CURRICULUM-2023

C-23

DIPLOMAIN ELECTRICAL AND ELECTRONICS ENGINEERING

STATE BOARD OF TECHNICAL EDUCATION& TRAINING

ANDHRA PRADESH

PREAMBLE

Technical Education is a key driver of economic development and plays a crucial role in providingindividualswiththeskillsandknowledgenecessarytothriveintheworkplace.As technologicaladvancementscontinuetoreshapeindustriesandcreatenewopportunities,it is critical that technical education curricula remain relevant and up-to-date.

The curriculum has been designed with this in mind, with a focus on practical skills, criticalthinking,andproblem-solving.Webelievethattheseskillsareessentialforsuccessin both academic and professional spheres. The revamping of the technical education curriculumis made with collaborative effort from educators, industry experts, policymakers, and students.

Attheheartofthecurriculum,isthebeliefthatthetechnicaleducationshouldbe**student-centered**, empowering learners to take ownership of their learning and pursue their passions. Weaimtocreatealearningenvironmentthatissafe,supportive,andnurturing,whereevery studenthastheopportunitytoreachtheirfullestpotential.Weacknowledgethatlearningis alifelongjourney,andourcurriculumisdesignedtoprovideasolidfoundationforcontinued growth and development. We hope that our students will not only leave with a diploma but with employability and passion for learning.

The State Board of Technical Education and Training, (SBTET) AP, has been offering Diploma programmes to meet the above said aspirations of the stake holders:industries, students, academia, parents and the society at large.**The Curriculum should be flexible, adaptable,andresponsivetothechangingneedsoftheindustryandsociety.**As such, it has been the practice of SBTET, A.P., to keep the curriculum abreast with the advances in technologythroughsystematicandscientificanalysisofcurrentcurriculumandbringoutan updated revised version at regular intervals.

ThedesignofCurriculumC-23wasstartedinthemonthofJanuary-2023.Feedback wascollectedfromallstakeholders:Students,Lecturers,SeniorLecturers,HeadofSections and Principals for all programmes for this purpose. Accordingly, a workshop was convened on 15thFebruary 2023 by Smt. C. Naga Rani, I.A.S, Director of Technical Education& Chairperson, SBTET, AP to discuss on revamping of C-20 curriculum to meet the needs of industries and for improvement of placements.

The meeting was attended by Sri. Saurab Gaur, I.A.S, Principal Secretary, Skill Development& Training, Smt. Lavanya Veni, I.A.S, Director, Employment& Training. Thirteen Representatives from Industries and Fourteen Academicians from Higher Level Institutions and officials of ITI, Skill Development, CTE & SBTET attended the workshop.

Smt. C Naga Rani, I.A.S., Commissioner of Technical Education while addressing in theworkshop, emphasized thenecessityofindustrial trainingand on-hand experience, that thestudentsneedtoundergotosupporttheindustries andtheGapsintheCurriculumneed to be fixed to make the students passionate to work in the industry in order to support economy of the country.

The committees of each branch consisting of experts from Industries, Higher Level InstitutionsandFacultyofPolytechnicsareinformedtostudythepossibilityofincorporating the following aspects while preparation of the curriculum so as to improve employability.

- **TobringoutindustryorientedDiplomaEngineers.**
- **InternetofThings(IoT)forallbranches**
- **Theoretical&Practicalsubjects50:50Ratio**
- **Industry4.0concepts.**
- **5G Technology.**
- **Critical Thinking (Quantitative Aptitude, Data Interpretation, Quantitative reasoning etc) to face the written tests conducted by the industries during placements.**

Incontinuation,seriesofworkshopswithsubjectexpertsfollowedinthesubsequent weeks for thorough perusal for preparation of draft curriculum. Also, the suggestions received from representatives from various industries, academic experts from higher level institutions, subject experts from Polytechnics, have been recorded, validated for incorporation into the**Curriculum C-23.**Finally, the draft curriculum was sent to academicians of higher-level institutions, industrial experts for Vetting.

The design of new Curricula C-23 for different diploma programmes has thus been finalised withtheactiveparticipationofthe membersofthefacultyteaching inthe Polytechnics of Andhra Pradesh, and duly reviewed by Expert Committee constituted of academicians and representatives from industries. Thus, the primary objective of thecurriculumchangeistoproduceemployablediplomaholdersinthecountrybycorrelating thegrowingneedsoftheindustrieswithrelevantacademicinput.

The outcome-based approach as given by NBA guidelines has been followed throughout the design of this curriculum and designed to meet the requirements of NBA Accreditation, too.

TheRevisedCurriculumi.e.,Curriculum–2023(C-23)isapprovedby45thAcademic Committee of SBTET,A.P foritsimplementation with effect fromAcademicYear2023-24. Also, the SBTET, A.P under the aegis of the Department of Technical Education, Andhra Pradeshinit's62ndBoardMeetingheldon13-07-2023(videitemno:17)Approvedtoupdate the Polytechnic Curriculum C-23 with effect from the academic year 2023-2024 onwards after revamping the presentC-20 curriculum, to meet the latest industrial technological developments including Industry 4.0 concepts.

2.HIGHLIGHTSOFCURRICULUMC-23

The following Courses/ Topics are incorporated in this curriculum C-23 as per the suggestions received from Industrial Experts, Faculty of Higher Level Institutions and Polytechnics to improve the Employability Skills of the Polytechnic Students.

1. DurationofcourseforregularDiplomais3years.
2. The Curriculum is prepared in Semester Pattern. However, First Year is maintained as Year-wise pattern.
3. 6MonthsIndustrialtraininghasbeenintroducedfor3yearsDiplomaCoursesinVI semester.

4. Updated subjects/topics relevant to the industry are introduced in all courses atappropriate places.
5. The policy decisions taken at the State and Central level with regard to environmental sciencearеimplementedbyincludingrelevanttopicsinChemistry.Thisisalsoinaccordance with the Supreme Court guidelines issued in Sri Mehta's case.
6. Keepinginview the increasedneedof communication skills whichis playinga majorrole inthesuccessofDiplomaLevelstudentsintheindustries,emphasisisgivenforlearningand acquiringlistening,speaking,readingandwritingskillsinEnglish.Furtherasemphasizedin themeetings,CommunicationSkillslabandLifeSkillslabarecontinuingforallthebranches.
7. CADspecifictothebranchhasbeengivenemphasisinthecurriculum.Preparingdrawings using CAD software has been given more importance.
8. Upon reviewing the existing C-20 curriculum, it is found that the theory content is found to havemoreweightagethanthePracticalcontent.InC-23curriculum,moreemphasisisgiven to the practical content in Laboratories and Workshops, thus strengthening the practical skills. The ratio of Theory & Practicals is 50:50.
9. With increased emphasis for the student to acquire Practical skills, the course content in all the subjects is thoroughly reviewed and structured as outcome based than the conventional procedure based.
10. Curriculum of Laboratory and Workshops have been thoroughly revised based on the suggestions received from the industry and faculty, for better utilization of the equipment available in the Polytechnics. The experiments /exercises that are chosen for the practical sessions are identified to confirm to the field requirements of industry.
11. The theory and practical subjects are restructured to find room for new theory andpractical subjects to meet the present the industrial needs.
12. Aselectricvehiclesarethekeytechnologytodecarboniseroadtransport,itisimportantto learn about EV Technology. Hence, to meet the need of present technology a new subject titled "ELECTRICVEHICLETECHNOLOGY"isintroducedinVsemester.
13. A new laboratory titled "HYBRID POWER SYSTEMS LABORATORY" is introduced in IV semester in which industrial visits are made compulsory to bridge the gap between classroom learning and real-world circumstances and to aware the latest trends in industries which facilitates thestudentsfor better understanding of power system concepts.
14. To make the students effective and efficient in all aspects, three periods per week are allotted in every year/semester for STUDENT CENTRIC ACTIVITY in which student will be trained for placements or make use of library or participate in sports & games/clean & greenetc.

SPECIFICCHANGESINCORPORATEDINPRESENTCURRICULUMC-23

a) The number of theory subjects in each semester is limited to 05 only by restructuring the related subjects/topics and deleting repeated/higher order topics. Similarly, the relevant laboratories are restructured to find room for new laboratories.
b) Thedurationofengineeringdrawingismade03periodsbyreducingthesyllabuswhichis not necessary for Electrical & Electronics Engineering students.
c) Toboostthetechnicalknowledgeforbetterunderstandingoftheoryconceptstheratioof Theory & Practical is made 50:50 in this C-23 curriculum.

d) The Electrical Engineering Drawing I & II are restructured and made into one singleelectricaldrawingsubjectbydeletingthetopicswhichcoverintheorysubjectstofindspace for introducing new laboratories.
e) AnewlaboratoryEE-410isintroducedinIVsemestertitledwithHYBRIDPOWERSYSTEM LABORATORY in which power systems practicals are introduced.
f) Industrialvisitsplayakeyrolefortechnicalstudentswhichhelptobridgethegapbetween classroom learning and real-world job circumstances. Keeping this in view, the industrial visits are made compulsory in EE-410, HYBRID POWER SYSTEM LABORATORY and proper weightage is given for industrial visits.
g) Anewtheory subjecttitled ELECTRIC VEHICLE TECHNOLOGY,EE-502isintroducedin VsemesterinwhichEVtechnologyandbatterytechnologytopicsareintroducedtomeetthe present industrial needs.
h) MATLAB practicals are introduced in MATLAB PRACTICE LABORATORY, EE-506 in V semester in which simulation practicals are incorporated.
i) SCADA practicals have been incorporated in PLC& SCADA laboratory, EE-507 in V semester to throw light on importance of SCADA in power system.

3. ACKNOWLEDGEMENTS

The Members of the working group are grateful to Smt C. Naga Rani I.A.S., Commissioner of Technical Education & Chairman of SBTET, for continuous guidance and valuable inputs during process of revising, modifying and updating the Curriculum C-20 to Curriculum C-23.

WearegratefultoSri.S.SureshKumar,I.A.S,PrincipalSecretary,SkillsDevelopment & Training for his valuable suggestions to bring the revamped curriculum C-23 in to a final form to meet latest Industry 4.0 concepts.

We are grateful to Sri. Saurab Gaur, I.A.S, former Principal Secretary, Skills Development& Training who actively participated in the Industry-Academia workshop conducted on 15thFebruary, 2023 and offered valuable suggestions and insights into the learning needs and preferences so that the curriculum is engaging, inclusive, and effective.

It is pertinent to acknowledge the support of the following in the making of Curriculum C-23.A series of workshops in different phases were conducted by SBTET, AP, GunturinvolvingfacultyfromPolytechnics,PremierEngineeringColleges&representatives from various Industries and Dr. C. R. Nagendra Rao, Professor& Head, NITTTR-ECV to analyse the Previous C-20 Curriculum and in designing of C-23 Curriculum, is highly appreciated and gratefully acknowledged.

We also extend our sincere thanks to Sri K.V. Ramana Babu, Secretary, SBTE&T, Andhra Pradesh, Sri K.Vijaya Bhaskar, Former Secretary, SBTET, Andhra Pradesh, Sri. V.Padma Rao, Joint Director of Technical Education, officials of Directorate of Technical Education and the State Board of Technical Education, Andhra Pradesh and all teaching fraternityfromthePolytechnicswhoaredirectlyorindirectlyinvolvedinpreparationofthe curricula.

4. RULESANDREGULATIONSOFC-23 CURRICULUM

Durationandpatternofthecourses

All the Diploma programs run at various institutions are of AICTE approved 3 years or 3½ years duration of academic instruction. All the Diploma courses are run on yearwise pattern in the first year, and the remaining two or two & half years are run in the semester pattern.In respect of few courses likeDiplomainBio-Medical course,thetraining will bein the seventh semester. **Run-through system is adopted for all the Diploma Courses, subject to eligibility conditions.**

ProcedureforAdmissionintotheDiplomaCourses:

Selection of candidates is governed by the Rules and Regulations laid down in this regard from time to time.

a) CandidateswhowishtoseekadmissioninanyoftheDiplomacourseswillhavetoappear for the Common Entrance Test for admissions into Polytechnics (POLYCET) conducted by the State Board of Technical Education and Training, Andhra Pradesh, Vijayawada. Only the candidates satisfying the following requirements will be eligible to appear for the Common Entrance Test for admissions into Polytechnics (POLYCET).
    a. The candidates seeking admission should have appeared for S.S.C examination, conducted by the Board of Secondary Education, Andhra Pradesh or equivalent examination thereto, at the time of applying for the Common Entrance Test for admissions into Polytechnics (POLYCET). In case of candidates whose results of their Qualifying Examinations is pending, their selection shall be subject to productionofproofoftheirpassingthequalifyingexaminationinoneattemptor compartmentally at the time of admission.
    b. Admissionsare madebased on the merit obtained in the Common Entrance Test (POLYCET) and the reservation rules stipulated by the Government of Andhra Pradesh from time to time.
    c. ForadmissionintothefollowingDiplomaCoursesforwhichentryqualificationis 10+2, candidates need not appear for POLYCET. A separate notification will be issued for admission into these courses.
        i).D.HMCTii).D.Pharmacy

MediumofInstruction

ThemediumofinstructionandexaminationshallbeEnglish.

PermanentIdentificationNumber(PIN)

Acumulative/academicrecordistobemaintainedoftheMarkssecuredinsessional workandendexamination of each yearfordeterminingtheeligibilityforpromotion etc., A Permanent Identification Number (PIN) will be allotted to each admitted candidate to maintain academic records.

NumberofWorkingDaysPerSemester/Year:

a) The Academic year for all the Courses shall be in accordance with the Academic Calendar.
b) TheWorkingdaysinaweekshall befromMondayto Saturday

c) Thereshallbe7periodsof50minutesdurationeachonallworkingdays.
d) The minimum number of working days for each semester / year shall be 90 / 180 daysexcludingexaminationdays.Ifthisprescribed minimum isnot achieveddue to any reason, special arrangements shall be made to conduct classes to completethe syllabus.

Eligibility(AttendancetoAppearfortheEndExamination)

a) A candidate shall be permitted to appear for the end examination in all subjects, if he or she has attended a minimum of 75% of working days during the year/Semester.
b) Condonation of shortage of attendance in aggregate up to 10% (65% and above andbelow75%)ineachsemesteror1styearmay begrantedonmedicalgrounds.
c) A stipulated fee shall be payable towards condonation for shortage of attendance.
d) Candidateshavinglessthan65%attendanceshallbedetained.
e) Students whose shortageof attendance is not condoned in any semester / 1styear and not paid the condonation fee in time are not eligible to take their end examination of that class and their admissions shall stand cancelled. They may seek re-admission for that semester / 1styear when offered in the next subsequent academic semester/year.

ForINDUSTRIALTRAINING:
i) DuringIndustrialTrainingthecandidateshallputinaminimumof90%attendance.
ii) If the student fails to secure 90% attendance during industrial training, the student shallreappearfor6monthsindustrialtraining at hisownexpenses.

Readmission

Readmission shall be granted to eligible candidates by the respective Principal/ Regional Joint Director.

a) (i) Within 15 days after commencement of class work in any semester (Except Industrial Training).
(ii)ForIndustrialTraining:beforecommencementoftheIndustrialtraining.
b) Within 30 days after commencement of class work in any year (including D. PharmacycourseorfirstyearcourseinEngineeringandNon-Engineering Diploma streams). Otherwise, such cases shall not be considered for readmissionfor that semester / year and are advised to seek readmission in the nextsubsequent eligible academic year.
c) The percentage of attendance of the readmitted candidates shall be calculated from the first day of beginning of the regular class work for that year / Semester, as officially announced by CTE/SBTET but not from the day on which he/she has actually reported to the class work.

Schemeof Evaluation

a) **First Year**
TheoryCourses: EachCoursecarriesMaximummarksof80withanend examinationof3hoursduration,alongwithinternalassessmentforMaximumof

20marks.(Sessionalmarks). However,there are nominimummarks prescribed for sessionals.

Laboratory Courses: There shall be 40/20 Marks for internal assessment i.e. sessional marks for each practical Course with an end examination of 3 hours duration carrying 60/30 marks. However, there are no minimum marks prescribed for sessional.

b) III,IV,V,VIandVII Semesters:

TheoryCourses:Endsemesterevaluationshallbeof3hoursdurationandfora maximum of 80 marks.

Laboratory Courses: Each Course carry 60/30 marks of 3 hours duration 40/20 sessional marks.

InternalAssessmentScheme

a) Theory Courses: Internal assessment shall be conducted for awarding Sessional marks on the dates specified. **Three-unit tests shall be conducted for I year students and two Unit Tests for semesters. The details are presented below.**

S. No.	TypeofAssessment	Weightage Assigned
(i)	Testingofknowledgethroughmid-examinationfor year/semas(Mid-1+Mid-2+Mid3)or(Mid-1+Mid-2)	40
(ii)	Assignments	5
(iii)	*Dynamic Learning activities : Project Work/ Seminar/Tech-fest/Group Discussion, Quizzes etc./Extra-curricular activities/NSS/NCC/IPSGM/Cleaning&GreeningofCampus etc.*	*5*
	TOTAL	50

Internal Assessment shall be of 90 minutes duration and for a maximum of 40 marksfor each test.

Atleastoneassignmentshouldbecompletedforeachunitwhichcarries10marks. Thetotalassignmentmarksshouldbereducedto5.

The dynamic learningactivityistobeconductedwhichcarries 10marks.The total marks should be reduced to 5.

Thetotal50marksassignedtointernalassignmentistobescaleddownto20marks.

b) PracticalCourses:

(i) **DrawingCourses:**

TheawardofSessionalmarksforinternalAssessmentshallbeasgiveninthe following table:

DistributionofMarksfortheInternalAssessmentMarks			
FirstYear(Total:40Marks)		**Semesters(Total:40Marks)**	
Max:20 Marks	Max:20Marks	Max:20Marks	Max:20Marks
From the Averageof THREE Unit Tests.	From the Averageof Assessment of Regular Class work Exercises.	FromtheAverageof TWO Unit Tests.	From the Average of Assessment ofRegular Class work Exercises.

- Forfirstyearengineeringdrawingeachunittestwillbeconductedforaduration of 2 hours with maximum marks of 40.
- (Part-A:4questionsx5marks=20Marks;Part–B:2questionsx10marks=20 marks).
- Forthesemesterdrawingexaminations,TwoUnittestsshallbeconductedasper the Board End Examination Question Paper Pattern.
- All Drawing exercises are to be filed in serial order and secured for further scrutiny by a competent authority

(ii) LaboratoryCourses:

(a) Student'sperformanceinLaboratories/ Workshop shall beassessedduring theyear/semesterofstudyfor40marksineachpracticalCourse.

