ofacapacitoronthestartingandrunningofasingle-phaseinductionmotorby changing value of capacitor and also to reverse the direction of rotation of a single phase induction motor

ReferenceBooks:

1. ElectricalMachinesbySKBhattacharya,TataMcGrawHill,NewDelhi
2. ElectricalMachinesbySKSahdev,UniqueInternationalPublications,Jalandhar
3. ElectricalMachinesbyNagrathandKothari,TataMcGrawHill,New Delhi
4. ElectricalEngineeringbyJBGupta,SKKataria&sons,NewDelhi

DIEE502

Power-I

RATIONALE

The majority of the polytechnic passouts have to perform various activities in the State ElectricityBoards in the field of Generation, Transmission and Distribution of Electrical power. The range ofthese activities vary from simple operation and maintenance of equipment, lines, fault location,planninganddesigningofsimpledistributionschemes,executiveandsupervisorycontrolin powerstations, transmission and distribution networks in addition to administrative jobs to public relations,They should also be made aware of recent developments, current practices in the electricitydepartments, corporations and boards to keep them abreast with modern techniques inGeneration, Transmission and Distribution of Electrical Power.

DETAILEDCONTENTS

Unit-I

PowerGeneration

- Mainresourcesofenergy,conventionalandnon-conventional
- Different types of power stations, thermal, hydro, gas,diesel and nuclear powerstations. Flow diagramsandbriefdetailsoftheiroperation,comparisonofthegeneratingstationsonthebasis of running cost, site, starting, maintenance etc.
- Importanceofnon-conventionalsourcesofenergyinthepresentscenario.Briefdetails ofsolar energy, bio-energy, wind energy

Unit-II

TransmissionSystems

- Layoutoftransmissionsystem,selectionofvoltageforH.TandL.Tlines,advantagesofhigh voltage for Transmission both AC and DC
- Comparisonofdifferentsystem:ACversusDCfor powertransmission,conductormaterialand sizes from table
- Constructional features of transmission lines: Types of supports, types ofinsulators, Selection ofinsulators,conductors,earthwireandtheiraccessories,Transpositionandstrigefficiencyof lines
- Mechanicalfeaturesofline:Importanceofsag,calculationofsag,effectsofwindandiceand related problems; Indian electricity rules pertaining to clearance
- Electrical features of line: Calculation of resistance, inductance and capacitancewithout derivationina.c.transmissionline,voltageregulationconceptofcorona.Effectsofcoronaand remedial measures

Unit-III

DistributionSystem

- LayoutofHTandLTdistributionsystem,constructionalfeatureofdistributionlinesandtheir erection. LT feeders and service mains; Simple problems on ACradial distribution system, determination of size of conductor
- ConstructionofLTandHTpowercables advantages/disadvantages
- PreparationofestimatesforLTandHToverheaddistribution lines.
- Calculationoflinelossesindistributionsystem

Unit-IV

Substations:

- Briefideaaboutsubstations;outdoorgridsub-station220/132KV,66/33KVoutdoor substations, pole mounted substations and indoor substation
- Layoutof33/11KVdistributionsubstationandvariousauxiliariesandequipmentassociated with it
- Preparationofestimatesfor11KV/0.4KVsubstations(pole mounted)

Faults:

- Commontypeoffaultsinbothoverheadandundergroundsystems

Unit-V

PowerFactor:

- Conceptofpowerfactor
- Reasonsanddisadvantagesoflowpowerfactor
- Methodsforimprovementofpowerfactorusingcapacitorbanks

VariousTypesof Tariffs:

- Tariffs
- Blockrate,flatrate,maximumdemandandtwoparttariffs
- Simpleproblems

Field Visits

ReferenceBooks:

1. ElectricalPowerSystemandAnalysisbyCLWadhwa,3rdedition,NewAge InternationalPublishers, New Delhi
2. SubstationDesignandEquipmentbySatnamandPVGupta,DhanpatRai&Sons, NewDelhi
3. ElectricalPower–IbySKSahdev,UniqueInternationalPublications,Jalandhar
4. ElectricalPowerSystembyVKMehta,SChand&CO.,New Delhi
5. ElectricalPowerSystembyJBGupta,KatariaandSons,NewDelhi
6. Sub-StationDesignbySatnam,DhanpatRaiandCo.,New Delhi
7. ElectricalPowerDistributionSystembyASPabla,TataMcGrawHill,NewDelhi

DIEE503

IndustrialElectronics&ControlofDrives

RATIONALE

Industrialelectronicsplaysaveryvitalroleinthefieldofcontrolengineeringspecificallyinthemodern industries as they mostly use electronic controls which are more efficient, effective andprecise as compare to the conventional method. The old magnetic and electrical control schemeshave all become obsolete. Electrical diploma holder many times has to maintain the panels used inthe modern control process. Therefore, the knowledge of components like thyristors and othersemiconductor devices used in such control electronics is must for them in order to supervise thework efficiently and effectively. Lookingintousefulnessandimportancetothesubjectthishasbeenincorporatedinthecurriculum.