(b) EvaluationforLaboratoryCourses,otherthanDrawingcourses:

i. Instruction (teaching) in laboratory courses (except for the course on Drawing) here after shall be task/competency based as delineated in the Laboratory sheets, preparedby SBTET, AP & NITTTR- ECVand postedin SBTETwebsite.
ii. Internal assessment for Laboratory shall be done on the basis of task/s performedbythestudentasdelineatedin thelaboratorysheets,preparedby SBTET, AP & NITTTR- ECV and posted in AP, SBTET website.
iii. Question paper for End semester Evaluation shall also be task/s based and shall bepreparedanddistributedbySBTETas done incase of theorycourses be prepared as per SBTET rules in vogue.

c) Internal assessment in Labs / workshops / Survey field work etc., during the course of study shall be done and sessional marks shall be awarded by the concerned Teacher.

d) For practical examinations, except in drawing, there shall be two examiners. External examiner shall be appointed by the Principal in consultation with respective Head of Section preferably choosing a qualified person from in the order of preference.

i) NearbyIndustry
ii) Govt / Semi Govt organization like R& B, PWD, PR, Railways, BSNL, APSRTC, APSEBetc.
iii) Govt/UniversityEnggCollege.
iv) HoD/SeniorLecture (SelectionGrade-II)fromtheGovt. Polytechnic

Internal examiner shall be the person concerned with internal assessment as in (c) above.Theendexaminationshallbeheldalongwithalltheorypapersinrespect of drawing.

e) Question Paper for Practicals: Question paper should cover (the experiments / exercise prescribed to test various) skills like handling, manipulating, testing, trouble shooting, repair, assembling and dismantling etc., from more than one experiment/ exercise

f) Records pertaining to internal assessment marks of both theory and practical Courses are to be maintained for official inspection.

g) In case of Diploma programs having Industrial Training, Internal Assessment and Summative Evaluation, shall be done as illustrated in the following table:

Assessment no	Upon completion of	By	Basedon	Max Marks
1	12weeks	1. The faculty concerned(Guide) and 2. Trainingin charge (Mentor) of the industry	Learningoutcomesas givenintheschemeof assessment ,for Industrial Training	120
2	22weeks			120
3. Final summative Evaluation	24week	1. Thefaculty member concerned, 2. HoDconcerned and 3. Anexternal examiner	1. Demonstration of any oneoftheskillslistedin learningoutcomes	30
			2.TrainingReport	20
			3.VivaVoce	10
			TOTAL	**300**

h) Eachstaffmemberincluding HeadofSectionshallbeassignedabatchof students 10 to 15 for making assessment during industrial training.

MinimumPassMarks

a) TheoryExamination:

For passing a theory Course, a candidate has to secure a minimum of 35% in end examinationandacombinedminimumof35%ofbothSessionalandendexamination marks put together.

b) PracticalExamination:

For passing a practical Course, a candidate has to secure a minimum of 50% in end examinationandacombinedminimumof50%ofbothsessionalandpracticalend

examination marks put together. In case of D.C.C.P., the pass mark for typewriting and short hand is 45% in the end examination. There are no sessional marks for typewriting and Shorthand Courses of D.C.C.P course.

C) IndustrialTraining:

I. Monitoring:Similartoprojectworkeachteachermaybeassignedabatchof 10-15 students irrespective of the placement of the students to facilitateeffectivemonitoringofstudentslearningduringindustrialtraining.

II. Assessment: The Industrial training shall carry 300 marks and pass marks is 50% in assessments at industry (first and second assessment) and final summative assessment at institution level put together i.e. 150 marks out of 300 marks. And also student has to secure 50% marks in final summativeassessment at institution level.

III. In-PlantIndustrialTrainingfor3-YearDiploma(C-23)Coursesisscheduled as per the Academic Calendar of the SBTET every year.

ProvisionforImprovement

Improvementisallowedonlyafterhe/shehascompletedalltheCoursesfromFirst Year to Final semester of the Diploma.

a) Improvementisallowedinany4(Four)CoursesoftheDiploma.
b) Thestudentcanavailofthisimprovementchance **ONLYONCE**,thattoowithinthe succeedingtwoexaminationsafterthecompletionofDiploma.However,theduration including Improvement examination shall not exceed **FIVE** years from the year of first admission.
c) No improvement is allowed in Practical / Lab Courses or Project work or Industrial Training assessment. However, improvement in drawing Course(s) is allowed.
d) If improvement is not achieved, the marks obtained in previous Examinations hold good.
e) ImprovementisnotallowedinrespectofthecandidateswhoarepunishedunderMal-practice in any Examination.
f) Examinationfeeforimprovementshallbepaidasperthenotificationissuedby State Board of Technical Education and Training from time to time.
g) Allthecandidateswhowishtoappearforimprovementofperformanceshalldeposit the original Marks Memos of all the years / Semesters and also original Diploma Certificate to the Board.If there is improvement in performance of the current examination, the revised Memorandum of marks and Original Diploma Certificate will be issued, else the submitted originals will be returned.

RulesofPromotionFrom1ST YEARTO3rd,4th,5th,6thand7thSemesters:

A) ForDiplomaCoursesof3Yearsduration

i).Acandidateshallbepermittedtoappearforfirstyearexaminationprovidedhe/ sheputs in 75% attendance (which can be condoned on Medical grounds up to 10%) and pay the examination fee.

ii) A candidate shall be promoted to 3rd semester if he/she puts the required percentage of attendance in the first year and pays the examination fee.A candidatewhocouldnotpaythefirstyearexaminationfeehastopaythe

promotion fee as prescribed by State Board of Technical Education and Training,AP from time to time before commencement of 3rd semester.

Acandidateiseligibletoappearforthe3rdsemesterexaminationifhe/sheputsthe requiredpercentageofattendanceinthe3rdsemesterandpaystheexamination fee.

iii) A candidate shall be promoted to 4th semester provided he/she puts the required percentage of attendance inthe 3rd semester and pay the examinationfee.A candidate, who could not pay the 3rd semester exam fee, has to pay the promotionfeeasprescribedbyStateBoardofTechnicalEducationandTraining APfromtimetotimebeforecommencementof4thsemester.Acandidateis eligible to appear for the 4th semester examination if he/she puts the required percentage ofattendance inthe 4thsemesterand pays the examination fee.

iv) A candidate shall be promoted to 5thsemester provided he / she puts the required percentage of attendance in the 4thsemester and pays the examination fee. A candidate, who could not pay the 4thsemester examination fee, has to pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 5thsemester.

A candidate is eligible to appear for the 5thsemester examination if he/she puts the required percentage of attendance in the 5thsemester and pays the examination fee.

v) A candidate shall be sent to Industrial training / VI semester provided he/she puts in the required percentage of attendance in the 5thsemester and pay the examination fee/ promotion fee as prescribed by SBTET.
A candidate is eligible to appear for Industrial Training assessment (Seminar/Viva-voce)putstherequiredpercentageofattendance,i.e.,90%in6th semester Industrial Training.

ForIVC&ITILateralEntry students:

i.) A candidate shall be permitted to appear for Third Semester examination provided he / she puts in 75% attendance (which can be condoned on Medical grounds up to 10%) and pay the examination fee for Third semester.

ii) A candidate shall be promoted to 4th semester provided he/she puts the required percentage of attendance in the 3rd semester and pay the examination fee.A candidate, who could not pay the 3rd semester exam fee, has to pay the promotion feeasprescribedbyStateBoardofTechnicalEducationandTrainingAPfrom time to time before commencement of 4th semester.

A candidate is eligible to appear for the 4th semester examination if he/she puts the required percentage of attendance in the 4th semester and pays the examination fee.

ii) Acandidateshallbepromotedto5thsemesterprovidedhe/sheputstherequired percentage of attendance in the 4thsemester and pays the examination fee. A candidate,whocouldnotpaythe4thsemesterexaminationfee,hastopaythe

promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 5thsemester.

A candidate is eligible to appear for the 5thsemester examination if he/she puts the required percentage of attendance in the 5thsemester and pays the examination fee.

iii) A candidate shall be sent to Industrial training / VI semester provided he/she puts in the required percentage of attendance in the 5thsemester and pay the examination fee/ promotion fee as prescribed by SBTET.
A candidate is eligible to appear for Industrial Training assessment (Seminar/Viva-voce)putstherequiredpercentageofattendance,i.e.,90%in6th semester Industrial Training and pays the examination fee.

B) ForDiplomaCoursesof3½Yearsduration(MET/CH/CHPP/CHPC/CHOT/TT):

i. A candidate shall be permitted to appear for 1stYear examination provided he / she puts in 75% attendance (which can be condoned on Medical grounds upto 10%) i.e.attendanceaftercondonationonMedicalgroundsshouldnotbelessthan65% and pay the examination fee.
ii. A candidate shall be promoted to 3rdsemester if he/she puts the requiredpercentage of attendance in the 1styear and pays the examination fee.A candidate who could not pay the 1styear examination fee has to pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 3rdsemester.
iii. A candidate shall be promoted to 4thsemester provided he/she puts the required percentage of attendance in the 3rdsemester and pay the examination fee.A candidate, who could not pay the 3rdsemester exam fee, has to pay the promotionfee as prescribed by State Board of Technical Education and Training from time to time before commencement of 4thsemester.
A candidate is eligible to appear for the 4th semester exam if he/she puts the required percentage of attendance in the 4thsemester

<u>ForIVC&ITILateralEntry students</u>:

a) Putstherequiredpercentageofattendanceinthe4thsemester

iv. Acandidateshallbepromotedto5thsemesterindustrialtrainingprovidedhe/ she puts the required percentage of attendance in the 4th semester and pays the examination fee. A candidate, who could not pay the 4th semester examination fee, has to pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 5th semester.
v. Promotionfrom5thto6thsemesterisautomatic(i.e.,from1stspellofIndustrial Training to 2nd spell) provided he/she puts the required percentage of attendance, which in this case ie.,90 % of attendance and attends for the VIVA-VOCE examination at the end of training.
vi. A candidate shall be promoted to 7th semester provided he / she puts the required percentage of attendance in the 6th semester and pays the examination fee. A candidate, who could not pay the 6th semester examination fee, has to pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 7th semester.
vii. Acandidateshallbepromotedto7thsemesterofthecourseprovidedhe/shehas successfully completed both the spells of Industrial Training.

Acandidateiseligibletoappearfor7thsemesterexaminationifhe/she

a) Putsintherequiredpercentageofattendanceinthe7thsemester

ForIVC&ITILateralEntry students:

a)Putsintherequiredpercentageofattendanceinthe7thsemester.

C) ForDiplomaCourses of3½Yearsduration(BM):

The same rules which are applicable for conventional courses also apply for this course. The industrial training in respect of this course is restricted to one semester (6 months) afterthe6thsemester(3years)ofthecourse.

i. A candidate shall be permitted to appear for first year examination provided he/sheputsin75%attendance(whichcanbecondonedonMedicalgrounds upto10%)i.e.attendanceaftercondonationonMedicalgroundsshouldnotbe less than 65% and pay the examination fee.

ii. A candidate shall be promoted to 3rdsemester if he/she puts the required percentage of attendance in the first year and pays the examination fee.A candidate who could not pay the first year examination fee has to pay the promotionfeeasprescribedbyStateBoardofTechnicalEducationand Training from time to time before commencement of 3rdsemester.

iii. A candidate shall be promoted to 4thsemester provided he/she puts therequired percentage of attendance in the 3rdsemester and pay the examination fee.Acandidatewhocouldnotpaythe3rdsemesterexaminationfee,hasto pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 4thsemester.

Acandidateiseligibletoappearforthe4thsemesterexaminationifhe/she

a) Putsintherequiredpercentageofattendanceinthe4thsemester

ForIVC&ITILateralEntry Students:

Acandidateiseligibletoappearforthe4thsemesterexaminationifhe/sheputs therequiredpercentageofattendancein the4thsemester

iv. A candidate shall be promoted to 5thsemester provided he / she puts the required percentage of attendance in the 4thsemester and pays the examination fee.Acandidate,whocouldnotpaythe4thsemesterexaminationfee,hasto pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of5thsemester.

Acandidateiseligibletoappearforthe5thsemesterexamifhe/she

a) Putsintherequiredpercentageofattendanceinthe5thsemester.

ForIVC&ITILateralEntry students:

a) Putsintherequiredpercentageofattendanceinthe5thsemester.

v. A candidate shall be promoted to 6thsemester provided he/she puts in the required percentage of attendance in the 5thsemester and pays the examination fee.

A candidate who could not pay the 5thsemester examination fee, has to pay the promotionfeeasprescribedbyStateBoardofTechnicalEducationand Training from time to time before commencement of 6thsemester.

Acandidateiseligibletoappearfor6thsemesterexamination

a) Putsintherequiredpercentageofattendancein6thsemester

IVC&ITILateralEntrystudents:

a) Putsintherequiredpercentageofattendancein6thsemester.

vi. A candidate shall be promoted to 7th semester provided he/she puts in the requiredpercentage of attendance in 6th semester and pay the examinationfee.Acandidate,whocouldnotpaythe6thsemesterexaminationfee,hast o pay the promotion fee prescribed by SBTET from time to time before commencement of the 7th semester (Industrial Training).

Acandidateiseligibletoappearfor7thsemesterIndustrialTrainingassessment (Seminar/Viva-voce) if he/she

a) Puts in the required percentage of attendance, ie., 90% in 7th semester Industrial Training.

ForIVC&ITILateralEntry students:

a) Puts in the required percentage of attendance, i.e., 90% in 7thsemester Industrial Training.

StudentsPerformanceEvaluation

SuccessfulcandidatesshallbeawardedtheDiplomaunderthefollowingdivisionsof pass.

a) FirstClasswithDistinctionshallbeawardedtothecandidateswhosecureanoverall aggregate of 75% marks and above.
b) FirstClassshallbeawardedtocandidateswhosecureoverallaggregateof60%marks and above and below 75% marks.
c) SecondClassshallbeawardedtocandidateswhosecureapasswithanoverall aggregate of below 60%.
   i. The Weightage of marks for various year/Semesters which are taken for computing overall aggregate shall be 25% of I year marks + 100% of 3rdand subsequent Semesters.
   ii. In respect IVC & ITI Lateral Entry candidates who are admitted directly into diploma course at the 3rdsemester (i.e., second year) level the aggregate of (100%) marks secured at the 3rdand subsequent semesters of study shall be taken into consideration for determining the overall percentage of marks secured by the candidates for award of class/division.
d) SecondClassshallbeawardedtoallstudents,whofailtocompletetheDiplomain theregular3years/3½yearsandfoursubsequentexaminationsfromtheyearof first admission.

EXAMINATIONFEESCHEDULE:

TheexaminationfeeshouldbeasperthenotificationissuedbyStateBoardof Technical Education and Training, AP from time to time.

StructureofExaminationQuestionPaper:

I. Formativeassessment(Internalexamination)

a) FortheoryCourses:

Three-unit tests forfirstyear and two-unit tests for semesters shall be conducted withadurationof90minutesforeachtestformaximummarksof40.Itconsistsof part A and Part B.

PartAcontainsfivequestionsandcarries16marks.Amongthesefivequestions firstquestionconsistsoffourobjectiveitemslikeonewordorphrase answer/filling-in the blanks/true or false etc with one mark for each question. The other four questions are short answer questions and carry three marks each.

Part B carries 24 marks and consists of three questions with internal choice ie., Either/Or type , and eachquestion carries8 marks.

The sum of marks of 3 tests for I year and 2 tests for semesters includingassignments and Dynamic learning activities (50 marks) shall be reduced to 20marksineachCoursefor arriving atfinalsessionalmarks.

b) FordrawingCourses:

For I year:

Three-unittestswithdurationof90minutesandformaximummarksof40marks shall be conducted for first year. It consists of part A and Part B.

Part A consists four questions for maximum marks of 16 and each question carries four marks (4×4 marks=16 marks).

Part B carries maximum marks of 24 and consists of five questions while the student shall answer any three questions out of these five questions. Each question in this part carries a maximum mark of 8, (3×8 marks=24 marks).

The sum of marks obtained in 3-unit test marks shall be reduced to 20 marks for arriving at final sessional marks. Remaining 20 marks are awarded by the Course teacher basedonthestudent'sperformanceduringregularclassexercise.

For semester: Two-unit tests with duration of 90 minutes and for maximum marksof 40 marks shall be conducted.The sum of marks obtained in2-unit test marksshall be reduced to 20 marks for arriving at final sessional marks. Remaining 20 marks are awarded by the Course teacher based on the student's performanceduring regular class exercise.

c) For Laboratory /workshop:50% of total marks for the Course shall be awarded based on continuous assessment of the student in laboratory/workshop classes and theremaining50%shallbebasedonthesumofthemarksobtainedbythestudentsin two tests.

II. Summativeassessment(Endexamination)

The question paper for theory examination is patterned in such a manner that the Weightageofperiods/marksallottedforeachofthetopicsforaparticularCoursebe considered. End Examination paper is of 3 hours duration.

a) **EachtheorypaperconsistsofSection'A' and'B'**
Section'A'withMaxmarksof30,contains10shortanswerquestions.All questionsaretobeansweredandeachcarry3marks,i.e.,10x3=30.

Section'B'withMaxmarksof50contains8 essaytypequestions.Only5questions aretobeansweredandeachcarry10marks,i.e.,Max.Marks:5x10=50.
Thus,thetotalmarksfortheoryexaminationshallbe:80.

b) **ForEngineeringDrawingCourse(107)consistofsection'A'andsection'B'**.

Section'A'withmaxmarksof20, contains four (4) questions. All questions in section'A'aretobeansweredtothescaleandeach carries5marks,ie.4x5=20.

Section 'B' with max marks of 40, contains six (6) questions. The student shall answer any four (4) questions out of the above six questions and each question carries 10 Marks, i.e., 4 x 10 = 40.

c) **PracticalExaminations**
ForWorkshoppracticeandLaboratoryExaminations,Eachstudenthastopickup a question paper distributed by Lottery System.

Max.Marksforanexperiment/exercise	:	50
Max.MarksforVIVA-VOCE	:	10
TotalMax.Marks	:	60

Incaseofpracticalexaminationswith50marks,themarks shallbedistributedas

Max.Marksforanexperiment/exercise	:	25
Max.MarksforVIVA-VOCE	:	05
TotalMax.Marks	:	30

Incaseofanychangeinthepatternofquestionpaper,thesameshallbeinformed sufficiently in advance to the candidates.

d) **Note:EvaluationforLaboratoryCourses,otherthanDrawingcourses**:

I. Instruction (teaching) in laboratory courses (except for the course on Drawing)hereaftershallbetask/competencybasedasdelineatedinthe Laboratory sheets, prepared by SBTET, AP and posted in its website.
II. Internal assessment for Laboratory shall be done on basis of task/s performed by the student as delineated in the laboratory sheets, prepared by SBTET, AP and posted in its website.
III. Question paper for End semester Evaluation shall be prepared as per SBTET rules in vogue.

ISSUEOFMEMORONDUMOFMARKS

All candidates who appear for the end examination will be issued memorandum of marks without any payment of fee. However candidates who lose the original memorandumofmarkshavetopaytheprescribedfeetotheSecretary,StateBoardof Technical Education and Training, A.P. for each duplicate memo from time to time.