DETAILEDCONTENTS

Unit-I

IntroductiontoSCR

- ConstructionandworkingprinciplesofanSCR,twotransistoranalogycircuit andcharacteristics of SCR
- SCRspecificationsandrating
- Construction,workingprinciplesandV-IcharacteristicsofDIACandTRIAC
- BasicideaabouttheselectionofheatsinksforSCRand TRIACS
- MethodsoftriggeringaThyristor.Studyoftriggeringcircuits
- .UJT,itsConstruction,workingprinciplesandVIcharacteristics,UJTlaxationoscillator
- CommutationofThyristors
- .SeriesandparalledoperationofThyristor
- ApplicationsofSCRandTRIACSsuchaslightintensitycontrolcontrolofDCanduniversal motor, fan regulator, battery charger etc.

Unit-II

ControlledRectifiers

- Singlephasehalfwavecontrolledrectifierwithresistiveloadandinductive load
- Singlephasehalfcontrolledfullwaverectifier
- Fullycontrolledfullwaverectifierbridge
- Singlephasefullwavecentrelap rectifier
- Threephasefullwavehalfcontrolledbridge rectifier
- Threephasefullwavefullycontrolledbridgerectifier

Unit-III

Inverters,choppers,dualconvertersandcycloconvertors

- Inverter-introduction,workingprinciples,voltageandcurrentdriveninseriesandparalled invertors and applications
- Choppersintroduction,typesofchoppersandtheirworkingprinciplesandapplications
- DualConvertors-introduction,typesofcyclo-convertors,workingprinciplesandapplications
- Cyclo-convertors-introduction,types,workingprinciplesandapplications

Unit-IV

Thyristorcontrolofelectricdrives

- DCdrives control
- Halfwave drives
- Fullwavedrives
- Chopperdrives
- ACdrives control
- Phase control
- Variablefrequencya.c. drives
- ConstantV/Fappreciation
- Voltagecontrolledinverterdrives
- Constantcurrentinverterdrives
- CycloconvertorscontrolledACdrives
- SlipcontrolACdrives

Unit-V

Uninterruptedpowersupplies

- UPS,online,standby,RedundantUPS,DCUPS
- Storagedevices,batterychargerwithUPS

StaticControlofMachines

Advantages and disadvantages of static control compared to magnetic control.Development of simple control circuits using logic gates, off-return and retentive memoryelements. Input and output devices for solid state logic circuits. Study of some industrialcontrol circuits like product dispersion, product inspectionconveyorsystemetc.usingshiftregisters,counters,decoder,monoshot,clock,downcounter and encoder.

ProgrammableLogicControllers

Partsofaprogrammablecontroller,inputs/outputsection,central processingunit,inputimagetable, output image table, user program memory, variable data memory, completescan cycle, the programmingterminals,programmingbasics,relay,timer,CounterandSequencertypeinstructions, analog operation.

Note-Practicalsyllabuswillbebasedondetailed syllabus.

ReferenceBooks:

1. ControlofElectricalMachinesbyS.K.BhattacharyaandBrijinderSingh.TataMcGrawHill,New Delhi
2. IndustrialControlElectronics.JohnWebb,KevinGreshock,Maxwell,MacmillanInternational editions.
3. FundamentalsofPowerElectronicsbySRamaReddi,NarosaPublishingHousePvt.Ltd,NewDelhi
4. PowerElectronics,CircuitsDevicesandApplicationsbyMohammadH.Rashid
5. PowerElectronicsbyPCSen
6. PowerElectronicsbyDr.PSBhimbra,KhannaPublishers,NewDelhi
7. IndustrialElectronics&ControlbySKBhattacharya&SChatterji,NewAge internationalPublications(P) Ltd, New Delhi
8. PowerElectronicsbySKSahdev,UniqueInternationalPublication,Jalandhar
9. PowerElectronicsbyJCKarhava,KingIndia Publication,

10. FundamentalsofElectricalDevicesbyGopalKDubey,NarosaPublishingHousePvt.Ltd,New Delhi
11. PowerElectronicsandControlsbySamirKDatta,PrenticeHallofIndia,NewDelhi

DIEE504

PCMaintenance&Repair

RATIONALE

ThePCisthetoolthatdefinestodaycurrentageandculture.Arightunderstandingaboutanytoolis required to use it effectively. There has been a complete revolution in this area because of rapidadvancementinthefieldofelectronics.ThePCisthemostlogicalandmodernmachineandis nomore difficult to understand its function. It is very important to learn the various components of PCand how these parts work together. All technically trained individuals must understand the generalnature of PC operation of memory, I/O techniques, interfacing applications etc. Looking at theimportance and usefulness, this subject has been included in the curriculum.

DETAILEDCONTENTS

Unit-I

Introduction

- OriginofPC
- Hardwareandsoftware
- Operatingsystem
- Programminglanguage

Unit-II

HardwareComponents

- Motherboard
- MicroprocessorsandCo-processors
- Memory–ROM,RAM
- Chipsetsandsupportcircuits,itsfunction,systemcontrol,peripheralcontrolandmemory control
- Bus-architecture,functionandvariousbusesi.e.ISA,EISA,VESA,PCI
- Mossstoragedevicei.e.harddisk,floppydisk,compactdisk
- Input/outputdevicesi.e.keyboard,mouse,displaysystem.Videoadopter,audioprinters, modems, serial and parallel ports, IEEE 1284, RS-232-C
- Generalinformationaboutcomputervirusandanti-virus

Unit-III

InterfacingComponentsandTechniques

- Interfacesystemsand standards
- Programmableperipheralsinterface(PPI)Chip-8255,8155
- Pindiagramsand programming

Unit-IV

-NetworkingTopologiesStandards,CablingandConfiguration,IEEEStandardsfor LANS

-ConceptofInternet

- InternetProtocolsH.T.T.P.

Unit-V

- SimpleNetworkingManagementProtocol(SNMP)
- DomainNameSystems(DNS)
- Security
- ElectronicMail
- WorldWideWeb
- ConceptofATMNetworks

ReferenceBooks:

1. HardwareBible;Winn.L.Rosch,Techmedia
2. ThecompletePCupgradeandmaintenanceguide,MarkMinasi,BPBPublications
3. ComputerNetworks,A.Tanenbaum,PHILtd.,NewDelhi

DIEE505

DigitalElectronics&Microprocessor

RATIONALE

Digital electronics has made extremely rapid advances in the last five decades. It has importantapplications in communication entertainment, instrumentation, control, automation etc. Thus itappears that there is no end to its usefulness in the light and the new world belongs to it. So it isnecessary to give the knowledge of digital electronics to the students. Microprocessor is one of themost exciting technological among the semiconductor devices in recent times. It has a tremendousimpactontheIndustrialprocessesduetoitshighreliabilityandflexibilitybothatthedesign and theImplementation stages. The decreasing cost of with increasing facilities act as catalysts inwidening their scope of applications.

DETAILEDCONTENTS

Unit-I

Number Systems

- Decimal,binary,octalandhexa-decimalnumbersystemsandtheirinterconversion
- Binaryaddition,substractionandmultiplication
- 1‟sand2‟scomplementmethodsofaddition/substraction

Gates

- Definition,symbolandtruthtablesforinverter,OR,AND,NAND,NORandX-ORgates

Boolean algebra

- BooleanRelations
- DeMorgan‟sLaw
- K-Mapuptofour variables

Unit-II

CombinationalCircuits

- Halfadder,Full adder
- Encoder,Decorder
- Multiplexer/Demultiplexer
- DisplayDevices(LED,LCDand7-segment display)

Unit-III

Flip-Flops

- J-KFlip-Flop
- R-SFlip-Flop
- D-TypeFlip-Flop
- T-TypeFlip-Flop
- ApplicationsofFlip-Flops

A/DandD/A Converters

- D/Aconverters(Binaryweighted,R-2RD/AConverter)
- A/Dconverter(Counterramp,successiveapproximationmethodofA/DConversion)

Unit-IV

Semi-conductorMemories

Microprocessor

- Study7085microprocessorarchitecture,pinconfiguration,busorganisation,registersflags, interrupts
- Instructionsetof7085microprocessor,addressingmodes,instructionformat.Writingsome simple assembly language programmes. Use of stacks and subroutinesin programming
- Interfacinganddatatransferbetweenperipheral,I/Oandmicroprocessor
- Studyofperipheralchips–8255,8253,9155
- Introductionof16-bit,32-bitmicroprocessor,theiradvantagesover8-bitmicroprocessor
- Conceptof7086and67000microprocessors

Unit-V

IntroductiontoMicrocontrollers

- Differentbetweenmicroprocessorandmicrocontroller
- Architectureof7031and7051varietiesof microprocessor

ProgrammableLogicController(PLC)

- IntroductiontoPLC
- BasicconfigurationofPLC
- Comparisonoflogiccontroller

Note-Practicalsyllabuswillbebasedondetailed syllabus

ReferenceBooks:

1. ModernDigitalElectronicsbyRP Jain
2. DigitalPrinciplesandElectronicsbyMalvino&Leach
3. DigitalElectronicsbyRLRokheine
4. DigitalElectronicsbySN Ali
5. MicroprocessorbyGoanker,WileyEasternLtd.New Delhi
6. DigitalElectronicsbyT.L.Foyal
7. DigitalElectronicsbyJamwal
8. MicroprocessorsArchitecture,ProgrammingandApplicationwith7085/7070A,RSGaonkar,Wiley Eastern Ltd. New Delhi
9. IntroductiontoMicroporcessorsbyAdityaMathur,TMHPublishingCo.,NewDelhi

DIEE506

IndustrialTraining

Industrial Training aims at exposing the students to field practices, size and scale of operation and work culture at practical sites. For this purpose, students at the end of fourth semester are required to be sent for a period of 4 weeks to industry. Each student is supposed to study the material and technology used at site and prepares a detailed report of the observation of process seen by him/her. These students should be supervised andguidedbyrespectivesubjectteachers.Eachteachermay guideagroupof four to five students. The teacher alongwith field supervisors will conduct performance assessment of students.

The components of evaluation will include the following.

a) Punctuality and regularity 15%
b) Initiative in learning new things 15%
c) Relationship with workers 15%
d) Industrial training report 55

SEMESTER-VI

DIEE601

UtilizationofElectricalEnergy

RATIONALE

This subject assumes importance in view of the fact that a technician has to work in a widespectrum of activities wherein he has to make collections from alternative schemes from technicaland economical considerations; i.e. to plan and design using basic principles and handbooks, toselect equipment, processes and components in different situations.The curriculum hs been designed keeping the above objectives in view. Besides giving him basicknowledge in the topics concerned, attempts have been made to ensure that the knowledgeacquired is applied in various fields as per his job requirements. To orientthesubjectmatterintheproperdirection,visitstoindustrialestablishmentsare Referenceinorder to familiarize thestudents with the new developments in different areas

DETAILEDCONTENTS

Unit-I

ElectricDrives:

- Advantagesofelectricdrives
- Characteristicsofdifferentmechanicalloads
- Typesofmotorsusedinelectricdrive
- Electricbraking
  - Plugging
  - Rheostatbraking
  - Regenerativebraking
- Methodsofpowertransferbydirectcouplingbyusingdeviceslikebeltdrive,gears,pulley drives etc.
- Examplesofselectionofmotorsfordifferenttypesofdomesticloads
- Selectionofdriveforapplicationssuchasgeneralworkshop,textilemill,papermill,steelmill, printing press, crane and lift etc. Application of flywheel.
- Specificationsofcommonlyusedmotorse.g.squirrelcage,slipringinductionmotors,AC series motors, FKW motors

Illumination:

- Natureoflight,visibilityspectrumcurveofrelativesensitivityofhumaneyeandwavelength of light
- Definition:Luminousflux,solidangle,luminousintensity,illumination,luminousefficiency, depreciation factor, coefficient of utilization, space to height ratio,reflection factor, glare, shadow, lux.
- Lawsofillumination-simplenumericals
- Differenttypeoflamps,constructionandworkingofincandescentand dischargelamps–their characteristics, fittings required for filament lamp, mercury vapourlamp, fluorescent lamp, metal halide lamp, neon lamp.

Unit-II

- Calculationofnumberoflightpointsforinteriorillumination,calculationofilluminationat different points, considerations involved in simple design problems.Illumination schemes; indoor and outdoor. Illumination levels
- Mainrequirementsofproperlighting;absenceofglare,contrastandshadow
- Generalideasboutstreetlighting,floodlighting,monumentlightinganddecorativelighting, light characteristics etc.

ElectricHeating

- Advantagesofelectricalheating
- Heatingmethods:
  - Resistanceheating–directandindirectresistanceheating,eletctricovens,theirtemperature range, properties of resistance heating elements,domestic water heaters and other heating appliances and thermostatcontrol circuit
  - Inductionheating;principleofcoretypeandcorelessinductionfurnace
  - Electricarcheating;directandindirectarcheating,construction,workingandapplications of arc furnace
  - Dielectricheating,applicationsinvariousindustrialfields
  - Infra-redheatingandits applications
  - Microwaveheating
- Simpledesignproblemsofresistanceheatingelement

Unit-III

ElectricWelding:

- Advantagesofelectricwelding
- Weldingmethod
  - Principlesofresistancewelding,types –spot,projectionseamandbuttweldingandwelding equipments used
  - Principle of arc production, electric arc welding, characteristics of arc;carbon arc, metal arc, hydrogen arc welding method of and theirapplications.Power supplyrequired. Advantages of usingcoatedelectrodes,comparisonbetweenACandDCarcwelding,weldingcontrolcircuits, welding of aluminum and copper
- IntroductiontoTIG,MIG Welding

Unit-IV

ElectrolyticProcesses:

- Needofelectro-deposition
- Lawsofelectrolysis,processofelectro-deposition-clearing,operation,depositionofmetals, polishing, buffing
- Equipmentandaccessoriesfor electroplating
- Factorsaffectingelectro-deposition
- Principleofgalvanizingandits applications
- Principlesofanodisinganditsapplications
- Electroplatingonnon-conductingmaterials
- Manufactureofchemicalsbyelectrolyticprocess
- Manufacturingofchemicalsbyelectrolysisprocess

ElectricalCircuitsusedinRefrigerationandAirConditioningandWaterCoolers:

- Principleofairconditioning,vapourpressure,refrigerationcycle,eco-friendlyrefrigerants
- DescriptionofElectricalcircuitusedin
  a) refrigerator,
  b) Air-conditioner,and
  c) Watercooler

Unit-V

ElectricTraction:

- Advantagesofelectrictraction
- Differentsystemsofelectrictraction,DCandACsystems,dieselelectricsystem,typesof services – urban, sub-urban, and main lines and their speed-time curves
- Differentaccessoriesfortrackelectrification;suchasoverheadcapacitorwire,conductorrail system, current collector-pentagraph
- Factorsaffectingscheduledspeed
- Electricalblockdiagramofanelectriclocomotivewithdescriptionofvariousequipmentand accessories
- Typesofmotorsusedforelectrictraction
- Startingandbrakingoftractionmotors
- IntroductiontoEMUandmetro railways

ReferenceBooks:

1. ArtandScienceofUtilizationofElectricalEnergybyHPartap,DhanpatRai&Sons, Delhi
2. UtilizationofElectricalEnergybyJBGupta,KatariaPublications,Ludhiana
3. A.TextBook.ofElectricalPowerbyDr.SLUppal,KhannaPublications,Delhi
4. ModernElectricTractionbyHPartap,DhanpatRai&Sons, Delhi
5. UtilizationofElectricalEnergybyOSTaylor,PitmanPublications
6. Generation,DistributionandUtilizationifElectricalPowerbyCLWadhwa,WileyEasternLtd.,New Delhi

DIEE602

InstallationofMaintenanceofElectricalequipment

RATIONALE

Inhiscareerasasupervisor,an electricalengineeringtechnicianwillbecalledupontoinspect,testand modify the work done by skilled workers or artisans working under him. Many a times it willbecome necessary for him to demonstrate the correct method and procedure of doing certainoperations.

Normally manufacturers of heavy electrical equipment provide service manuals,instructions for installation, maintenance and faultlocation. Indian ElectricityRules and IndianStandard Specifications alsoprovideenoughguidelines.Thissyllabushasbeendesignedtoprovidecertainguidelinesandbroad principles regarding theabove activities. Appropriate field trips will reinforce the learning.

DETAILEDCONTENTS

Unit-I

Tools,accessoriesandinstrumentsrequiredforinstallation,maintenanceandrepairwork

- KnowledgeofIndianElectricityrules,safetycodescausesandpreventionof accidents,artificial respiration, workmen's safety devices

Installation

- InstallationoftransmissionandDistributionLines:
- Erection of steel structures, connecting of jumpers, tee-off points, joints and deadends; crossingofroads,streets,power/telecommunicationlinesandrailwaycrossings,clearances; earthing of transmission lines and guarding, spacing andconfiguration of conductors: Arrangement for suspension and strain insulators, birdguards, anti-climbing devices and danger plates; sizes of conductor, earthwireand guy wires, Testing and Commissioning.
- Layingofservicelines,earthing,provisionofservicefuses,installationofenergymeters

Unit-II

- **LayingofUndergroundCables:**
  Inspection, storage, transportation and handling of cables, cable handlingequipment, cable laying depths and clearances from other services such as:water, sewerage, gas, heating and other mains, and also a series of power andtelecommunication cables and coordination with these services, excavation oftrenches, direct cable laying (including laying of cable from the drum, laying cablein the trench, taking all measurements and making as installed drawings, backfillingoftrenches withearthorsand,layingprotectivelayerofbricksetc),layingofcables into pipes and conduits and within buildings, introduction tocable filling compounds, epoxy resins and hardeners, cable jointing andterminations, testing and commissioning.
- Elementary idea regarding, inspection and handling of transformers; Pole mountedsubstations, plinth mountedsubstations,grid substation, busbars, isolation,voltage andcurrenttransformers, lightningarrestors,controlandrelaypanels,HT/LTcircuitbreakers,LTswitches,installationof power/distribution transformers,dehydration. Earthing system, fencing of yard, equipment foundations andtrenches.

Unit-III

- Testing of various electrical equipment such as electrical motor, transformerscables and generatorandmotorcontrolcentres,mediumvoltagedistributionpanels,powercontrolcentres, motor control centres, lighting arrangement,storage, pre-installation checks, connecting and starting, pre-commissioningchecks, drying out.