MAXIMUMPERIODFORCOMPLETIONOFDIPLOMAPROGRAMMES:

Maximum period for completion of the diploma courses is twice the duration of the course from the date of First admission (includes the period of detention and discontinuation of studies by student etc) failing which they will have to forfeit the claim for qualifying for the award of Diploma (They will not be permitted to appear for examinations afterthat date). This rule applies forall Diploma courses of 3 years and 3 ½ years of engineering and non-engineering courses.

ELIGIBILITYFORAWARDOFDIPLOMA

A candidate is eligible for award of Diploma Certificate if he / she fulfil the following academic regulations.

i. He/Shepursuedacourseofstudyfornotlessthan3/3½academicyears&not more than 6 / 7 academic years.
ii. He/she havecompleted alltheCourses.
Students who fail to fulfil all the academic requirements for the award of the Diploma within 6 / 7 academic years from the year of admission shall forfeit their seat in the course & their seat shall stand cancelled.

ForIVC&ITILateral Entry students:

i. He/Shepursuedacourseofstudyfornotlessthan2/2½academicyears&not more than 4 / 5 academic years.
ii. He/shehascompletedalltheCourses.
Students who fail to fulfil all the academic requirements for the award of the Diploma within 4 / 5 academic years from the year of admission shall forfeit their seat in the course & their seat shall stand cancelled.

ISSUEOFPHOTOCOPYOFVALUEDANSWERSCRIPT,RECOUNTING&REVERIFICATION:

A) FORISSUEOFPHOTOCOPIESOFVALUEDANSWERSCRIPTS

I. A candidate desirous of applying for Photo copy of valued answer script/s should apply within prescribed date from the date of the declaration of the result.
II. Photocopiesofvaluedanswerscriptswillbeissuedtoall theoryCoursesand Drawing Course (s).
III. The Photo copy of valued answer script will be dispatched to the concerned candidate's address as mentioned in the application form by post.
IV. Noapplicationcanbeentertainedfromthirdparties.

B) FORRE-COUNTING(RC)andRE-VERIFICATION(RV)OFTHEVALUEDANSWER SCRIPT

i. AcandidatedesirousofapplyingforRe-verificationofvaluedanswerscript should apply within prescribed date from the date of the declaration of the result.
ii. Re-verificationofvaluedanswerscriptshallbedoneforalltheory Courses' and Drawing Course(s).
iii. TheRe-verificationcommitteeconstitutedbytheSecretary,SBTETAPwith Course experts shall re-verify the answer scripts.

I. **RE-COUNTING**

TheOfficerofSBTETwillverifythemarkspostedandrecountthemin the already valued answer script. The variations if any will be recorded separately,withoutmakinganychangesonthealreadyvaluedanswerscript. The marks awarded in the original answer script are maintained (hidden).

II. RE-VERIFICATION

(i) The Committee has to verify the intactness and genuineness of the answer script(s) placed for Re-verification.

(ii) Initiallysingle membershallcarryout the re-verification.

(iii) Onre-verificationbysinglemember,ifthevariationislessthan12%of maximummarks,andifthereisnochangeintheSTATUSintheresult ofthecandidate,suchcaseswillnotbereferredtothenextlevelie.,for 2-Tier evaluation.

(iv) On re-verification by a single member, if the variation is more than 12% of maximum marks, it will be referred to 2-Tier evaluation.

(v) Ifthe2-Tier evaluationconfirmsvariationinmarks asmorethan12% ofmaximummarks,thevariationisconsideredasfollows:

a) If the candidate has already passed and obtains more than 12% of the maximum marks on Re-verification, then the variation is considered.

b) Ifthecandidateisfailedandobtainsmorethan12%ofthemaximum marks on Re-verification and secured pass marks on re-verification, then the status of the candidate changes to PASS.

c) If a candidateis failedand obtainsmore than 12% of the maximum marks on Re-verification and if the marks secured on re-verification are still less than the minimum pass marks, the status of the candidate remain FAIL only.

(vii) AfterRe-verificationofvaluedanswerscriptthesameorchangeifany therein on Re-verification, will be communicated to the candidate.

(viii) OnRe-verificationofValuedAnswerScriptifthecandidate'smarksare revised, the fee paid by the candidate will be refunded or else the candidate has to forfeit the fee amount.

Note: NorequestforPhotocopies/Recounting/Re-verificationofvaluedanswerscript would be entertained from a candidate who is reported to have resorted to Malpractice in that examination.

MalPracticeCases:

IfanycandidateresortstoMalPracticeduringexaminations,he/sheshallbebooked andthePunishmentshallbeawardedasperSBTETAPrulesandregulationsinvogue.

Discrepancies/Pleas:

Any Discrepancy /Pleas regarding results etc., shall be represented to the SBTETAP withinonemonthfromthedateofissueofresults.Thereafter,nosuchcasesshallbe entertained in any manner.

IssueofDuplicateDiploma

IfacandidateloseshisheroriginalDiplomaCertificateanddesiresaduplicatetobe issuedhe/sheshouldproducewrittenevidencetothiseffect.He/shemayobtaina

duplicatefromtheSecretary,StateBoardofTechnicalEducationandTraining,A.P., on payment of prescribed fee and on production of an affidavit signedbefore a First ClassMagistrate(Judicial)andnon-traceablecertificatefromtheDepartmentof Police.IncaseofdamageoforiginalDiplomaCertificate,he/shemayobtaina duplicate certificate by surrendering the original damaged certificate on payment of prescribedfeetotheStateBoardofTechnicalEducationandTraining,A.P.

Incasethecandidatecannotcollecttheoriginal Diplomawithin1yearfromthedate of issue of the certificate, the candidate has to pay the penalty prescribed by the SBTET AP from time to time.

IssueofMigrationCertificateandTranscripts:

The Board on payment of prescribed fee will issue these certificates for the candidates whointendtoprosecuteHigherStudiesinIndiaorAbroad.

General

i. The Board may change or amend the academic rules and regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students, for whom it is intended, with effect from the dates notified by the competent authority.
ii. AlllegalmatterspertainingtotheStateBoardofTechnicalEducationandTraining, AP are within the jurisdiction of Mangalagiri.
iii. In case of any ambiguity in the interpretation of the above rules, the decision of the Secretary, SBTET, A.P is final.

C-23CurriculumforDEEE

WithIndustrialtraining(In-house)inSemesterVI

VISION
To develop Electrical &ElectronicsEngineering professionals competent to face the global challenges in a Edifyingenvironment conducive to learn technical knowledge, skills blended with ethics and values, to Coordinate and serve to the society for bettermentand comfortable living.

MISSION

M1	To provide a competitive learning environment,through a need based curriculum designed incollaborationwithindustry,conduciveforhighqualityeducationemphasisingontransfer of knowledge and skill development essential for the profession and the society as well.
M2	To nurture higher order leadership qualities and ethics and values in students to enable themtobeleadersintheirchosen professionswhilemaintainingthehighestlevelofethics.
M3	Toencouragethe spiritofinquisitiontopromoteinnovationandentrepreneurship strengthened with life skills to sustain the stress.
M4	Tofostereffectiveinteractionsandnetworkingwithallthestakeholderssoastowork towards the growth and sustainability of the society and environment.

ProgrammeEducationalObjectives(PEOs)

On completion of the Diploma Electrical & Electronics Engineering programme, the students should have acquired the following characteristics

PEO1	Anabilitytoapplyknowledgeofmathematics,Science,engineeringandmanagement principles in solving problems in the field of Electrical and Electronics Engineering.
PEO2	Tobelife-longlearnerswithspritofenquiryandzealtoacquirenewknowledgeandskills so as to remain contemporary and posses required professional skills.
PEO3	Toenhanceentrepreneurial,communicationandothersoftskills,whichwillenablethem to work globally as leaders, team members and contribute to nation building for the betterment of the society.
PEO4	Tomakethemstronglycommittedtothehighestlevelsofprofessionalethicsandfocus on ensuring quality, adherence to public policy andlaw, safety, reliability and environmental sustainability in all their professional activities

PROGRAMMEOUTCOMES(POs)

1. **Basicanddisciplinespecificknowledge**:Applyknowledgeofbasicmathematics,scienceand engineeringfundamentalsandengineeringspecializationtosolvetheengineeringproblems.
2. **Problemanalysis**:Identifyandanalysewell-definedengineeringproblemsusingstandard methods
3. **Design/Developmentofsolutions**:Designsolutionsforwell-definedtechnicalproblemsand assist with the design of systems components or processes to meet specified needs
4. **Engineeringtools,ExperimentationandTesting**:Applymodernengineeringtoolsand appropriate technique to conduct standard tests and measurements.
5. **Engineeringpracticesforsociety,sustainabilityandenvironment**:Applyappropriate technology in context of society, sustainability, environment and ethical practices.
6. **Project Management**: Use engineering management principles individually, as a team memberoraleadertomanageprojectsandeffectivelycommunicateaboutwelldefined engineering activities.
7. **Life-Longlearning**:Abilitytoanalyseindividualneedsandengagingupdatinginthecontextof technological changes.

PROGRAMMESPECIFICOUTCOMES(PSOs)

1. AnabilitytounderstandthebasicconceptsofElectrical&ElectronicsEngineeringandtoapply them to various areas likeWiring Installations, Lighting Schemes , Static & Rotating machinery, drawinglayouts , Power System (Generation, Transmission, Distribution & utilisation), Digital electronics, power control devices, Computer programming ,managerial skillsand the use SMART technologies .

2. An ability to Repair, develop and troubleshooting of Various Electrical & Electronics equipment's by using suitable tools and techniques, to design Customized applications in Electrical & Electronics Engineering at economic and efficient considerations, to develop software & hardware solutions.

3. Wisdom of social and environmental awareness along with ethical responsibility to have a successful career and to sustain passion and zeal inthe field of Electrical & Electronics Engineering for real-world applications in the field of Electronics using optimal resources as an Entrepreneur.

FIRST YEAR

DIPLOMAINELECTRICAL&ELECTRONICSENGINEERING SCHEME OF INSTRUCTIONS AND EXAMINATIONS

(FIRST YEAR) Subject Code	NameoftheSubject	Instruction periods/week		Total Periods /year	Schemeof Examination			
		Theory	Practical/ Tutorial		Duration (hours)	Sessional Marks	End Exam Marks	Total Marks
THEORY								
EE-101	English	3	-	90	3	20	80	100
EE-102	Engineering Mathematics-I	5	-	150	3	20	80	100
EE-103	EngineeringPhysics	3	-	90	3	20	80	100
EE-104	Engineering chemistry &Environmental studies	3	-	90	3	20	80	100
EE-105	ElectricalEngineering MaterialScience	4	-	120	3	20	80	100
EE-106	BasicElectrical Technology	6	-	180	3	20	80	100
PRACTICAL								
EE-107	EngineeringDrawing	-.	3	90	3	40	60	100
EE-108	ElectricalWiring Laboratory	-	6	180	3	40	60	100
EE-109	Physics Lab	-	1.5	45	1½	20	30	50
EE-110	ChemistryLab	-	1.5	45	1½	20	30	50
EE-111	Computer Fundamentals Laboratory	-	3	90	3	40	60	100
	TOTAL	**24**	**15**	**1170**	**30**	**280**	**720**	**1000**

NOTE:03periodsperweekareallottedtoStudentCentric Activity (Library,Sports&Games,Clean &Green, Preparationfor placementsetc)

ENGLISH

CourseCode	Course Title	No.ofPeriods per Week	TotalNo.of Periods	Marks forFA	Marksfor SA
EE-101	English	3	90	20	80

TimeSchedule:EE-101:ENGLISH						
Chapter No.	**Title**	**No. of Periods**	**Weightage**	**No. of short questions**	**No. of Essay questions**	**CO'S Mapped**
1	English for Employability	8	16	2	1	CO1,CO2, CO3, CO4,CO5
2	Living in Harmony	8			2	CO1,CO2,CO3, CO4,CO5
3	Connectwith Care	8	26	2		CO1,CO2, CO3, CO4,CO5
4	Humourfor Happiness	8				CO1,CO2,CO3, CO4,CO5
5	NeverEverGive Up!	8	10	1	1	CO1,CO2, CO3, CO4,CO5
6	Preserveor Perish	9	23		2	CO1,CO2, CO3, CO4,CO5
7	TheRainbow of Diversity	8		2		CO1,CO2, CO3, CO4,CO5
8	NewChallenges -Newer Ideas	8	19		1	CO1,CO2, CO3, CO4,CO5
9	TheEndPoint First	8		1		CO1,CO2, CO3, CO4,CO5
10	TheEqualHalves	8	16	1	1	CO1,CO2, CO3, CO4,CO5
11	Dealingwith Disaster	9		1		CO1,CO2, CO3, CO4,CO5
	Total	**90**	**110**	**30**	**80**	

S.No.	TitleoftheUnit	No of Periods	COsMapped
1	EnglishforEmployability	8	CO1,CO2,CO3,CO4,CO5
2	LivinginHarmony	8	CO1,CO2,CO3,CO4,CO5
3	ConnectwithCare	8	CO1,CO2,CO3,CO4,CO5
4	HumourforHappiness	8	CO1,CO2,CO3,CO4,CO5
5	NeverEverGiveUp!	8	CO1,CO2,CO3,CO4,CO5
6	PreserveorPerish	9	CO1,CO2,CO3,CO4,CO5
7	TheRainbowofDiversity	8	CO1,CO2,CO3,CO4,CO5
8	NewChallenges-NewerIdeas	8	CO1,CO2,CO3,CO4,CO5
9	TheEndPointFirst	8	CO1,CO2,CO3,CO4,CO5
10	TheEqualHalves	8	CO1,CO2,CO3,CO4,CO5
11	DealingwithDisaster	9	CO1,CO2,CO3,CO4,CO5
TotalPeriods		**90**	

COURSE OBJECTIVES	-Toimprovegrammaticalknowledgeandenrichvocabulary.
	-Todevelopeffectivereading,writingandspeaking skills.
	-TocomprehendthemesrelatedtoPersonality,Society,Environmentto exhibitUniversalHumanValues.

COURSE OUTCOMES	CO1	Learnandapplyvariousgrammaticalconceptstocommunicatein academic,professionalandeverydaysituations.
	CO2	Useappropriatevocabularyinvariouscontexts.
	CO3	Readandcomprehenddifferentformsofacademic,professionaland generalreadingmaterial.
	CO4	Communicateeffectivelyinspeakingandwritinginacademic, professional and everyday situations.
	CO5	Displayhumanvaluesbyapplyingthe knowledgeof themesrelatedto Self,Society,Environment,ScienceandTechnologyforholistic developmentandharmoniouslivingthroughcommunication.

CO-POMatrix

<table>
<tr><td>CourseCode
EE-101</td><td colspan="3">Course Title: English
NumberofCourseOutcomes:5</td><td>No.ofPeriods:
90</td></tr>
<tr><td rowspan="2">POs</td><td rowspan="2">MappedCO No.</td><td colspan="2">COPeriodsAddressingPOin Column 1</td><td>Level of Mapping
(1,2,3)</td><td rowspan="2">Remarks</td></tr>
<tr><td>Number</td><td>Percentage</td></tr>
<tr><td>PO1</td><td></td><td colspan="4" rowspan="4">NotdirectlyApplicableforEnglishcourse,however,thelanguage activities make use of the content from Science and Technology relevant to the programme to enhance English communication skills.</td></tr>
<tr><td>PO2</td><td></td></tr>
<tr><td>PO3</td><td></td></tr>
<tr><td>PO4</td><td></td></tr>
<tr><td>PO5</td><td>CO5</td><td>16</td><td>18%</td><td>Level1</td><td rowspan="3">Up to 20%: Level1
21%-50%:Level 2
>50%:Level3</td></tr>
<tr><td>PO6</td><td>CO1, CO2, CO3,CO4,</td><td>52</td><td>58%</td><td>Level3</td></tr>
<tr><td>PO7</td><td>CO1, CO2, CO3, CO4,CO5</td><td>22</td><td>24%</td><td>Level2</td></tr>
</table>

Level3–StronglyMapped, Level2-ModeratelyMapped; Level1-SlightlyMapped

LEARNINGOUTCOMES

1. EnglishforEmployability

PerceivetheneedforimprovingcommunicationinEnglishforemployability
Useadjectivesandarticleseffectivelywhilespeakingandinwriting
Writesimplesentences

2. LivinginHarmony

Developpositiveself-esteemforharmoniousrelationships
Useaffixationtoformnewwords
Usepreposition sanduseafewphrasalverbscontextually

3. Connectwith Care

Usesocialmediawithdiscretion
Speakaboutabilitiesandpossibilities
Makerequestsandexpressobligations
Usemodalverbsandmainverbsinappropriate form

Writeshortdialoguesabouteverydaysituations

4. HumourforHappiness

Realizetheimportanceofhumourforahealthyliving
Improvevocabularyrelatedtothetheme
Inculcatereadingandspeakingskills
FramesentenceswithproperSubject –Verbagreement
Understandthefeaturesofagoodparagraphandlearnhowtogatherideasasapreliminarystep for writing a good paragraph.

5. NeverEverGive Up!

Learntodealwithfailuresin life

Use the present tense form for various every day communicative functions such as speaking and writing about routines, professions, scientific descriptions and sports commentary

Writeparagraphswithcoherenceandothernecessaryskills

6. Preserveor Perish

Understandtheecologicalchallengesthatwefacetodayandacttosavetheenvironment.
Narrate/Reportpasteventsandtalkaboutfutureactions
Developvocabularyrelatedtoenvironment
Writee-mails

7. TheRainbowofDiversity

Appraiseandvalueotherculturesforahappylivinginmulti-cultural workspace
Understandtheusageofdifferenttypesofsentences
Askfororgivedirections,information,instructions
Uselanguagetoexpressemotionsinvarioussituations
Writelettersinvariousreallifesituations

8. NewChallenges–NewerIdeas

UnderstandthefunctionaldifferencebetweenActiveVoiceandPassiveVoice
UsePassiveVoicetospeakandwriteinvariouscontexts
Understandthemajorpartsandsalientfeaturesofanessay
Learnaboutlatestinnovationsandgetmotivated

9. TheEndPointFirst!

Understandtheimportanceofsettinggoalsin life
Reportaboutwhatothershavesaidbothinspeakingandwriting
Writeanessayfollowingthestructureinacohesiveandcomprehensivemanner
ApplythewordsrelatedtoGoalSettinginconversationsandinlife

10. TheEqualHalves

Valuetheothergendersanddevelopagender-balancedviewtowardslife
Identifytheuseofdifferentconjunctionsinsynthesisingsentences
Writevarioustypesofsentencestocompareandcontrasttheideas
Applytheknowledgeofsentencesynthesisinrevisingandrewritingshortessays
Developdiscoursesinspeechandwriting

11. DealingwithDisasters

beawareofdifferentkindsofdisastersand theconceptof disastermanagement

Generatevocabularyrelevanttodisastermanagementanduseitinsentences

Analyzeanerrorinasentenceandcorrectit

Learnandwritedifferentkindsofreports

Textbook:**'INTERACT'**(ATextbookofEnglishforIYearEngineeringDiplomaCourses)-bySBTET,AP

ReferenceBooks:

1. MartinHewings:*AdvancedGrammarinUse,*CambridgeUniversityPress
2. Murphy,Raymond:*EnglishGrammarinUse,*CambridgeUniversityPress
3. SidneyGreenbaum:*OxfordEnglishGrammar*,OxfordUniversityPress
4. WrenandMartin(RevisedbyN.D.V.PrasadRao):*EnglishGrammarandComposition*, BlackieELT Books, S.Chand and Co.
5. SarahFreeman:*StrengthenYourWriting*,Macmillan

	EndExam(80Marks)	**1,2,3UnitTests(20Marks each)**
PartA	10Question @3Marks	5Questions @(1QX4M)+(4QX3M=12)
	Total=30 Marks	Total=16 Marks
PartB	5Questions(+3Choice) @10Marks	3Questions(withinternalchoice) @8Marks
	Total=50 Marks	Total=24 marks
GrandTotal	**80Marks**	**40Marks**

ENGINEERINGMATHEMATICS-I
(CommontoallBranches)

Course Code	CourseTitle	No.of Periods/week	TotalNo.of periods	MarksforFA	MarksforSA
EE-102	Engineering Mathematics-I	5	150	20	80

Chapter No.	Title	No. of Periods	Weightage	No.ofshort question (3marks)	No.ofEssay questions (10marks)	CO'SMapped
1	Algebra	31	22	4	1	CO1
2	Trigonometry	44	29	3	2	CO2
3	Co-ordinate Geometry	23	13	1	1	CO3
4	Differential Calculus	34	26	2	2	CO4
5	Applicationsof Derivatives	18	20	0	2	CO5
TOTAL		**150**	**110**	**10**	**8**	

S.No.	Chapter	No. of Periods	Marks Allotted	Short type	Essay type	CO's mapped
Unit-I: Algebra						
1	Functions	6	3	1	0	CO1
2	PartialFractions	5	3	1	0	CO1
3	MatricesandDeterminants	20	16	2	1	CO1
Unit-II: Trigonometry						
4	TrigonometricRatios	2	0	0	0	CO2
5	CompoundAngles	5	3	1	0	CO2
6	MultipleandSubmultiple angles	8	3	1	0	CO2
7	Transformations	6	5	0	1/2	CO2
8	InverseTrigonometric Functions	6	5	0	1/2	CO2
9	TrigonometricEquations	6	5	0	1/2	CO2
10	Propertiesoftriangles	5	5	0	1/2	CO2
11	ComplexNumbers	6	3	1	0	CO2
UnitIII:Co-ordinateGeometry						
12	StraightLines	5	3	1	0	CO3
13	Circles	6	5	0	1/2	CO3
14	ConicSections	12	5	0	1/2	CO3
Unit–IV:DifferentialCalculus						
15	LimitsandContinuity	6	3	1	0	CO4
16	Differentiation	28	23	1	2	CO4
Unit–V:ApplicationsofDerivatives						

17	GeometricalApplications	4	5	0	1/2	CO5
18	PhysicalApplications	6	5	0	1/2	CO5
19	MaximaandMinima	4	5	0	1/2	CO5
20	ErrorsandApproximations	4	5	0	1/2	CO5
	Total	150	110	10	8	
			Marks	**30**	**80**	

COURSE OBJECTIVES	(i) ToapplytheprinciplesofAlgebra,TrigonometryandCo-ordinate Geometry to real-time problems in engineering. (ii) TocomprehendandapplytheconceptofDifferentialCalculusin engineering applications.

COURSE OUTCOMES	CO1	Identifyfunctionsasspecialrelations,resolvepartialfractionsand solveproblemsonmatricesanddeterminants.
	CO2	Solveproblemsusingtheconceptoftrigonometricfunctions, their inversesandcomplexnumbers.
	CO3	Findtheequationsandpropertiesofstraightlines,circlesandconic sectionsincoordinatesystem.
	CO4	Evaluatethelimitsandderivativesofvariousfunctions.
	CO5	Findsolutionsforengineeringproblemsusingdifferentiation.

LEARNINGOUTCOMES

UNIT-I

C.O.1Identifyfunctions,resolvepartialfractionsandsolveproblemsonmatricesand determinants.

L.O. 1.1 DefineSet,OrderedpairandCartesianproductof twosets-examples.

ExplainRelationsandFunctions–examples

FindDomain&Rangeoffunctions–simpleexamples.

Defineone-oneandonto functions.

Findtheinverseofafunction–simpleexamples.

Definerational,properandimproperfractionsofpolynomials.

Explaintheprocedureofresolvingproperfractionsofthetypesmentioned below into partial fractions

i) $\frac{f(x)}{(ax+b)(cx+d)}$ *ii)* $\frac{f(x)}{(ax+b)^2(cx+d)}$

Defineamatrixandorderofamatrix.

Statevarioustypesofmatriceswithexamples(emphasison3rdordersquare matrices).

Compute sum, difference, scalar multiplication and product of matrices. Illustrate the properties of these operations such as commutative, associative and distributive properties with examples and counter examples.

Definethetransposeofamatrixandstate itsproperties–examples.

Definesymmetricandskew-symmetricmatriceswithexamples.Resolveasquarematrixintoasumofsymmetricandskew-symmetricmatricesand provide examples.

Definedeterminantofasquarematrix;minor,co-factorofanelementofa 3x3squarematrixwithexamples.Expandthedeterminantofa3x3matrix usingLaplaceexpansionformula.Stateandapplythepropertiesofdeterminants to solve problems.

Distinguishsingularandnon-singularmatrices.Definemultiplicativeinverseof a matrix and list properties of adjoint and inverse. Compute adjoint andmultiplicative inverse of a square matrix.

Solveasystemof3linearequationsin3unknownsusingCramer'sruleandmatrix inversion method.

UNIT-II

C.O. 2 Solveproblems usingtheconceptoftrigonometric functions,their inverses andcomplex numbers.

L.O. 2.1 Definetrigonometricratiosofanyangle-Listthevaluesoftrigonometricratiosat specified values.

Drawgraphsoftrigonometricfunctions-Explainperiodicityoftrigonometricfunctions.

Definecompoundanglesandstatetheformulaeofsin(A±B),cos(A±B),tan(A±B)and cot(A±B).

Givesimpleexamplesoncompoundanglestoderivethevaluesofsin15^0,cos15^0,sin75^0 ,cos75^0,tan15^0,tan75^0etc.

Deriveidentitieslikesin(A+B)sin(A-B)=$\sin^2A-\sin^2B$etc.

Solvesimpleproblemsoncompoundangles.

Derivetheformulaeofmultipleangles2A,3A etcand submultipleangle A/2intermsof angle A of trigonometric functions.

Deriveusefulalliedformulaelike$\sin^2A=(1-\cos2A)/2$etc.

Solvesimpleproblemsusingthemultipleandsubmultipleformulae.

SyllabusforUnittest-Icompleted

Derive the formulae on transforming sum or difference of two trigonometricratios in to a product and vice versa - examples on these formulae.

Solveproblemsbyapplyingtheseformulaetosumordifferenceorproductoftwoterms.

Explain the concept of the inverse of a trigonometric function by selecting an appropriate domain and range.

Defineinversesofsixtrigonometricfunctionsalongwiththeirdomainsandranges.

Derive relations between inverse trigonometric functions so that the given inverse trigonometric function can be expressed in terms of other inverse trigonometric functions with examples.

Statevariouspropertiesofinversetrigonometricfunctionsandidentitieslike $\sin^{-1}x+\cos^{-1}x=\frac{\pi}{2}$, etc.

Applyformulaelike $\tan^{-1}x+\tan^{-1}y=\tan^{-1}\left(\frac{x+y}{1-xy}\right)$ $where x\geq0, y\geq0, xy<1$ etc.,

tosolveSimpleproblems.

Explainwhatismeantbysolutionoftrigonometricequationsandfindthegeneral solutions of sin x=k, cos x =k and tan x=k with appropriate examples.

Solvemodelsofthetypeasin^2x+bsinx+c=0andasinx+bcosx=c.

State sine rule, cosine rule, tangent rule and projection rule and solve a triangle usingthese formulae.

Listvariousformulaeforthe areaofa trianglewithexamples.

Defineacomplexnumber,itsmodulus,conjugate,amplitudeandlisttheirproperties.

Definearithmeticoperationsoncomplexnumberswithexamples.

Represent the complex number in various forms like modulus-amplitude (polar) form, Exponential (Euler) form with examples.

UNIT-III

CoordinateGeometry

Find the equations and properties of straight lines, circles and conic sections in coordinate system.

L.O.3.1Writedifferentformsofastraightline–generalform,point-slopeform,slope- interceptform,two-pointform,interceptformandnormalform(orperpendicular form).

Find distance of a point from a line, acute angle between two lines, intersection of twonon-parallel lines and distance between two parallel lines.

Definelocusofapointandcircle.

Writethegeneralequationofacircleandfindits centreandradius.

Find the equation of a circle, given (i) centre and radius, (ii)two ends of the diameter (iii) three non collinear points of type (0,0) (a,0), (0, b).

Defineaconicsection-Explainthetermsfocus,directrix,eccentricity,axesandlatus- rectum of a conic with illustrations.

Findtheequationofaconicwhenfocus,directrixandeccentricityaregiven.

DescribethepropertiesofParabola,EllipseandHyperbolainstandardforms whose axes are along the co-ordinate axes and solve simple examples on these conics.

SyllabusforUnittest-IIcompleted

Evaluatethelimitsandderivativesofvariousfunctions.

L.O. 4.1Explain the conceptof limitand meaning of $\lim_{x\to a} f(x)=l$ and state the propertiesoflimits.

Evaluatethelimitsofthetype$\lim_{x\to a}\frac{f(x)}{g(x)}$ and $\lim_{x\to\infty}\frac{f(x)}{g(x)}$

State the Standard limits $\lim_{x\to a}\frac{x^n-a^n}{x-a}$, $\lim_{x\to 0}\frac{\sin x}{x}$, $\lim_{x\to 0}\frac{\tan x}{x}$, $\lim_{x\to 0}\frac{a^x-1}{x}$, $\lim_{x\to 0}\frac{e^x-1}{x}$, $\lim_{x\to 0}(1+x)^x$, $\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$ (withoutproof)andsolvesimpleproblems usingthesestandard limits.

Explaintheconceptof continuityof afunctionatapointandonaninterval

Statetheconceptofderivativeofafunctiony=f(x)–definition,firstprinciple as$\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ andalsoprovidestandardnotationstodenotethe derivativeofafunction.

Explainthesignificanceofderivativeinscientificandengineeringapplications.
Findthederivativeofstandardalgebraic,logarithmic,exponentialandtrigonometric functions using the first principle.
Findthederivativesofinversetrigonometric,hyperbolicandinversehyperbolic functions.
State the rules of differentiation of sum,difference,scalar multiplication, product and quotient of functions with simple illustrative examples.
Explainthemethodofdifferentiationofafunctionofafunction(Chainrule) with illustrative examples.
Explainthemethodofdifferentiationofparametricfunctionswithexamples.
Explaintheprocedureforfindingthederivativesofimplicitfunctionswithexamples.
Explaintheneedoftakinglogarithmsfordifferentiatingsomefunctionsof$[f(x)]^{g(x)}$type– examples on logarithmic differentiation.
Explaintheconceptoffindingthesecondorderderivativeswithexamples.
Explaintheconceptoffunctionsofseveralvariables,findingpartialderivativesand difference between the ordinary and partial derivatives with simple examples.
Explaintheconceptoffindingsecondorderpartialderivativeswithsimpleproblems.

C.O.5Evaluatesolutionsforengineeringproblemsusingdifferentiation

L.O. 5.1 Statethegeometricalmeaningofthederivative-Explaintheconceptofderivativetofind the slopes of tangent and normal to a given curve at any point on it with examples.
Findtheequationsof tangentand normaltotoagivencurveatany pointon it–simple problems.
Explain the derivative as a rate of change in distance-time relations to find the velocity and acceleration of a moving particle with examples.
Explainthederivativeasaratemeasurerintheproblemswherethequantitieslikeareas, volumes vary with respect to time- illustrative examples.

Definetheconceptofincreasinganddecreasingfunctions-Explaintheconditionstofind points where the given function is increasing or decreasing with illustrative examples.
Explain the procedure to find the extreme values (maxima or minima) of a function ofsingle variable- simple problems for quadratic and cubic polynomials.
Applytheconceptofderivativestofindtheerrorsandapproximations-simple problems.

SyllabusforUnittest-IIIcompleted

CO/PO–Mapping

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	3				3	2	2
CO2	3	3	2	2				3	2	2
CO3	3	3	2	2				3	2	2
CO4	3	3	3	3				3	3	3
CO5	3	3	3	3				3	3	3
Avg.	3	2.8	2.4	2.6				3	2.4	2.4

3=Stronglymapped(High),**2=**moderatelymapped(Medium),**1=**slightlymapped(Low)

Note: ThegapsinCO/POmappingcanbemetwithappropriateactivitiesasfollows:

For PO5: Appropriatequizprogrammesmaybeconductedatintervalsandduration as decided by concerned faculty.

For PO6: Seminarsonapplicationsofmathematicsinvariousengineeringdisciplinesaretobe planned and conducted.

For PO7: Plan activities in such a way that students can visit the Libraryto refer standard books on Mathematics and access the latest updates in reputed national and international journals. Additionally, encourage them to attend seminars and learn mathematical software tools.

PO-CO–Mappingstrength

PONo	**MappedwithCOno**	**COperiodsaddressingPOin columnI**		**Level (1,2or3)**	**Remarks**
		No	**%**		
1	CO1,CO2,CO3,CO4, CO5	150 (31+44+23+34+18)	100%	3	>40%Level3 Highly addressed 25%to40% Level2 Moderately addressed 5%to25% Level1Low addressed <5%Not addressed
2	CO1,CO2,CO3,CO4, CO5	80 (8+23+12+22+15)	53.3%	3	
3	CO1,CO2,CO3,CO4, CO5	61 (9+14+9+14+15)	40.6%	3	
4	CO1,CO2,CO3,CO4, CO5	61 (14+9+9+14+15)	40.6%	3	
PSO1	CO1,CO2,CO3,CO4, CO5	150 (31+44+23+34+18)	100%	3	
PSO2	CO1,CO2,CO3,CO4, CO5	62 (10+14+9+14+15)	41.3%	3	
PSO3	CO1,CO2,CO3,CO4, CO5	62 (10+14+9+14+15)	41.3%	3	

COURSECONTENT

Unit-I

Algebra

1. **Functions**:

Definitions of Set, Ordered pair, Cartesian product of two sets, Relations, Functions, Domain & Range of functions – One-one and onto functions, inverse of a function.

2. **PartialFractions:**

Definitions of rational, proper and improper fractions of polynomials. Resolve rational fractions (proper fractions) into partial fractions covering the types mentioned below.

i) $\frac{f(x)}{(ax+b)(cx+d)}$ *ii)* $\frac{f(x)}{(ax+b)^2(cx+d)}$

3. **Matrices:**
Definition of a matrix, types of matrices - Algebra of matrices, equality of two matrices, sum, difference,scalarmultiplicationandproductofmatrices.Transposeofamatrix,Symmetric,skew-symmetric matrices - Determinant of a square matrix, minor and cofactor of an element, Laplace's expansion,properties of determinants - Singular and non-singular matrices, Adjoint and multiplicative inverse of a square matrix-System of linear equations in 3 variables-Solutions by Cramer's rule and Matrix inversion method.

Unit-II

Trigonometry

4. **Trigonometricratios:**
Definitionoftrigonometricratios ofany angle,valuesoftrigonometricratios atspecifiedvalues, draw graphs of trigonometric functions, periodicity of trigonometric functions.
5. **Compoundangles:**
Formulasofsin(A±B),cos(A±B),tan(A±B),cot(A±B),andrelatedidentities.
6. **Multipleandsubmultipleangles:**
Formulaefortrigonometricratiosofmultipleangles2A,3Aandsubmultipleangle A/2.
7. **Transformations:**
Transformationsofproductsintosumsordifferencesandviceversa.
8. **Inversetrigonometricfunctions:**
Definition,domainsandranges-basicproperties.
9. **Trigonometricequations:**
Conceptofasolution,principalvalueandgeneralsolutionoftrigonometricequations:
Sinx =k, cosx= k, tanx =k, where k is a constant. Solutions of simple quadratic equations and equations of type a sin x + b cos x=c.
10. **Propertiesoftriangles:**
Relations between sides and angles of a triangle- sine rule, cosine rule, tangent rule and projection rule-area of a triangle.
11. **ComplexNumbers:**
Definition of a complex number, modulus, conjugate and amplitude of a complex number - Arithmeticoperationsoncomplexnumbers-Modulus-Amplitude(polar)form, Exponential form (Euler form) of a complex number.

UNIT-III

Coordinategeometry

12**Straightlines:** Variousforms ofa straight line -Anglebetweentwolines, perpendiculardistance from a point, intersection of non-parallel lines and distance between parallel lines.
13. **Circle:**Locusofapoint,Circledefinition-Circleequationgiven(i)centreandradius,(ii) twoendsofadiameter(iii)threenon-collinearpointsoftype(0,0),(a,0),(0,b)-Generalequation of a circle –its centre and radius.
14. Definitionofaconicsection-Equationofaconicwhenfocus,directrixandeccentricity are given - Properties of parabola, ellipse and hyperbola in standard forms.

UNIT-IV

DifferentialCalculus

15. **ConceptofLimit-**DefinitionandPropertiesofLimitsandStandardLimits-Continuityofafunction at a point.
16. **Concept of derivative-** Definition (first principle)- different notations -Derivatives of standard algebraic,logarithmic,exponential, trigonometric,inversetrigonometric,hyperbolicand inverse

hyperbolic functions -Derivatives of sum, difference, scalar multiplication,product, quotient of functions -Chain rule, derivatives of parametric functions, derivatives of implicit functions, logarithmic differentiation -Second order derivatives - Functions of several variables, first and second order partial derivatives.

UNIT-V

ApplicationsofDerivatives

17. Geometricalmeaningofthederivative,equationsoftangentandnormaltoacurveatanypoint.

18. Physicalapplicationsof derivatives –Velocity,acceleration,derivativeasaratemeasurer.

19. Applications of the derivative to find the extreme values – Increasing and decreasing functions, maxima and minima for quadratic and cubic polynomials.

20. Absolute,relativeandpercentageerrors-Approximatevaluesduetoerrorsinmeasurements.

Textbook:

Engineering Mathematics-I,a textbook for firstyear diploma courses, prepared & prescribed by SBTET, AP.

ReferenceBooks:

1. ShantiNarayan,ATextbookofmatrices,S.Chand&Co.
2. Robert E.Moyer &FrankAyersJr.,Schaum's OutlineofTrigonometry,4th Edition,Schaum's Series.
3. G.B.Thomas,R.L.Finney,CalculusandAnalyticGeometry,AddisonWesley,9thEdition,1995.
4. FrankAyers&ElliottMendelson,Schaum'sOutlineofCalculus,Schaum'sSeries.
5. M.Vygodsky,MathematicalHandbook,MirPublishers,Moscow.