Maintenance

- Typesofmaintenance,maintenanceschedules,procedures
- MaintenanceofTransmissionandDistributionSystemAuthorizedpersons,dangernotice, caution notice, permit to work, arranging ofshutdowns personally and temporary earths cancellation of permit and restorationof supply.
- Patrollingandvisualinspectionoflines -pointstobenotedduringpatrollingfromground; special inspections and night inspections.

Unit-IV

- Location of faults using Meggar, effect of open or loose neutral connections,provision of properfusesonservicelinesandtheireffectonsystem,causesanddimandflickeringlights.
- MaintenanceofDistributionTransformersTransformermaintenanceandpointstobeattended to in respect of various itemsof equipmentChecking of insulation resistance, transformer oil level and BDV test of oil,measurement of earth resistance
- MaintenanceofGridSubstationsCheckingandmaintenanceofbusbars,isolatingswitches, HT/LT circuit breakers,LT switches. Power transformers

Unit-V

- MaintenanceofMotors

Overhaulingofmotors,preventivemaintenance,troubleshootingofelectricmotors

- DomesticInstallation
  Introduction,testingofelectricalinstallationofabuilding,testingofinsulationresistanceto earth,testingofinsulationandresistancebetweenconductorscontinuityor opencircuittest, short circuit test, testing of earthing continuitylocation of faults IE rules for domestic installation

LIST OFPRACTICALS

1. Identificationoftoolsandequipment
2. Givingexposuretostudentsatactualsites
3. Studyof codesand practices

ReferenceBooks:

1. Testing,Commissioning,OperationandMaintenanceofElectricalEquipmentbySRao,Khanna Technical Publication, New Delhi
2. .PreventiveMaintenanceofElectricalApparatusbySKSharotri,KatsonPublishingHouse,Ludhiana

DIEE603

Power-II

RATIONALE

In view of the complexities associated with the modern interconnected power stations, the responsibilities and the job requirements of a diploma pass out have become more complex than what theyusedtobeearlier.Heisrequiredtoworkwithmodernelectricalequipmentand maintainreliability of supply. The course is designed to understand the concepts, principles involved in the construction and working of generating stations and protective switch gear system so that one can handle, install, maintain them and also take decisions at his/her level in different situations.The teaching of thissubject requires reinforcement in the form of visits to substation, power stations and well designed laboratory experiences. A practice-oriented approach to the teaching of this
subjectis suggested.

DETAILEDCONTENTS

Unit-I
PowerSystemFaults

Typesoffaults,singlelinetoground,doublelinetoground,threephasetoground, openconductors, severity of faults and their effects on system

Unit-II
Switchgears

- Purposeofprotectivegear.Differencebetweenswitch,isolatorand circuitbreakers.Function of isolator and circuit breaker. Making and breaking capacity of circuit breaker (only definition)
- PrinciplesofArcextinctionbyOCBandACB,ConstructionalfeaturesofOCB,ACB,andtheir working,
- Circuitbreakers.Typesofcircuitbreakers,bulkandminimumoilcircuit breakers,airblast circuit breakers, SF6 circuit breakers
- MiniaturecircuitbreakersACB,ELCB,MCB,fordistributionandtransmissionsystem (Descriptive)

Unit-IIIProtectionDevices

- Fuses;functionoffuse.Typesoffuses,HVandLVfuses,rewire-able, cartridge,HRC
- Earthing,purposeofearthing:Equipmentearthing,Substationearthing,systemearthingasper Indian Electricity rules.
- Relays:

a) Introduction,typesofrelays.Electromagneticandthermalrelays,theirconstructionand working

b) Inductiontypeover-current,earthfaultrelays,instantaneousovercurrentrelay

c) Directionalover-current,differentialrelays,theirfunctions

d) Ideaofstaticrelaysandtheirapplications.

Unit-IVProtectionScheme

- Relaysforgeneratorprotection
- Relaysfortransformer,protectionincludingBuchholtzrelayprotection
- Protectionoffeedersandbusbars.Overcurrentandearthfaultprotection,distanceprotection
- Relaysformotor protection

Unit-V

Over-voltageProtection

- Protectionofsystemagainstovervoltage;causesofovervoltage,functionofgroundwire
- Lightningarrestors,Rodgap,horngap,metaloxidetype.
- Line protection

LISTOF PRACTICALS

Visittopowerstation/substationfortheconductoffollowingpracticalwork:

1. Testingofthedielectricstrengthoftransformeroilandair
2. Studyofdifferenttypesofcircuitbreakersandisolators
3. Plotthetimecurrentcharacteristicsofovercurrent relay
4. PowermeasurementbyusingCTsandPTs
5. EarthingofdifferentequipmentMainDistributionBoardandEnergyMeterBox
6. PerformtheoverloadandshortcircuittestofMCBasperIS specifications
7. Plotthetime-currentcharacteristicsofKit-Katfusewire
8. TakingreadingofcurrentonanyLTlinewithclipon meter