ENGINEERINGPHYSICS

Coursecode	Coursetitle	No.ofperiods per week	Totalno.of periods	MarksforFA	MarksforSA
EE-103	Engineering Physics	03	90	20	80

Chapter No.	Title	No. of Periods	Weightage	No.ofshort question (3marks)	No.ofEssay questions (10marks)	CO'SMapped
1	Units and measurements	09	03	1	0	CO1
2	Statics	11	13	1	1	
3	Gravitation	12	20	0	2	CO2
4	Concepts of energy	10	13	1	1	
5	Thermalphysics	10	13	1	1	CO3
6	Sound	12	16	2	1	
7	Electricity &Magnetism	13	16	2	1	CO4
8	Modernphysics	13	16	2	1	
TOTAL		**90**	**110**	**10**	**8**	

COURSE OBJECTIVES	(1) Tounderstandthe basicconceptsofphysicsforvariousEngineering applications as required for industries. (2) Toequipthestudents withthescientificadvancesintechnologyand make the student suitable for any industrial or scientific organization.

COURSE OUTCOMES	CO1	Familiarizewithvariousphysicalquantities,theirSIunitsand errorsinmeasurements;understandtheconceptsofvectors and various forces in statics.
	CO2	Understandtheconceptsofgravitationwithreferenceto applicationsinsatellites,providetheknowledgeofvarious forms of energy and their working principles.
	CO3	Familiarizewiththeknowledgeoftransmissionofheatandgas laws; provide the knowledge on musical sound and noise as pollutionandalsotheconceptsofechoandreverberation.
	CO4	Provide basic knowledge of electricity and concepts of magnetism and magnetic materials;familiarize with the advancesinPhysicssuchasphotoelectricell,opticalfibers, semiconductors, superconductors and nanotechnology.

MatrixshowingmappingofCourseOutcomeswithProgramOutcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	1			2	2		2
CO2	3	2	2	2	2		2	1		2
CO3	2		1		2		1		1	1
CO4	3	2	3	2	2		3	2		2

CO-POMappingStrength

Course code EE-103	**EngineeringPhysics NoofCourseObjectives:4**			**No ofperiods90**
POs	MappedwithCONo	CO periods addressingPOin Col 1 NO	%	1,2,3 remarks
PO1	CO1,CO2,CO3,CO4	44	48.9%	3
PO2	CO1,CO2,CO4	11	12.2%	1
PO3	CO1,CO2,CO3,CO4	10	11.1%	1
PO4	CO1, CO2,CO4	8	8.9%	1
PO5	CO2,CO3,CO4	8	8.9%	1
PO6				
PO7	CO1,CO2,CO3,CO4	9	10.0%	1

>40% level 3 (highlyaddressed)

25% to 40% level 2 (moderatelyaddressed)

5%to25%level1(Low addressed)

<5% (not addressed)

3=stronglymapped,2=moderately mapped, 1=slightlymapped

Note:ThegapsinCOandPOmappingwillbeachievedbyoneormoreappropriateactivitiesfromthe following.

(i)Seminars (ii)Tutorials (iii)GuestLecturers(iv)Assignments
(v)Quizcompetitions(vi)Industrialvisits (vii)Techfest (viii)Miniproject
(ix)Groupdiscussions(x)Virtualclasses (xi)Libraryvisitfor e-books

LEARNINGOUTCOMES

Uponcompletionofthecoursethestudentshallbeable to

Understandtheconceptofunitsandmeasurements

Explaintheconceptofunits

Definethetерms

a)Physicalquantity,b)Fundamentalphysicalquantitiesand

c)Derivedphysicalquantities

Defineunit

Definefundamentalunitsandderivedunits

StateSIunitswithsymbolsforfundamentalandsome derivedquantities

StateMultiplesandSubmultiplesinSIsystem

StaterulesofwritingS.Iunits

StateadvantagesofSIunits

Whataredirectand indirectmeasurements.

Defineaccuracyandleastcount

Defineerrorinmeasurement

Defineabsolute,relativeandpercentageerrorswiththeirformulae

Solvesimpleproblemsonabsolute,relativeandpercentageerrors

Understandtheconceptsof statics

ExplaintheconceptofVectors

Definescalarandvectorquantitieswithexamples

Representvectorsgeometrically

Definethetypesofvectors(equal,negative,unit,co-initial,co-planar,positionvector)

Resolvethevectorintorectangularcomponents

Stateandexplaintrianglelawofadditionofvectors

Defineconcurrentforces,co-planarforcesandequilibrant.

StateandexplainLami'stheorem

Statetheparallelogramlawofadditionofforceswithdiagram.

Writetheexpressionsformagnitudeanddirectionofresultant(noderivation)

Illustrateparallelogramlawwithexamples(i)flyingofbirdand(ii)workingofsling.

Definemomentofforceand couple.

WritetheformulaeandS.Iunitsofmomentofforceandcouple.

Solvesimpleproblemson(i)Resolutionofforce and

(ii)Parallelogramlawofforces(findingR,αandθ).

Understandtheconceptsof Gravitation

StateandexplainNewton'suniversallawofgravitation.

DefineGand mentionitsvalue.

Explaintheaccelerationduetogravity(g)

Explainthefactorsaffectingthevalueofg

DerivetherelationshipbetweengandG.

3.6. StateandexplaintheKepler'slawsofplanetarymotion

Defineasatellite.

Whatarenaturalandartificialsatellites?Giveexamples.

Defineorbitalvelocityandwriteitsformula.

Defineescapevelocityandwriteitsformula.

WriteabriefnoteonPolarsatellites.

WriteabriefnoteonGeo-stationarysatellites.

Mentiontheapplicationsofartificialsatellites.

Solve simple problems on (i) Newton's law of gravitation and (ii) calculation of orbital and escape velocities.

Understandtheconceptsof Energy.

Defineworkdoneandenergy.MentiontheirSI units.
Listvarioustypesofenergy.
DefineP.Ewithexamples.Writeitsequation.
DefineK.Ewithexamples.Writeitsequation.
DeriverelationshipbetweenK.Eandmomentum.
Statethelawofconservationofenergy.Givevariousexamples.
Writeabriefnoteonsolarenergy.
Explaintheprincipleofsolarthermalconversion.
Explaintheprincipleofphotovoltaiceffect
Solvesimpleproblemson(i)workdone(ii)P.E&K.Eand(iii)RelationbetweenK.E &momentum.

Understandtheconceptsofthermalphysics

Definetheconceptsofheatand temperature
Statedifferentmodesoftransmissionofheat
Explainconduction,convectionandradiationwithtwoexampleseach.
StateandexplainBoyle'slaw
Defineabsolutezerotemperature
Explainabsolutescaleoftemperature
Statetherelationshipbetweendegree Celsius,KelvinandFahrenheittemperatures
StateCharle'slawandwriteitsequation
StateGay-Lussac'slawandwriteitsequation
Defineideal gas
Deriveidealgasequation
Explainwhyuniversalgasconstant(R)issameforallgases
CalculatethevalueofRfor1grammoleofgas.
Solvesimpleproblemson(i)Interconversionoftemperaturesbetween°C,KandF (ii)Gaslawsand(iii)Idealgas equation.

UnderstandtheconceptsofSound

Definethetermsound
Definelongitudinalandtransversewaveswithoneexample each
Explainthefactorswhichaffectthevelocityofsoundin air
Distinguishbetweenmusicalsoundandnoise
Explainnoisepollutionandstate SIunitforintensityofsound
Explainsourcesofnoise pollution
Explaineffectsofnoisepollution
Explainmethodsofminimizingnoisepollution
DefineDopplereffect.
ListtheApplicationsofDopplereffect
Definereverberationandreverberationtime
WriteSabine'sformulaandnamethephysicalquantitiesinit.
Defineechoesandexplaintheconditiontohear an echo.
Mentionthemethodsofreducinganecho
Mentiontheapplicationsof an echo
Whatareultrasonics
Mentiontheapplicationsofultrasonics, SONAR
Solvesimpleproblemson echo

UnderstandtheconceptsofElectricityandMagnetism

ExplaintheconceptofP.DandEMF
StateOhm'slawandwritetheformula
ExplainOhm'slaw
Defineresistanceandspecificresistance. WritetheirS.Iunits.
StateandexplainKichoff'sfirstlaw.
StateandexplainKirchoff'ssecondlaw.
DescribeWheatstonebridgewithlegiblesketch.
DeriveanexpressionforbalancingconditionofWheatstonebridge.
DescribeMeterBridgeexperimentwithnecessarycircuitdiagram.
Writetheformulaetofindresistanceandspecificresistanceinmeterbridge
Explaintheconcept of magnetism
Whatarenaturalandartificialmagnets(mentionsometypes)
Definemagneticfieldandmagneticlinesofforce.
Writethepropertiesofmagneticlinesof force
StateandexplaintheCoulomb'sinversesquarelawofmagnetism
Definemagneticpermeability
Definepara,dia,ferromagneticmaterialswithexamples
Solvesimpleproblemson(i)Ohm'slaw(ii)Kirchoff'sfirstlaw(iii)Wheatstonebridge(iv)meter bridgeand(v)Coulomb'sinversesquarelaw

UnderstandtheconceptsofModernphysics

StateandexplainPhoto-electriceffect.
WriteEinstein'sPhotoelectricequationandnamethephysicalquantitiesinit.
Statelawsofphotoelectriceffect
ExplaintheWorkingofphotoelectriccell
ListtheApplicationsofphotoelectriceffect
Recapitulaterefractionoflightandits laws
Definecriticalangle
ExplaintheTotalInternalReflection
Explaintheprincipleandworkingof OpticalFiber
ListtheapplicationsofOpticalFiber
Explaintheenergygapbasedonbandstructure
Distinguishbetweenconductors,semiconductorsandinsulatorsbasedonenergygap
Definedoping
Explaintheconceptof hole
Explainthetypesofsemiconductors:Intrinsicandextrinsic
Explainn-typeandp-typesemiconductors
Mentiontheapplicationsofsemiconductors
Definesuperconductorandsuperconductivity
Listtheapplicationsofsuperconductors
Nanotechnologydefinition,nanomaterialsand applications

COURSECONTENT

1. **Unitsandmeasurements**

   Introduction – Physical quantity – Fundamental and Derived quantities – Fundamental and derived units- SIunits – Multiples and Sub multiples – Rules for writingS.I.units-Advantagesof SI units – Direct and indirect measurements – Accuracy and least count – Errors : Absolute, relative and percentage errors –Problems.

2. Statics

Scalars and Vectors– Representation of a vector - Types of vectors - Resolution of vector into rectangular components – Triangle law of vectors – Concurrent forces -Lami's theorem - Parallelogram law of forces : Statement, equations for magnitude and direction of resultant, examples – Moment of force and couple – Problems.

3. Gravitation

Newton's law of gravitation and G –Conceptof acceleration due to gravity (g) – Factors affectingthevalueofg–RelationbetweengandG-Kepler'slaws–Satellites: Naturaland artificial– Orbital velocity and escapevelocity– Polar and geostationary satellites– Applicationsof artificial satellites– Problems.

4. Conceptsofenergy

Work done & Energy-Definition and types of energy - potential energy - kinetic energy-- K.E and momentum relation – Law of Conservation of energy, examples - Solar energy, principles of thermal and photo conversion – Problems.

5. Thermalphysics

Modes of transmission of heat – Expansion of Gases - Boyle's law – Absolute scale of temperature-Thermometricscalesandtheirinterconversion -Charle'slaw-Gay-Lussac'slaw- Ideal gas equation - Universal gas constant (R) - Problems.

6. Sound

Sound -Natureofsound -Typesofwavemotion,Longitudinal andtransverse – Factorsaffecting the velocity of sound in air - musical sound and noise - Noise pollution – Causes & effects - Methods of reducing noise pollution - Doppler effect- Echo- Reverberation-Reverberationtime-Sabine'sformula–Ultrasonics&applications–SONAR-Problems.

7. Electricity&Magnetism

ConceptofP.DandEMF-Ohm'slawandexplanation-Specificresistance-Kirchoff's laws–Wheat stone's bridge - Meter bridge.

Naturalandartificial magnets–magnetic fieldand magnetic linesofforce–Coulomb's inverse square law – Permeability – Magnetic materials – Para, dia, ferro – Examples – Problems.

8. ModernPhysics

Photoelectric effect – laws of photoelectric effect – photoelectric cell – Applications of photoelectric cell-Total internal reflection - Fiber optics - Principle and working of an optical fiber -Applications of optical fibers –Semiconductors :Basedon Energygap – Doping –Hole - Intrinsic and extrinsic semiconductors (n-type & p-type) – Applications of semiconductors – Superconductivity – applications – Nanotechnology definition, nano materials, applications.

REFERENCES

1. Intermediatephysics-Volume-I&2 — TeluguAcademy(Englishversion)
2. UnifiedphysicsVolume1,2,3and4 — Dr.S.LGupthaandSanjeev Guptha
3. ConceptsofPhysics,Vol1&2 — H.C.Verma
4. TextbookofphysicsVolumeI&2 — Resnick&Halliday
5. Fundamentalsofphysics — Brijlal&Subramanyam
6. Textbookofappliedphysics — Dhanpath Roy
7. NCERTTextBooksofphysics — ClassXI&XIIStandard
8. e-books/e-tools/websites/LearningPhysicssoftware/eLMS

Tableshowingthescopeofsyllabustobecoveredforunittests

Unittest	**Learningoutcomestobecovered**
Unittest-1	From1.1to3.14
Unittest-2	From4.1to6.18
Unittest-3	From7.1to8.20

ENGINEERINGCHEMISTRYANDENVIRONMENTALSTUDIES

Coursecode	CourseTitle	No. of Periodsper week	TotalNo.of Periods	Marks forFA	Marksf or SA
EE-104	Engineering Chemistryand Environmental Studies	3	90	20	80

Chapter No.	Title	No. of Periods	Weightage	No.ofshort question (3marks)	No.ofEssay questions (10marks)	CO'SMapped
1	Fundamentalsof Chemistry	14	21	2	1.5	CO1
2	Solutions,Acids andBases	16	21	2	1.5	CO1
3	Electrochemistry	12	13	1	1	CO2
4	Corrosion	8	13	1	1	CO2
5	WaterTreatment	8	13	1	1	CO3
6	Polymers& Engineering Materials	12	13	1	1	CO4
7	Fuels	6	3	1	0	CO4
8	Environmental Studies	14	13	1	1	CO5
TOTAL		**90**	**110**	**10**	**8**	

COURSE OBJECTIVES	1. Tofamiliarizewiththeconceptsofchemistryinvolvedinthe process of various Engineering Industrial Applications. 2. To know the various natural and man-made environmental issues and concerns with an interdisciplinary approach that includephysical,chemical,biologicalandsocioculturalaspects of environment. 3. toreinforcetheoreticalconceptsbyconductingrelevant experiments/exercises

COURSE OUTCOMES	CO1	ExplainBohr`satomicmodel,chemicalbonding,moleconcept,acidsand bases,P^HandBuffersolutions.
	CO2	Explainelectrolysis,Galvaniccell,batteriesandcorrosion
	CO3	Explainthechemistryinvolvedinthetreatmentofhardnessinwater.
	CO4	ExplainthemethodsofpreparationandapplicationsofPolymersand Elastomers,chemicalcompositionandapplicationsofAlloys,Composite Materials, Liquid Crystals, Nano Materials and Fuels.
	CO5	ExplainGlobalimpactsduetoairpollution, causes, effectsandcontrolling methods of water pollution and understand the environment, forest resources,e-PollutionandGreenChemistryPrinciples.

EE-104	Engineering.ChemistryandEnvironmentalstudies No of Course Outcomes:5				NoOfperiods90
POs	MappedwithCO No	COperiods addressing PO in Col NO.1	%	Level 1,2,3	remarks
PO1	CO1,CO2,CO3	42	46.7%	3	>40%level3(highly addressed)25%to40%level 2(moderatelyaddressed)5% to 25% level 1 (Low addressed)<5%(not addressed)
PO2	CO2,CO3	16	17.8%	1	
PO3	CO4	12	13.3%	1	
PO4	CO4	6	6.7%	1	
PO5	CO5	14	15.5%	1	
PO6					
PO7					

COs-POsmappingstrength(aspergiventable)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	1	-	-	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	-	-	-
CO4	-	-	1	1	-	-	1	-	-	-
CO5	-	-	-	-	1	-	-	1	-	-
Average	3	1	1	1	1		1	1	1	-

3=stronglymapped 2=moderatelymapped1=slightlymapped

Note:ThegapsinCOand POmappingwill beachievedbyoneormoreappropriateactivities from the following:

i)Seminarsii)Tutorialsiii)GuestLecturesiv)Assignmentsv)Quizcompetitionsvi)Industrialvisitvii) Tech Fest viii) Mini project ix) Group discussions x) Virtual classes xi) Library visit for e-books

LEARNINGOUTCOMES

Atomicstructure

Explainthecharge,massoffundamentalparticlesofanatom(electron,protonandneutron) and the concept of atomic number and mass number.

StatethePostulatesofBohr'satomictheoryanditslimitations.

Explain thesignificanceoffourQuantum numbersanddrawtheatomicstructuresof Silicon and Germanium.

DefineOrbitalofanatomanddrawtheshapes ofs,pandd-orbitals.

Explain1.Aufbauprinciple,2.Pauli'sexclusionprinciple3.Hund'sprinciple.

Writetheelectronicconfigurationofelementsuptoatomicnumber30.

Explainthesignificanceofchemicalbonding.

ExplainthePostulatesofElectronictheoryofvalency.

Define and explainIonicandCovalentbondswithexamplesofNaCl ,*H_2,*$O_2$and*N_2.(* Lewis dot method).

Listout the Properties ofIonic compounds and covalent compounds and distinguishbetween their properties.

Solutions,AcidsandBases

Definetheterms1.Solution,2.Soluteand3.Solvent.

Classifysolutionsbasedonsolubility.

Define the terms 1. Atomic weight, 2. Molecular weight and 3. Equivalent weight.

CalculateMolecularweightandEquivalentweightofthegivenacids(HCl,H_2SO_4,H_3PO_4)

Bases (NaOH, $Ca(OH)_2$, $Al(OH)_3$and Salts (NaCl, Na_2CO_3, $CaCO_3$).

Definemoleandsolvenumericalproblemsonmoleconcept.

Definemolarity,normalityandsolvenumericalproblemsonmolarityandnormality.

a) CalculatetheMolarityorNormality,ifweightofsoluteandvolumeofsolutionaregiven.

b) Calculatetheweightofsolute,ifMolarityorNormalitywithvolumeofsolutionaregiven.

c) Problemsondilutiontoconverthighconcentratedsolutionstolowconcentrated solutions.

ExplainArrheniustheoryfAcidsandBasesandgiveitslimitations.

Defineionicproductofwater,pHandsolve numericalproblemsonpH(StrongAcidsandBases).

Definebuffersolutionandclassifybuffersolutionswithexamples.Giveitsapplications.

Electrochemistry

Define theterms1.Conductor 2. Semiconductor3. Insulator, 4.Electrolyte5.Non–electrolyte. Give two examples each.

DistinguishbetweenMetallicconductionandElectrolyticconduction.

Explainelectrolysisbytakinganexampleofused NaClandlistouttheapplicationsof electrolysis.

DefineGalvaniccell.Explaintheconstructionandworkingof Galvaniccell.

Distinguishbetweenelectrolyticcellandgalvaniccell.

Definebatteryandlistthetypesofbatterieswithexamples.

Explaintheconstruction,workingandapplicationsofi)Drycell(Leclanchecell),ii)Leadstorage battery, iii) Lithium-Ion batteryandiv) Hydrogen-Oxygen fuel cell.

Corrosion

Definethetermcorrosion.

statetheFactorsinfluencingtherateofcorrosion.

Describethe formationof(a)compositioncell(b)stresscell(c)concentrationcellduringcorrosion.

Definerustingofironandexplainthemechanismofrustingofiron.

Explain the methods of prevention of corrosion by

(a)Protectivecoatings(anodicandcathodiccoatings)

.

(b)Cathodicprotection(SacrificialanodeprocessandImpressed–voltageprocess).

WaterTreatment

Definesoftwaterandhardwaterwithrespecttosoap action.

Defineandclassifythehardnessofwater.

Listoutthesaltsthatcausinghardnessof water (with Formulae).

Statethe disadvantagesofusinghardwaterinindustries.

DefineDegreeofhardnessandunitsofhardness(mg/Land ppm).

Solvenumericalproblemsonhardness.

Explainthemethodsofsofteningofhardwaterby(i)Ion-exchangeprocessand(ii)Reverse Osmosis process.

Polymers&Engineeringmaterials.

A)Polymers

Explaintheconcept ofpolymerization.

Describe the methods of polymerization (a) additionpolymerization of ethylene (b) condensation polymerization of Bakelite (Only flowchart).

Defineplastic. Explainamethodof preparationandusesofthefollowingplastics:

1.PVC2.Teflon3.Polystyrene4.Nylon 6,6.

Defineelastomers.Explainamethodofpreparationandapplicationsof thefollowing:

1. Buna-S2.Neoprene.

B)EngineeringMaterials

Defineanalloy.Writethecompositionandapplicationsofthefollowing:

1.Nichrome2.Duralumin3.StainlessSteel.

DefineCompositeMaterialsandgiveanytwoexamples.State theirPropertiesandapplications.

DefineLiquidCrystalsandgiveanytwoexamples.State theirPropertiesandapplications.

DefineNanoMaterialsandgiveanytwoexamples.StatetheirPropertiesandapplications.

Fuels

Definethetermfuel.

Classifythefuelsbasedonoccurrence.

Writethecompositionandusesofthefollowing:

1.LPG 2. CNG 3.Biogas 4.Poweralcohol

Writethe commercialproductionof Hydrogenasfuturefuel.Giveitsadvantagesand disadvantages.

ENVIRONMENTALSTUDIES

Explainthescopeandimportanceofenvironmentalstudies.

Define environment. Explain the different segments ofenvironment.

1.Lithosphere2. Hydrosphere3. Atmosphere4.Biosphere

Definethefollowingterms:

1.Pollutant2.Pollution3.Contaminant4.Receptor5.Sink6.Particulates7.Dissolvedoxygen (DO)8.ThresholdLimitValue(TLV)9.BOD10.COD 11.Ecosystem12. Producers13. Consumers14.Decomposers with examples.

Statetherenewableandnon-renewableenergysourceswithexamples.

Statethe usesofforest resources.

Explainthecausesandeffectsofdeforestation.

Defineairpollutionandexplainits Globalimpacts1.Greenhouse effect,2. Ozonelayerdepletion and 3. Acid rain.

DefineWaterpollution.Explainthecauses,effectsandcontrollingmethodsofWaterpollution.

Definee-Pollution,Statethe sourcesof e-waste.Explainitshealtheffectsand control methods.

DefineGreenChemistry.WritethePrinciplesandbenefitsofGreenChemistry.

COURSECONTENT

ENGINEERINGCHEMISTRYANDENVIRONMENTALSTUDIES

1. **FundamentalsofChemistry**

   Atomic Structure: Introduction - Fundamental particles – Bohr's theory – Quantum numbers – Atomic structure of Silicon and Germanium - Orbitals, shapes of s, p and d orbitals - Aufbau's principle - Hund's rule - Pauli's exclusion Principle -Electronic configuration of elements.

   Chemical Bonding: significance–Electronic theory of valency- Types of chemical bonds – Ionic and covalent bond with examples–Properties of Ionic and Covalent compounds.

2. **Solutions,AcidsandBases**

   Solutions: Types of solutions - Mole concept – Numerical problems onmole concept -Methods of expressing concentration of a solution – Molarity and Normality – Numerical problems on molarity and normality.

   AcidsandBases:Arrheniustheoryofacidsandbases – Ionicproductofwater-pH–Numerical problems on pH–Buffer solutions – Classification- applications.

3. **Electrochemistry**

   Conductors, semiconductors, insulators, electrolytes and non-electrolytes – Electrolysis offused NaCl–Applications of electrolysis - Galvaniccell–Battery-Types- Dry Cell (Leclanche Cell), Lead-Storage battery- Lithium-Ion battery-Hydrogen-Oxygen Fuel cell.

4. **Corrosion**

   Introduction - Factors influencing corrosion - Composition, Stress and Concentration Cells– Rusting of iron and its mechanism – Prevention of corrosion by Protective Coating methods, Cathodic Protection methods.

5. **Watertreatment**

   Introduction– Soft and Hard water– Causes of hardness– Types of hardness– Disadvantages of hard water – Degree of hardness (ppm and mg/lit) – Numerical problems on hardness - Softening methods – Ion-Exchange process– Reverse Osmosis process.

6. **Polymers&Engineeringmaterials**

   Polymers:

   Conceptofpolymerization–Typesofpolymerization–Addition,condensationwithexamples – Plastics - Preparation and uses of i).PVC ii) Teflon iii) Polystyreneandiv) Nylon 6,6.

   Elastomers:Preparationandapplicationofi)Buna-sandii)Neoprene.

   EngineeringMaterials:

   Alloys-Compositionandapplicationsof i)Nichrome,ii)Duraluminandiii)StainlessSteel. Composite Materials- Properties and applications.

   Liquid Crystals- Properties and applications.

   NanoMaterials-Propertiesandapplications.

7. **Fuels**

   Definitionandclassificationoffuels–Compositionandusesofi)LPGii)CNGiii)Biogas andiv)Poweralcohol–Hydrogenasafuturefuel-production-advantagesanddisadvantages.

8. **ENVIRONMENTALSTUDIES**

   Scope and importance of environmental studies – Environment - Important terms related to environment–Renewableandnon-renewableenergysources–Forestresources–Deforestation– Air pollution–Global impacts on environment –Water pollution – causes – effects – control measures-e-Pollution–Sourcesofe-waste -Healtheffects- Controlmethods- GreenChemistry-Principles-Benefits.

REFERENCEBOOKS

1. TeluguAcademy — IntermediatechemistryVol. 1&2
2. Jain&Jain — EngineeringChemistry
3. O.P.Agarwal,Hi-Tech. — EngineeringChemistry
4. D.K.Sharma — EngineeringChemistry
5. A.K.De — EngineeringChemistry

SyllabusforUnittests

UnitTest	**Learningoutcomestobecovered**
UnitTest–1	**From1.1to2.8**
UnitTest–2	**From3.1to5.7**
UnitTest–3	**From6.1to8.10**

ELECTRICALENGINEERINGMATERIALSCIENCE

Course code	Coursetitle	No. of periods/week	Total no. of periods	Marks forFA	Marksfor SA
EE-105	ELECTRICAL ENGINEERING MATERIALSCIENCE	04	120	20	80

Chapter No.	Title	No. of Periods	Weightage	No.ofshort question (3marks)	No.ofEssay questions (10marks)	CO'S Mapped
1	Conducting Materials and Semiconducting Materials	25	26	2	2	CO1
2	Insulating Materialsand Di- electric Materials	30	26	2	2	CO2
3	Magnetic Materials	15	13	1	1	CO3
4	Magneticeffects of Electric Current and Electromagnetic Induction	30	29	3	2	CO4
5	Electrostatics and Capacitance	20	16	2	1	CO5
TOTAL		**120**	**110**	**10**	**8**	

COURSE OBJECTIVES	1) Tofamiliarisewiththeknowledgeofdifferentelectrical engineering materials. 2) Tocomprehendthemagneticeffectsofelectriccurrent. 3) Toknowtheconceptofelectro-magneticinductionand electrostatic field.

COURSE OUTCOMES	CO1	EE-105.1	Explainthepropertiesofdifferentconductingand semi-conducting materials and their applications
	CO2	EE-105.2	AnalyzeInsulatingmaterialsanddielectric materials
	CO3	EE-105.3	DescribeMagneticmaterialsandtheirproperties
	CO4	EE-105.4	ComprehendtheprinciplesofMagneticeffectsof Electric Current and Electromagnetic Induction
	CO5	EE-105.5	UnderstandtheconceptsofElectrostaticsand Capacitance

LEARNINGOUTCOMES

1. ConductingMaterialsandSemiconductingMaterials

DefineConductingMaterials
Statethepropertiesofconductingmaterials
Definetheterms(i)Hardening (ii)Annealing
Statethemainrequirementsof(i)LowResistivityMaterials(ii)Highresistivitymaterials
Listsomeexamplesofi)LowResistivityMaterialsii)HighResistivitymaterials
MentiontheProperties&ApplicationsofCopperandAluminium
DistinguishbetweenCopperandAluminium
Mentiontheproperties&applicationsofACSRConductorsandAAAC.
Listtheproperties&ApplicationsofHighResistiveMaterialsof(i)Nichrome(ii)Tungsten (iii)Carbon
DefineSemiconductingmaterials
ClassifySemiconductingmaterials
Define(i)IntrinsicSemiconductorsand(ii)ExtrinsicSemiconductors
DistinguishbetweenIntrinsicandExtrinsicsemiconductors.
Explaintheformationof(i)P–typesemiconductorand(ii)N–typesemiconductor
DistinguishbetweenPandNtype Semiconductors

2. InsulatingMaterialsandDi-electricmaterials

DefineInsulatingMaterials
Drawenergyleveldiagramsofconductors,insulatorsandsemi-Conductors
DistinguishbetweenConductors,InsulatorsandSemiconductors
DefineInsulationresistanceandexplainfactorsaffectinginsulationresistance
Classifyinsulatingmaterials
Statethe propertiesandapplicationsof(i)Impregnatedpaper(ii)Wood (iii)Asbestos(iv)Mica (v)Ceramics (vi) Glass
ExplainthepropertiesandapplicationsofPVC
State the effects of the following on P.V.C.
(i)Filler(ii)Stabilizer(iii)Plasticizer(iv)Additives.
KnowthePermittivityofcommonlyuseddi–electricmaterials
(i)Air(ii)Bakelite(iii)Glass(iv)Mica(v)Paper(vi)Porcelain(vii)Transformeroil
ExplainPolarization
ExplainDi-electric Loss

ListanyfourapplicationsofDi-electrics

3. Magnetic Materials

ClassifytheMagneticMaterials
(i)Ferro(ii)Para(iii)Dia-Magneticmaterialswith examples
Explain(i)SoftMagneticmaterials(ii)HardMagneticmaterials
Draw (i)B-HCurve(ii)Hysteresisloop
ExplainHysteresisloop
ExplainHysteresislossandStateSteinmetzequation(No-Problems)
ExplainEddyCurrentLosses
StateCurie point
DefineMagnetostriction

4. MagneticeffectsofElectricCurrentandElectromagneticInduction

StateCoulombslawsofMagnetism
DefinethetermsAbsoluteandRelativePermeabilityof mediumandgiverelationbetween them
Explaintheconceptoflinesofforce&magneticfield
StateRighthandThumbrule
Drawthefieldpatternsdueto
(i)Straightcurrentcarryingconductor (ii)Solenoid
Stateandlisttheapplicationsof(i)Worklaw(ii)Biot-Savart'sLaw(Laplacelaw)
ExplaintheMechanicalforceonacurrentcarryingConductorplacedinsideaMagnetic field.
Deriveanexpressionforthemagnitudeoftheforce onacurrentcarryingconductor inside a magnetic field.
StateFleming'sLeftHand rule
Understandtheconceptof the MagneticcircuitandDefinethetermsMMF,Fluxand Reluctance
CompareMagneticcircuitwithElectriccircuitindifferent aspects
Explaintheeffectofairgapinamagnetic circuit
Explainthetermsleakagefluxandleakageco-efficient
StateFaraday'slawsofElectro-MagneticInduction
ExplainDynamicallyandStaticallyinducedE.M.Fs
StateLenz'slaw
ExplainFleming'sRightHand rule
Statethe conceptofSelfandMutualinductanceandwritetheirexpressions
StateCo-efficientofcoupling
Developanexpressionfortheenergystoredinamagneticfield

5. ElectrostaticsandCapacitance

StateCoulomb'slawsofElectrostaticsandsolvetheproblems
Definethefollowingterms
(i)UnitCharge(ii)Absolutepermittivity(iii)Relative permittivity(iv)ElectricFlux
(v)FluxDensity(vi)Fieldintensity
Drawthefieldpatternsdueto
i) Isolatedpositivecharge

ii) Isolatednegativecharge

iii) Unlikechargesplacedsideby side

iv) Likechargesplacedsidebyside

CompareElectrostaticandMagneticlinesofforceindifferentaspects.

Definetheconceptofelectricpotentialandpotentialdifference

DefineDi-electricstrengthandDi-electricconstant

GivethepermittivityofcommonlyusedDi-electricmaterials

DefineCapacitanceandstatefactorsaffectingthecapacitanceofacapacitor

Derivetheformulaforcapacitanceofaparallelplatecapacitor

Statedifferenttypesof capacitorswithitsuses

Deriveanexpressionforequivalentcapacitance

i) WhentwoCapacitorsareconnectedinseries

ii) WhentwoCapacitorsareconnectedinparallel

DeriveanexpressionfortheEnergystoredinacapacitor

HYPONATEDCOURSECONTENTS

1. **ConductingMaterialsandSemiconductingmaterials:**
   Conducting Materials – Properties -Hardening, Annealing - Low Resistivity Materials – Requirements – Properties and applications of Copper and Aluminium - Comparison between Copper and Aluminium - ACSR Conductors, AAAC - High Resistive Materials – Requirements-Properties and applications of Nichrome, Tungsten and Carbon-Semiconducting materials-classification-comparison between intrinsic and extrinsic semiconductors –Formation ofP-type and N-type semiconductors-comparison of P-type and N-type semiconductors.
2. **InsulatingMaterialsandDi-electricmaterials**
   Insulating materials – Energy level diagrams of Conductors, Insulators and Semiconductors - Distinguish between Conductors, Insulators and Semiconductors-Factors effecting Insulation resistance-ClassificationofInsulatingmaterials-Properties&ApplicationsofImpregnatedPaper, Wood,Asbestos,Mica,Ceramics,Glass-propertiesandapplicationsofPVC-effectsofthe(i)Filler (ii)Stabilizer(iii)Plasticizer(iv)AdditivesonP.V.C. -PermittivityofdifferentDi -electricmaterials-Polarization - Dielectric Loss – Applications of Dielectrics.
3. **MagneticMaterials**
   Classificationofmagneticmaterials-Soft&Hardmagneticmaterials-B-HCurves-Hysteresisloop -Hysteresisloss-Steinmetzequation-EddyCurrentLoss--CuriePoint–Magnetostriction.
4. **MagneticeffectsofElectricCurrentandElectromagneticInduction**
   Coulombs laws- Permeability - Lines of force – Right Hand Thumb rule - Field pattern due to(i) longstraightcurrentcarryingconductor(ii)solenoid-WorkLawanditsapplications–BiotSavart's Law (Laplace Law)- Mechanical force on a current carrying conductor placed inside a magnetic field - Direction of force - Fleming's Left Hand rule- Magnetic circuit- mmf- Flux - Reluctance - Comparison of Magnetic circuit With Electric circuit - Magnetic leakage flux and leakage Co-efficient. Faraday's laws – Dynamically and Statically induced E.M.F-Lenz's Law &Fleming's Right Handrule-SelfandMutualinductance-Co-efficientofcoupling-Energystoredinamagneticfield.

5. **ElectrostaticsandCapacitance**
   Coulomb's Laws of Electrostatics–Permittivity, Electric flux, Flux density, Field intensity - Electrostaticfieldpatternsdueto(i)Isolatedpositivecharge(ii)Isolatednegativecharge(iii)Unlike

charges placed side by side (iv) Like charges placed side by side -Comparison of Electrostatic and Magneticlinesofforce - Concept of Electric potential andPotential difference –Di-electricstrength – Di-electricconstant-Capacitance–FactorsaffectingtheCapacitanceofCapacitor–capacitance ofaparallelplatecapacitor-TypesofCapacitors-Equivalentcapacitancewhenconnectedinseries and parallel - Uses- Energy stored in a Capacitor.

REFERENCEBOOKS

1 Dr.K.Padmanabham-ElectronicComponents–Laxmipublications(P)Ltd.
2 ElectricalEngineeringMaterials–N.IT.T.T.RPublications
3 B.K.Agarwal-IntroductiontoEngineeringmaterials–TataMcGrawHillPublishers
4 IanP.Jones-MaterialscienceforElectricalandElectronicEngineers–OxfordPublications
5 B.L.Theraja–ElectricalTechnology,Vol.-1–S.Chand&Co.Publications

SyllabustobeCoveredforUnitTests

UnitTest	LearningOutcomestobeCovered
UnitTest–I	From1.1to2.6
UnitTest–II	From2.7to 4.6
UnitTest–III	From4.7to 5.12

BASICELECTRICALTECHNOLOGY

Course code	Coursetitle	No. of periods/week	Totalno. of Periods	Marksfor FA	Marksfor SA
EE-106	BASICELECTRICAL TECHNOLOGY	06	180	20	80

Chapter No.	Title	No. of Periods	Weightage	No.ofshort question (3marks)	No.ofEssay questions (10marks)	CO'S Mapped
1	BasicPrinciples of Electricity	35	19	3	1	CO1
2	Resistive Circuits	40	23	1	2	CO2
3	Work,Power, Energy and Heatingeffects of Electric Current	40	29	3	2	CO3
4	Conversion Techniques	25	13	1	1	CO4
5	Network Theorems	40	26	2	2	CO5
TOTAL		**180**	**110**	**10**	**8**	

COURSE OBJECTIVES	i. TounderstandthebasicprinciplesofElectricityandanalysingresistive circuits. ii. Tocomprehendtheheatingeffectsofelectriccurrent iii. ToanalysevariousDCnetworktheorems.