ReferenceBooks:

1. Testing,Commissioning,OperationandMaintenanceof ElectricalEquipmentbySRao,Khanna Technical Publication, New Delhi
2. ElectricalPowerSystemsbyCLWadhwa,WileyEasternLtd.,New Delhi
3. TextbookofElectricalTechnologybyBLTheraja,SChandandCo.,New Delhi
4. ElectricalPowerbyDr.SLUppal,KhannaPublications, Delhi
5. ACourseinElectricalPowerbyMLSoni,PVGuptaandBhatnagar,DhanpatRai&Sons,New Delhi
6. PrinciplesofPowerSystemsbyVKMehta,SChandandCo.,New Delhi
7. PreventiveMaintenanceofElectricalApparatusbySKSharotri,KatsonPublishingHouse,Ludhiana

DIEE604

EnergyManagement

RATIONALE

One of the reasons for India not been able to catch up with the desired extent of modernization ofindustrial processes in light of challenges posed by multinationals is the non-availability of requiredenergy supply. The solution primarily lies in tapping all possible energy generation sources butefficient useof availableenergyis alsoimportant. Energy management focuseson these aspectsand thecoursewilldevelopaawarenessamongstthediplomaengineersandwillenablethemtopracticethe energy management techniques in whatever field they are engaged in.

.

DETAILEDCONTENTS

Unit-I

EnergyManagement

- Overviewofenergymanagement,needforenergyconservation,(Startedwithoilcrisis) Environmental Aspects, Alternative sources of energy.
- NeedforEnergyconservationwithbriefdescriptionofoilandcoal crisis.
- Environmentalaspects
- Alternatesourcesofenergy.
- Energyefficiency-itssignificance

Unit-II

EnergyConservation

- EnergyconservationinDomesticSector-Lighting,homeappliances
- EnergyconservationinIndustrialsector-Motors,IndustriallightingDistributionsystem, Pumps, Fans, Blowers etc.,
- EnergyconservationinAgriculturesectorTubewellpumps,diesel-generatingsets,standby energy sources.

- MacroLevelapproachforenergyconservationatdesign stage.

Unit-III

EnergyEfficientDevices

- Needforenergyefficientdevices
- Initialcostversuslifecycle,costanalysisonlifecyclebasis
- Energyefficientmotorsascomparedtostandard motors.
- BISspecificationforenergyefficientmotors,Salientdesignfeatures,
- Efficiencyasafunctionofload,safetymargins
- Energyefficientlightingsystemdifferentsources,lumens/watt,LEDs,role ofvoltageon efficiency
- Distributionsystem-Optimumcablesize,amorphouscoretransformer,roleofpowerfactor,use of compensating capacitors-manual and automatic, location ofcapacitors.

Unit-IV

EnergyAudit

- EnergyAuditMethodology
- Efficiencyofenergyconversionprocesses,monitoringsystem
- Specificenergyconsumption–threeprongedapproach,finetuning,technicalup
- gradation,avoidablelosses.
- Casestudiesofenergyauditofdistributionsystem,ACmotors,Industries.
- Organisationofenergyauditactivities.

Unit-V

- Environmentalimpactassessment
- NeedforEnvironmentalimpactAssessment
- Standardformatforassessmentanditscompletion
- Evaluationoftheassessment.

List ofExperiment

1. TocalibratesinglePhaseenergymeterbydirectloadingmethod.
2. Tostudytheenergyauditforaanyeducationalbuilding.
3. Tostudytheenergyconversionprocessforsolarenergytoelectricalenergy.
4. Tostudythedifferentalternativesourceofenergy.
5. TostudytheenergyconservationinIndustrialsectors.
6. Tostudytheenergyconservationinagriculturalsectors.
7. Todesignandstudytheenergyefficientlightingsystemusing LED
8. Todesignandstudytheconversionsystemusing LDR.
9. Tostudyandanalysisoflightingandlightingarrestor.
10. Tostudythesinglephasetransformerforenergyconservation.

ReferenceBooks:

1. Manualonenergyefficiencyatdesignstage,CIIenergymanagement cell.
2. Manualonenergyefficiencyinpumpingsystem,CIIenergymanagement cell.
3. Manualonvariablespeeddrivesforenergyefficiency CIIenergymanagement cell.
4. Energyconservationcasestudiesinceramicindustry,sugarindustry,fertiliserindustry,cement industry. CII, Energy Management Cell etc

DIEE605

EntrepreneurshipDevelopment&Management

RATIONALE

Entrepreneurship Development and Management is one of the core competencies of technicalhuman resource. Creating awareness regarding entrepreneurial traits, entrepreneurial supportsystem, opportunityidentification,projectreportpreparationandunderstandingoflegalandmanagerialaspects can be helpful in motivating technical/ vocational stream students to start theirown small scale business/enterprise. Based on the broad competencies listed above, followingdetailed contents are arrived to develop the stated competencies.