COURSE OUTCOMES	**CO1**	EE-106.1	Understandbasicprinciplesofelectricity
	CO2	EE-106.2	Familiarisewithvariouslawsandanalysisofresistive circuits
	CO3	EE-106.3	Understandwork,power,energyconceptsandheating effectsofElectriccurrent
	CO4	EE-106.4	Analysevariouselectriccircuitsourceconversion techniques
	CO5	EE-106.5	AnalysevariousDCnetworktheorems

LEARNINGOUTCOMES

1. **BasicPrinciplesofElectricity**

DefineElectricCurrent,Potentialdifference,VoltageandEMF
StateOhm'sLawandsolveproblems
ListthelimitationsofOhm's Law
Definethe terms
i)Specificresistanceii)Conductanceiii)Conductivity
Derivetherela*t*ionR=$\rho l/a$ andsolvethe problems
Explaintheeffectsoftemperatureonresistance
Developtheexpressionforresistanceatanytemperatureas$R_t=R_o(1+\alpha_o t)$
DefinetemperatureCo-efficientofresistanceandgiveits unit
WritetheformulaforCo-efficientofresistanceatanytemperatures$\boldsymbol{\alpha_t}$ $=\frac{\alpha_0}{1+\alpha_0 t}$

2. **ResistiveCircuits**

Developthe expressions for equivalentResistance withsimple SERIES andPARALLEL connections
SolveproblemsonequivalentresistanceincaseofSeries-Parallel networks
Statethe conceptof divisionofcurrentwhentwo Resistorsareconnectedinparalleland solve the problems
Differentiatebetweenactiveandpassivecircuits.
Definejunction,branchandloopincircuits
State(i)Kirchhoff'scurrentlaw (KCL) (ii)Kirchhoff'svoltagelaw (KVL)
Solveproblemsbyapplyingbranchcurrentmethodonly

3. **Work,Power,EnergyandHeatingeffectsofElectricCurrent**

StateandexplainelectricWork,Powerand Energy
SolveproblemsonWork,PowerandEnergy
Mention the typical power ratings of home appliances like Electric lamps (Incandescent, fluorescent, CFL & LED), Water heater, Electric Iron, Fans, Refrigerators, Air and Water coolers, Television sets, Air Conditioners, Water Pumps, Computers, Printers etc.
CalculateElectricitybillofdomesticconsumersaspertheElectricityTariff
DefineJoule'slawandstateitsexpression.
DefineThermalefficiency
SolveproblemsonElectricheating
Explaintheapplicationsofheatproducedduetoelectriccurrentin
(i)MetalFilamentlamp(ii)Electrickettle(iii)ElectricCooker(iv)Geyser

4. **ConversionTechniques**

Explainstaranddeltacircuits
Explaintheconceptofcircuittransformationandequivalentcircuits
Developtransformationformulaeforstar-deltatransformationsandvice-versa
SolveproblemsonStarDeltaTransformation.
Explainidealvoltagesource&idealcurrentsource
ExplainSourcetransformationtechnique
SolvesimpleproblemsonSourcetransformationtechnique

5. NetworkTheorems

Statethe needfornetwork theorems
listdifferenttypesoftheoremsappliedtoDCcircuits
StateandexplainSuperpositiontheorem.
StateandexplainThevenin'stheorem.
StateandexplainNorton'stheorem
StateandexplainMaximumpowertransfertheorem.
SolveproblemsontheabovetheoremsAllthetheoremswithreferencetoD.Conly)

HYPONATEDCOURSECONTENTS

1. BasicPrinciplesofElectricity

Electric current – Electric Potential, Potential difference, voltage and EMF - Ohm's law and its limitations–Resistance–SpecificResistance–Conductance-Conductivity–effectsoftemperature on resistance- Temperature coefficient of Resistance.

2. ResistiveCircuits

Resistances in series, parallel and series-parallel combinations -concept of division of current whentwoResistorsareconnectedinparallel -activeandpassivecircuits-junction,branch,loop – KCL& KVL.

3. Work,Power&EnergyandMagneticEffectsofElectricCurrent

Units of electric Work,Power and Energy – Ratings ofdifferentDomesticAppliances -Calculation of Electricity bill of Domestic Consumer – Mechanical Equivalent of Heat (Joules Law) -Thermal Efficiency-HeatproducedduetoflowofCurrentinMetalFilamentlamps,ElectricalKettle,Electric Cooker,Geyser

4. ConversionTechniques

Star and delta circuits-ideal voltage source & ideal current source -source transformation- Star-Delta& Delta-Star Transformations.

5. NetworkTheorems

Need fornetwork theorems - superposition theorem - Thevenin's Theorem - Norton's theorem - Maximum transfer theorem.

REFERENCEBOOKS

1) B.L.Theraja–ElectricalTechnology,Vol.-1 – S.Chand&Co. Publications
2) V.K.Mehta - IntroductiontoElectrical Engg
3) J.B.Gupta – AcourseinElectricalTechnology– KATSON BOOKS
4) G.B.Bharadhwajan&A.SubbaRao - ElementsofElectricalEngineering.
5) WilliamH.Hayt–EngineeringCircuitAnalysis – TataMcGraw- Hill

SyllabustobeCoveredforUnitTests

UnitTest	**LearningOutcomestobeCovered**
UnitTest–I	From1.1to2.4
UnitTest–II	From2.5to 4.2
UnitTest–III	From4.3to5.7

ENGINEERINGDRAWING

Coursecode	CourseTitle	No. of periods /week	TotalNo.of periods	MarksforFA	MarksforSA
EE-107	ENGINEERING DRAWING	3	90	40	60

Chapter No.	Title	No. of Periods	Weightage	No.ofshort question (5marks)	No.ofEssay questions (10marks)	CO'SMapped
1	UseofDrawing Instruments, Free Hand Lettering and Dimensioning Practice	10	10	2	0	CO1
2	Principlesof Geometric Constructions	15	15	1	1	CO2
3	Projectionsof points,lines, planes and solids	20	25	1	2	CO3
4	SectionalViews	20	10	0	1	CO4
5	Orthographic projection	25	20	0	2	CO5
TOTAL		**90**	**80**	**4**	**6**	

COURSE OBJECTIVES	Uponcompletionofthecoursethestudentshallbeabletounderstand the basic graphic skills and use them in preparation, reading and interpretation of engineering drawings.

COURSE OUTCOMES	**CO1**	EE-107.1	Practicetheuseofengineeringdrawinginstruments and Familiarisewiththeconventionstobefollowedin engineering drawing as perBIS
	CO2	EE-107.2	Constructthei)basicgeometricalconstructionsii) engineeringcurves
	CO3	EE-107.3	Visualiseanddrawtheprojectionsofi)Pointsii)Linesiii) RegularPlanesiv)RegularSolids
	CO4	EE-107.4	Visualiseanddrawthesectionalviewsofcomponents
	CO5	EE-107.5	Visualiseanddrawtheorthographicprojectionsof components

LEARNINGOUTCOMES

Uponcompletionofthe coursethestudentshallableto

UseofDrawingInstruments,FreeHandLetteringandDimensioningPractice

Statetheimportanceofdrawingasanengineeringcommunicationmedium
Selectthecorrectinstruments todrawthedifferentlines/curves.
Usecorrectgradeofpencilandotherinstrumentstodrawdifferenttypesoflinesandfor differentpurposes
Identifythestepstobe takentokeepthedrawingcleanandtidy.
Write titles using vertical and slopping (inclined) lettering and numerals of 7mm, 10mmand 14mm height.
Acquaintwith theconventions,notations,rulesandmethodsofdimensioningin engineering drawing as per the B.I.S.
Dimensionagivendrawingusingstandardnotationsanddesiredsystemofdimensioning.

PrinciplesofGeometricConstructions

Practicethebasicgeometricconstructionslikei)dividingalineintoequalparts
i) Exteriorandinteriortangentstothegiventwocircles
ii) Tangentarcs totwogivenlinesand arcs
Drawanyregularpolygonusinggeneralmethodwheni)sidelengthisgiven
i) Inscribingcircleradiusisgivenii)describingcircleradiusisgiven
Draw theengineeringcurveslikei)involuteii)cycloid

Projectionsofpoints,lines,planesandsolids(Allinfirstquadrantonly)

Explainthebasicprinciplesoftheorthographicprojections
Visualiseanddrawtheprojectionofapointwithrespecttoreferenceplanes(HP&VP)
Visualiseanddrawtheprojections ofstraightlineswithrespecttotwo reference Planes (up to lines parallel to one plane and inclined to other plane)
Visualiseanddrawtheprojections ofplanes(uptoplanesperpendicularto oneplane and inclined to other plane)
Visualiseanddrawtheprojections ofregularsolidslikePrisms,Pyramids,Cylinder, Cone(up to axis of solids parallel to one plane and inclined to other plane)

SectionalViews

Identifytheneedtodrawsectionalviews.
Drawsectionalviewsofregularsolidsbyapplyingtheprinciplesofhatching.

5.0Orthographicprojection

Drawtheorthographicviewsofanobjectfromitspictorialdrawing.
Draw theminimumnumberofviewsneededtorepresentagivenobjectfully.

CompetenciesandKeycompetenciestobeachievedbythestudent

S.No	Majortopic	KeyCompetency
1.	UseofDrawingInstruments,Free HandLetteringandDimensioning Practice	• Explain the linkages between Engineering drawing and other subjects of study in Diploma course.
		• Selectthecorrectinstruments todraw variousentitiesindifferentorientation
		• Writetitlesusingslopingandverticallettering and numerals as per B.I.S (Bureau of Indian standards)
		• Dimensionagivendrawingusingstandard notationsanddesiredsystemofdimensioning
2.	Geometricalconstruction	• Dividing a line into equal parts, tangents to circles, Construct involute, cycloid from the given data.
3.	Projectionofpoints,Lines, Planes & Solids	• Drawtheprojectionsofpoints,straightlines, planes&solidswithrespecttoreference planes (HP& VP)
4.	SectionalViews	• Differentiatebetweentrueshapeand apparent shape of section • Applyprinciplesofhatching. • Drawsimplesectionsofregularsolids
5.	OrthographicProjection	• Draw the minimum number of views needed to represent a given object fully.

COURSECONTENTS:

NOTES:1.B.I.SSpecificationshouldinvariablybefollowedinallthetopics.

2. A-3SizeDrawingSheetsaretobeusedfor allDrawingPracticeExercises.

1.0 UseofDrawingInstruments,FreeHandLetteringandDimensioningPractice

Explanationofthe scope andobjectivesofthe subject ofEngineeringDrawing.Itsimportance as a graphic communication -Need for preparing drawing as per standards – SP-46 –1988 – Mention B.I.S - Role of drawing in -engineering education - Basic Tools, tools for drawing– Mentioning of names under each classification and their brief description -Scales: Recommended scales reduced & enlarged -Lines: Types of lines, selection of line thickness - Selection of Pencils - Sheet Sizes: A0, A1, A2, A3, A4, A5, Layout of drawing sheets in respect of A0, A1, A3 sizes, Sizes of the Title block and its contents - Care and maintenance of Drawing Sheet,

Importance of lettering – Types of lettering -Guide Lines for Lettering Practicing of letters & numbers of given sizes (7mm,10mm and 14mm)-Advantages of single stroke or simple style of lettering -Useofletteringstencils- Purpose of engineering Drawing, Need of B.I.S code in dimensioning -Shapedescription of an Engineering object -Definition of Dimensioning size description -Location of features, surface finish, fully dimensioned Drawing -Notations or tools ofdimensioning,dimensionlineextensionline,leaderline,arrows,symbols,numberandnotes,

rules to be observed in the use of above tools -Placing dimensions: Aligned system and unidirectional system (SP-46-1988)-Arrangement of dimensions Chain, parallel, combined progressive, and dimensioning by co-ordinate methods-The rules for dimensioning standard, features “Circles (holes) arcs, angles, tapers, chamfers, and dimension of narrow spaces.

2.0 GeometricConstructions

Division of a straight line into given number of equal parts –Drawinginterior and exterior tangentsto twocirclesofgivenradiiandcentredistance-Drawingtangentarcofgivenradiusto touch two lines inclined at given angle (acute, right and obtuse angles), Tangent arc of given radius touching a circle or an arc and a given line, Tangent arcs of radius R, touching two given circlesinternallyandexternally-Constructionofanyregularpolygonbygeneralmethodforgiven sidelength,inscribingcircleradiusanddescribing/superscriptingcircleradius-Involute,Cycloid, explanations as locus of a moving point, their engineering application, viz., Gear tooth profile, screw threads, springs etc. – their construction

3.0 Projectionofpoints,linesandplanesandSolids(Allinfirstquadrantonly)

Classification of projections, Observer, Object, Projectors, Projection, Reference Planes, Reference Line, Various angles of projections –Differences between first angle and third angle projections

Projections of points -Projections of straight line –(a) Parallel to both the planes, (b)Perpendiculartooneof theplanesand (c) Inclinedtooneplaneand paralleltoother planes-Projections of regular planes-(a)Plane parallel to one of the reference planes, (b)Plane perpendicular to HP and inclined to VP and vice versa-Projections of regular solids- (a) Axis perpendicular to one of theplanes, (b) Axis parallel to VP and inclined to HP and vice versa.

4.0 SectionalViews

Needfordrawingsectionalviews–whatisasectionalview-Hatching–Sectionofregularsolids inclined to one plane and parallel to other plane.

5.0 OrthographicProjections

Meaning of orthographic projection - Using a viewing box and a model – Number of views obtained on the six faces of the box, - Legible sketches of only 3 views for describing object - Conceptoffrontview,topview,andsideviewsketchingtheseviewsforanumberofengineering objects - Explanation of first angle projection. – Positioning of three views in First angle projection-Projectionof pointsasameansoflocatingthecornersof thesurfacesof anobject– Use of meter line in drawing a third view when other two views are given -Method of representing hidden lines -Selection of minimum number of views to describe an object fully.

REFERENCEBOOKS

1 EngineeringGraphicsbyPIVarghese–(McGraw-hill)
2 EngineeringDrawingbyBasantAgarwal&C.MAgarwal-(McGraw-hill)
3 EngineeringDrawingbyN.D.Bhatt.
4 T.S.M.&S.S.Mon“TechnicalDrawing”preparedbyT.T.T.I.,Madras.
5 SP-46-1998–BureauofIndianStandards.

TablespecifyingsyllabustobecoveredforUNITTESTI,IIandIII.

UnitTest	**LearningOutcomestobeCovered**
UnitTest–I	From1.1to2.3
UnitTest–II	From3.1to 3.5
UnitTest–III	From4.1to 5.2

ELECTRICALWIRINGLABORATORY

Course code	Coursetitle	No. of periods/ week	Total no.of periods	Marks forFA	Marksfor SA
EE-108	ELECTRICALWIRING LABORATORY	06	180	40	60

S.no	ChapterTitle	No.of Periods	CO'SMapped
1	WiringtoolsandAccessories	20	**CO1**
2	ElectricalWiringJointsandSoldering Practice	30	**CO2**
3	LampCircuits	50	**CO3**
4	DCandACcircuits	40	**CO4**
5	Testandrepairofdomesticappliances	40	**CO5**
TOTAL		**180**	

COURSE OBJECTIVES	1) Tofamiliarisewiththeknowledgeofdifferentwiringtoolsusedin electrical wiring 2) Toknowthe etiquetteofworkinginthedomesticwiring 3) Toidentifyandrectifythesimplefaultsthatcanoccur indomestic appliances

COURSE OUTCOMES	CO1	EE-108.1	Understandingvarioustoolsandknowtheir usage
	CO2	EE-108.2	Performdifferentjoints,Solderingpracticeand execute different wiring circuits
	CO3	EE-108.3	Performvariouslampcontrolmethods
	CO4	EE-108.4	IdentifythedifferencebetweenDCand AC
	CO5	EE-108.5	Testingandrepairingofdomesticapplications.

LEARNINGOUTCOMES

1. WiringToolsandAccessories

Identifythefollowingelectricalwiringtoolswithrespectto
i) Size ii)Shape iii)Purpose iv)Speedv)Use

a) Screwdrivers
b) Pliers
c) Drillingmachines&Drilling Bits.
d) Rawlplugjumper,andpoker
e) Voltage/linetester
f) Splicers(insulationremover)
g) StandardWire gauge

IdentifydifferenttypesofElectricalWiringaccessorieswithrespectto
i) Size ii)Shape iii)Purpose iv)Use.

a) Switches
b) Ceilingroses
c) LampHoldersandAdopters
d) Sockets
e) Plug
f) Fuses

Identifydifferenttypesofmainswitcheswithrespect to
i) Ratingii)Purposeiii)Use.
SP,DPmains,TP,ICDP,ICTP,SPDT,DPDT,TPDT,Changeover-Knifetype,Rotary,Micro,
Modular switches, 2-pole and 3-pole MCBs

Studydifferenttypesofwiresand cables(1/18,3/20,7/20)withrespecttosizesrating,purpose and use etc

2. ElectricalWiringJointsandSolderingPractice

PrepareStraightjoint/Marriedjoint
PrepareTjoint
PrepareWesternunionjoint
PreparePigtailjoint
Familiarisationtousesolderingtoolsandcomponents
SolderingsimpleelectroniccircuitsonPCB

3. LampCircuits

MakeacircuitwithOne lampcontrolledbyoneswitchusingPVCsurfaceconduitsystem
MakeacircuitwithTwolampscontrolledbytwoswitchesusingPVCsurfaceconduitsystem
MakeacircuitwithOne lampcontrolledbyoneswitchandprovisionof2/3-pinsocket.
MakeacircuitforStair-casewiring
MakeacircuitforGo-downwiring
ControltwoLampsbySeries-Parallelconnectionusingone1-wayswitch&two 2-way switches with PVC surface conduit system
Controltwosub-circuitsthroughEnergymeter,MCB'sandtwo1-wayswitches.
Prepareswitchboardwithstardeltastarter,MCB,Pilotlampsfor3phasemotor
Controlandpractice thewiringforFluorescentLamp
ConnectComputerbymainswitchboardwithaminiaturecircuit breaker.