DETAILEDCONTENTS

Unit-I

Entrepreneurship

- Concept/Meaning
- Need
- Competencies/qualitiesofanentrepreneur

EntrepreneurialSupportSystem

- DistrictIndustryCentres(DICs)
- CommercialBanks
- StateFinancialCorporations
- Small Industries Service Institutes (SISIs), Small Industries Development Bank ofIndia (SIDBI),NationalBankforAgricultureandRuralDevelopment(NABARD),NationalSmall Industries Corporation (NSIC) and other relevantinstitutions/organizations at State level

Unit-II

MarketSurveyandOpportunityIdentification(BusinessPlanning)

- Howtostartasmallscale industry
- Proceduresforregistrationofsmallscaleindustry
- Listofitemsreservedforexclusivemanufactureinsmallscaleindustry
- Assessmentofdemandandsupplyinpotentialareasofgrowth
- Understandingbusinessopportunity
- Considerationsinproduct selection
- Datacollectionforsettingupsmall ventures

Unit-III

ProjectReportPreparation

- PreliminaryProjectReport
- Techno-Economicfeasibilityreport
- ProjectViability

ManagerialAspectsofSmallBusiness

- PrinciplesofManagement(Definition,functionsofmanagementvizplanning,organisation, coordination and control
- OperationalAspectsofProduction
- InventoryManagement
- Basicprinciplesoffinancial management
- MarketingTechniques
- PersonnelManagement
- ImportanceofCommunicationinbusiness

Unit-IV

LegalAspectsofSmallBusiness

- ElementaryknowledgeofIncomeTax,SalesTax,PatentRules,ExciseRules
- FactoryActandPaymentof WagesAct

Environmentalconsiderations

- Conceptofecologyandenvironment
- FactorscontributingtoAir,Water,Noisepollution
- Air,waterandnoisepollutionstandardsand control
- PersonalProtectionEquipment(PPEs)forsafetyatworkplaces

Unit-V

Motivation

- Factorsdeterminingmotivation
- Characteristicsofmotivation
- Methodsofimprovingmotivation
- Incentives–pay,promotion,rewards

Leadership

- Needfor leadership
- Functionsofa leader
- Factorstobeconsideredforaccomplishingeffectiveleadership

REFERENCEBOOKS

1. AHandbookofEntrepreneurship,EditedbyBSRathoreandDrJSSaini;AapgaPublications, Panchkula (Haryana)
2. EntrepreneurshipDevelopmentbyCBGuptaandPSrinivasan,SultanChandandSons,NewDelhi
3. EnvironmentalEngineeringandManagementbySureshKDhamija,SKKatariaandSons,NewDelhi
4. EnvironmentalandPollutionAwarenessbySharmaBR,SatyaPrakashan,NewDelhi
5. ThakurKailash,EnvironmentalProtectionLawandpolicyinIndia:DeepandDeepPublications, New Delhi
6. HandbookofSmallScaleIndustrybyPM Bhandari
7. MarketingManagementbyPhilipKotler,PrenticeHallofIndia,NewDelhi
8. TotalQualityManagementbyDrDDSharma,SultanChandandSons,New Delhi.
9. PrinciplesofManagementbyPhilipKotlerTEEPublication

DIEE606

MajorProject Work

Project workaims at developingskills inthestudents wherebytheyapplythetotalityof knowledgeand skills gained through the course in the solution of particular problem or undertaking a project.The students have various aptitudes and strengths. Project work, therefore, should match thestrengths of students.Forthispurpose,studentsshouldbeaskedtoidentifythetypeofprojectwork,theywouldlike to execute. It is also essential that the faculty of the respective departmentmay have a brainstorming sessiontoidentifysuitableprojectassignments.Theprojectassignmentcanbeindividualassignmentor a group assignment. There should not be more than 3 students ifthe project work is given to a group. Thestudentsshouldidentifyorgivenprojectassignmentatleasttwotothreemonthsinadvance.The projectworkidentifiedin collaboration withindustryshould be preferred.Each teacherisexpected to guide the project work of 5-6 students. The project assignments mayconsist of :

a) Projectsrelatedwithrepairandmaintenanceofmachineparts
b) Estimatingandcostingprojects
c) Designofcomponents/parts/jigs/fixtures
d) Projectsrelatedtoqualitycontrol
e) Projectworkrelatedtoincreasingproductivity
f) Projectconnectedwithworkstudy
g) Projectsrelatingtoerection,installation,calibrationandtesting
g) Projectsrelatedtowastagereduction
h) Progressrelatedtoenergyaudit