4. DCandAC circuits

DemonstrateunidirectionalcurrentflowwithVbattery
DeterminepolarityusingaVoltmeter/LED
DemonstrateACusingaLowvoltageTransformer
PracticeSeriesandParallelconnectionofLamps
PracticeBrightandDimlightarrangement

5. TestandrepairoftheDomestic appliances

Testingandrepairofelectricheater
Testingandrepairofiron box
Testingandrepairofelectrickettle
Testingandrepairofelectriccooker
Testingandrepairofelectricgeyser

CompetenciestobeachievedbytheStudent:

S.No	Competencies	KeyCompetencies
1	Handlethedifferentwiring tools and accessories a) Selectswitches,andMCB's b) Identifywiresandcablesas per therequirements of the load.	• Identifythesizeandspecificationsofvarious tools used for electrical wiring. • Understandtheusageofthestandardwire gauge. • Identifythetype,sizeandspecificationsofDP mains,
2.1	To prepare a Straight joint/Marriedjointusinga7/20 Al.Cable	• Identifythesizeofthecable • PerformsplicingofInsulationproperly. • PerformStraightjoint/Marriedjoint
2.2	ToprepareaTjointusinga 7/20 Al. Cable	• Insertthe leads of thewiresproperlyas perthe sketches. • Twistthewires properly.
2.3	Toprepare a Westernunion jointusingasinglestrandAl. Cable	• Overlapthetwowires properly • Twistthebindingwiresproperly
2.4	ToprepareaPigtailjointusing a single strand Copper Cable	• PlacethewiresinV-shape. • Twistthewiresinclockwisedirection.
2.5	ToFamiliarisevarioussoldering tools and components	• IdentifyingSolderinggun,flux,lead
2.6	Tosoldersimpleelectronic circuits on PCB	• Drawthelayoutof circuit • CarefullySolderingthecircuitonPCB.
3.1	Tocontrolonelampbyone1- way switch with PVC surface conduit wiring system	• Drawwiring diagram • Identifythesizeofcable,PVCpipe,typeof1-way switch and lamp holder. • MakeConnectionsasperWiringDiagram

3.2	Tocontroltwolampsbytwo1-way switches withPVC surface conduit wiring system	• Drawwiring diagram • Handle the screw driver, electrician Knife, line tester to fix the PVC pipe using saddles and junction boxes. • Select colour and length of wire for phase and neutral • Switchonthesupplyaftermakingofthe connections • Disconnectthecircuitaftertesting.
3.3	Tocontrolonelampand2/3 pin socket by two1-way switcheswithPVCsurface conduit wiring system	• Connect2/3pinsocketproperlywithrespectto phase, neutral and earth. • Connectphasewirethroughswitches.
3.4	Stair-casewiring	• Selecttwo2-wayswitches • Connect2-wayswitchesasper circuitdiagram. • Testwith1-phase,230V,50Hzsupplytothe circuit connected through ICDP switch.
3.5	Go-downwiringscheme	• Drawwiring diagram • Connectthe circuitasper the diagram. • Observesequenceofoperationof switches • Test with 1-phase,230 V,50 Hz supply to the circuit, neutral wire to the bottom point of the 1-wayswitchandphasetothefirstpointof lamp holder
3.6	Series-Parallelconnection	• Select colour and length of wire for phase and neutral. • Makeconnectionsasperwiring diagram. • DrawwirethroughPVCpipeproperly • Observe glow intensity of lamps for series and parallel connections
3.7	Control two sub circuits throughEnergymeter,MCB's and two1- way switches	• Drawwiring diagram. • Identifythesizeofcable,1-wayswitch,PVC pipe, MCB, capacity of Inverter and Socket • ReadthespecificationsofMCB,capacityof Inverter and Socket • Makeconnectionsasperwiring diagram. • DrawwirethroughPVCpipeproperly. • ConnectsupplytoInverterthroughMCBproperly. • Selectappropriatesocketwithswitch control. • Makeearthwireconnectionsforrequired points.

3.8	Prepareswitchboardwithstar deltastarter,MCB,Pilotlamps for 3 phase motor	• Selectthesizeofcable,PVCpipe,star-delta starter, MCB and lamp holder • Makeconnectionsasperwiring diagram. • DrawwirethroughPVCpipeproperly. • Draw wire ofthe 3-phase tothe motorthrough star-delta starter. • Test with 3-phase, 415 V,50 Hz supply to the circuit connected through ICDP switch. • Testbychanginganytwophasesofinputsupply
3.9	Wiringpracticeoffluorescent lamp	• Makeconnectionsasperwiring diagram. • Connecttoppointandbottompointofthe choke to tube light properly. • Notetheimportanceandworkingof starter.
3.10	Connect computer by main switchboardwithaminiature circuit breaker.	• Drawwiring diagram. • Identifythesizeofcable,1-wayswitch,PVC pipe, MCB and Sockets • ReadthespecificationsofMCBandSockets • Makeconnectionsasperwiring diagram. • ConnectsupplytoComputerthroughMCB properly. • Selectappropriatesocketswith1-wayswitch control. • Makeearthwireconnectionsforrequirepoints.
4.1	Demonstratedifference between DC and AC	• ConnectDCsourceandmeasureV&I • ConnectproperACsourceandmeasureV&I • Makeinferences.
5.1	Testingandrepairofdomestic appliances	• Inspecttheappliancevisually. • Checkforany discrepancies. • Performthedisassembling operation • Testtheinnerpartsforanyfaults • Rectifythefaultsif any. • Replacethepartsifnecessary. • Performtheassembling. • Test the Domesticappliance for proper functioning.

Note:

1. Everystudenthas tobringinsulatedtoolkitandfollowthegeneralsafetyprecautions throughout the lab sessions
2. Shouldnottouchtheliveterminals.

PHYSICSLAB

Coursecode	Coursetitle	No.of periods/ week	Totalno.of periods	Marksfor FA	Marksfor SA
EE-109	PHYSICSLAB	1.5	45	20	30

S.No	Listofexperiments	No.of Periods	CO's Mapped
1.	Verniercalipers	03	CO1
2.	Micrometer(Screw gauge)	03	
3.	VerificationofLami'stheoremusingconcurrentforces	03	
4.	Determinationof'g'usingsimplependulum	03	CO2
5.	Focallengthandfocalpowerofconvexlens	03	
6.	Refractiveindexofsolidusingtravellingmicroscope	03	
7.	VerificationofBoyle'slawusingQuilltube	03	CO3
8	Determinationofpolestrengthofthebarmagnetthroughmagnetic fieldlines	03	
9	Resonanceapparatus–Determinationofvelocityofsoundinair	03	
	Experimentsfordemonstration		
10	Meterbridge–Determinationofresistanceandspecificresistanceof a wire	03	CO4
11	VerificationofNewton'slawofcooling	03	
12	Photoelectriccell–Studyofitscharacteristics	03	
	Revision	06	
	Test	03	
	Total:	**45**	

COURSE OBJECTIVES	(1) ToprovidestrongpracticalknowledgeofPhysicstoserveasatool for various device applications in Engineering. (2) To enhance scientific skills of the students by incorporating new experimentssoastoenrichthe technicalexpertiseofthestudentsas required for industries.

COURSE OUTCOMES	CO1	Improvingaccuracyinvariousmeasurements;understandingthe nature of the forces keeping the body in equilibrium.
	CO2	Estimatingtheaccelerationcausedbythegravityofearth;Practical studyoftheconceptsofrefractionoflightatcurved/planesurface.
	CO3	Understanding the pressure of the gas as function of its volume; studyofthe combinedmagneticfieldoftheearthand anartificial magnet to estimate its pole strength; Estimating the velocity of soundinairthroughresonancephenomenon.
	CO4	Applying Kirchoff's laws to evaluate the specific resistance of a wire; Study of exchange of heat from system to surrounding by graphicalanalysis,Conversionoflightenergytomicrocurrentsas potentialengineeringapplication.

CO-POMAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	2	1	2
CO2	3		1	1	1	1	1
CO3	3	2			1		
CO4	3	2	2			1	2

CO-POMappingStrength

EE-109	PHYSICSLAB **NoofCourseObjectives:4**			**Noofperiods45**
POs	MappedwithCONo	iodsaddressingPOin Col 1 NO %	1,2,3	remarks
PO1	CO1,CO2,CO3,CO4	15	33.3%	2	>40% level 3 (highlyaddressed) 25% to 40% level 2 (moderatelyaddressed) 5%to25%level1(Low addressed) <5% (notaddressed)
PO2	CO1,CO3,CO4	8	17.8%	1	
PO3	CO1,CO2,CO4	6	13.3%	1	
PO4	CO1,CO2	3	6.7%	1	
PO5	CO1,CO2,CO3	5	11.1%	1	
PO6	CO1,CO2,CO4	3	6.7%	1	
PO7	CO1,CO2,CO4	5	11.1%	1	

3=stronglymapped,2=moderatelymapped, 1=slightlymapped

Note:ThegapsinCOandPOmappingwillbeachievedbyoneormoreappropriateactivitiesfromthe following.

(i)Seminars (ii)Viva-voce (iii)Assignments
(iv)Quizcompetitions(v)Industrialvisits (vi)Techfest (vii)Miniproject
(viii)Groupdiscussions(ix)Virtuallabs (x)Libraryvisitfore-books

LEARNINGOUTCOMES

Uponcompletionofthecoursethestudentshallbeable to

1.0 PracticewithVerniercaliperstodeterminethevolumesofcylinderandsphere.
2.0 PracticewithScrewgaugetodeterminethicknessofa glassplateandcrosssectionalareaof a wire.
3.0 VerifytheLami'stheoremusingconcurrentforces.
4.0 Determinethevalueofaccelerationduetogravity(g)usingSimplePendulum.Toverifythe result from$l\text{-}T^2$ graph.
5.0 CalculatetheFocallengthandfocalpowerof convexlensusingdistantobjectmethodand U-V method. To verify the result from U-V graph and 1 / U – 1 / Vgraph methods.
6.0 Determinetherefractiveindexofasolidusingtravellingmicroscope
7.0 VerifytheBoyle'slawusingQuilltube.Todrawagraphbetween P and 1/l.

8.0 Determinationofmagneticpolestrengthofabarmagnetbydrawingmagneticlinesofforce and locating null points (eitherN - N or N - S method)

9.0 Determinethevelocityofsoundinairatroomtemperatureanditsvalueatzero degree Centigrade using resonance apparatus.

10.0 DeterminetheresistanceandspecificresistanceofmaterialofawireusingMeterBridge

11.0 ToverifytheNewton'slawofcooling.

12. .0 Tostudythecharacteristicsofphotoelectriccell.

CompetenciesandKeycompetenciestobeachievedbythestudent

Name of the Experiment(Nu	**Competencies**	**Keycompetencies**
1 . Practice on Vernier Calipers(03)	• FindtheLeast count • Fixthespecimeninposition • Readthescales • Calculatethephysicalquantitiesof given object	• Readthescales • Calculatetherequisite physical quantities of given objects • Calculatingvolumesofthe cylinder and sphere
2.PracticeonScrew gauge(03)	• FindtheLeast count • Fixthespecimenin position • Readthescales • Calculatethicknessofglassplate and cross section of wire from radius	• Readthescales • Notingzero error • Calculate thickness of given glass plate • Calculatecrosssectionof wirefromradius
3. Verification of Lami's theorem forces(03)	• Makingexperimentalsetup • Fixsuitable weights • Notethepositionsofthreadson drawing sheet • Findtheanglesbetweenthe concurrent forces • Changingweightsappropriately • VerifyLami'stheorem	• Measuringangles betweentheforces • Marking the directions forces on a paper • VerifyingLami'stheorem from the weights and measured angles between the forces.

4.Simple pendulum(03)	• Fixthesimplependulumtothe stand • Adjustthelengthofpendulum • Findthetimefornumberof oscillations (say 20) • Findthetimeperiod • Calculatetheaccelerationdueto gravity • Drawl-T^2graph	• Findthetimefornumberof oscillations • Findthetimeperiod • Calculatetheacceleration due to gravity • Verifyforml-T^2graph
5.Focallengthand Focal power of convexlens (03)	• Fixtheobject distance • FindtheImage distance • Calculatethefocallengthand power of convex lens • Drawu-vand1/u–1/v graphs	• Find focal length from distant object method. • Calculate the focal length and power of convex lens • Verify result from u-v and 1/u – 1/v graphs
6Refractiveindexof solid using traveling microscope(03)	• FindtheleastcountofVernieron microscope • Placethegraphpaperbelow microscope • Readthescales	• Reading the scales on Microscope. • Fiding real and apparent thickness of the slab • Calculatetherefractive
7 . Boyle's law verification(03)	• Notetheatmosphericpressure • FixtheQuilltubetoretortstand • Findthelengthofair column • Findthepressureofenclosed air • Findandcomparethecalculated values of P x l	• Fixing Quill tube in various positions on retort stand. • Find the length of air column • Find the pressure of enclosed air • FindthevaluesofPxl • VerifyBoyle'slaw.
8.Mapping of magnetlinesof force (03)	• Drawmagneticmeridian • Place the bar magnet in N-N or N-S directions • Drawmagneticlinesofforce • Locatetheneutralpoints	• Drawthepatternofmagnetic lines of force • Locatetheneutralpoints • Calculatingpolestrengthof the bar magnet

9. Velocity of sound in air –Resonance method(03)	• Arrangetheresonanceapparatus • Adjustthereservoirlevelfor booming sound • Findthefirstandsecond resonanting lengths • Calculatevelocityofsound.	• Adjustthereservoirlevel • Find the first and second resonanting lengths • Calculate velocity of sound at room temperature andat 0^0 C
10.Meterbridge(03)	• Makethecircuitconnections • Findthebalancinglength • Calculateunknownresistance • Findtheradiusof wire • Calculatethespecificresistance	• Making connections as per circuit diagram. • Findthebalancinglength • Calculate unknown resistance • Calculate the specific resistance of the given wire
11.Verification of Newton'slawof Cooling (03)	• Heatingliquidinabeaker using a heating element • Insertingthermometerinliquidin calorimeter • Stirringliquid • Measuringtemperatures as a functionoftimeusingthermometer • Plottingacooling curve	• Measuring temperature ofa liquid as function of time. • Plottingacoolingcurve. • Verifying Newton's law of cooling.
12. Photo electric cell–Studyofits Characteristics(03)	• Experimentalsetupandmaking connections • Veryfying intensity of light by varyingdistancesbetweenlight source and photocell. • MeasuringVoltageandcurrent values.	• Making connections for experimental set up. • Varying distances appropriately • MeasuringVoltageand current values. • StudyofV-ICharacteristics form graph.

SchemeofValuationforEndPracticalExamination:

Activity	Marks
Forwriting,Apparatus,formulae,leastcount(ifapplicable)	5
Procedure&precautions	5
DrawingTables	3
Readings,calculations,graph(ifapplicable),reportingthefindings	12
Viva-voce	5
Totalmarks	**30**

CHEMISTRYLAB

Coursecode	Coursetitle	No.of periods/ week	Totalno.of periods	Marksfor FA	Marksfor SA
EE-110	CHEMISTRY LAB	1.5	45	20	30

S.No	NameoftheExperiment	No. of Periods	Mapped withCOs
1.	a) Recognitionofchemicalsubstancesandsolutionsusedinthe laboratory by senses. b) FamiliarizationofmethodsforVolumetricanalysis.	03	CO1
2.	PreparationofStd.Na_2CO_3solutionandmakingsolutionsofdifferent	03	CO1
3.	EstimationofHClsolutionusingStd.Na_2CO_3solution.	03	CO2
4.	EstimationofNaOHusingStd.HClsolution.	03	CO2
5.	Determinationofacidityofwatersample.	03	CO2
6.	Determinationofalkalinityofwatersample.	03	CO2
7.	EstimationofMohr'sSaltusingStd.$KMnO_4$.Solution.	03	CO3
8.	EstimationofFerrousionbyusingStd.$K_2Cr_2O_7$solution.	03	CO3
9.	DeterminationoftotalhardnessofwatersampleusingStd.EDTA solution	03	CO4
10.	Estimationof Chloridespresent inwatersamplebyusingStd.$AgNO_3$solution.	03	CO4
11.	EstimationofDissolvedOxygen(D.O)inwatersamplebyusingStd. hypo solution.	03	CO5
12.	DeterminationofpHusingpHmeter.	03	CO5
13.	Determinationofconductivityofwaterandadjustingionicstrength	03	CO5
14.	Determinationofturbidityofwater.	03	CO5
15.	Estimationoftotalsolidspresentinwatersample.	03	CO5
	Total:	**45**	

COURSE OUTCOMES	**CO1**	Operateandpracticevolumetricapparatusand preparation of standard solution.
	CO2	Evaluateandjudgetheneutralizationpointinacidbase titration.
	CO3	Evaluatetheendpointofreductionandoxidation reaction.
	CO4	Judgethestableendpointofcomplexformation, stableprecipitation.
	CO5	Judgeoperateanddemonstrateandperformprecise operationswithinstrumentforinvestigationofwater pollution parameters.

PO-COmapping

EE-110	ChemistryLab No.ofCO's:5				No.ofperiods:45
Pos	MappedwithCO No.	COperiods addressing PO in Col. No.1	%	Level 1,2,3	Remarks
PO1	CO1,CO2,CO3, CO4,CO5	12	26.66	2	>40% Level3(highly addressed) 25%to40% Level2(moderately addressed) 5%to 25% Level1(Low addressed) <5%(notaddressed)
PO2	CO1,CO2,CO3, CO4,CO5	9	20	1	
PO3					
PO4	CO1,CO2,CO3, CO4,CO5	12	26.66	2	
PO5	CO2,CO3, CO4,CO5	12	26.66	2	
PO6	-	-	-	-	
PO7	-	-	-	-	

COs-POsmappingstrength(aspergiventable)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	1	-	2	-	-	-	-	-	-
CO2	2	1	-	2	2	-	-	-	-	-
CO3	2	1	-	2	2	-	-	-	-	-
CO4	2	1	-	2	2	-	-	-	-	-
CO5	2	1	-	2	2	-	-	-	-	-

3=stronglymapped2=moderatelymapped1=slightlymapped

Note: ThegapsinCOandPOmappingwillbeachievedbyoneormoreappropriateactivities from the following: i) Seminars ii) Tutorials iii) Guest Lectures iv) Assignments v) Quiz competitions vi) Industrial visit vii) Tech Fest viii) Mini project ix) Group discussions x) Virtual classes xi) Library visit for e-books

OBJECTIVES:

Uponcompletionofthecoursethestudentshallbeable to

1.0 To identify the chemical compoundsand solutionsby senses. Practicevolumetricmeasurements (using pipettes, measuring jars, volumetric flask, burettes) and gravimetric measurements (using different types of balances), making dilutions, etc.

2.0 Practicemakingstandardsolutionswithpreweighedsaltsandtomakesolutionsof desired dilutions using appropriate techniques.

3.0 Conduct titrationsadopting standard proceduresand using Std. Na_2CO_3 solutionfor estimation of HCl.

4.0 Conduct titrations adopting standard procedures and using Std. HCl solution for estimation of NaOH.

5.0 Conducttitrationsadoptingstandardprocedurestodeterminetheacidityofgivensamplesofwater (One ground water and one surface / tap water, and rain water if available).

6.0 Conduct titrations adopting standard procedures to determine the alkalinity of given samples ofwater (One ground water and one surface / tap water).

7.0 Conduct titrations adopting standard procedures and using Std.$KMnO_4$ solution for estimation of Mohr'sSalt.

8.0 Conduct titrations adopting standard procedures and using Std.$K_2Cr_2O_7$ solution for estimation of Ferrous ion.

9.0 Conduct titrationsadoptingstandardprocedurestodeterminethetotalhardnessof givensamples of water (One ground water and one surface / tap water) using Std. EDTA solution.

10. Conducttitrationsadoptingstandardprocedurestodeterminethechlorides presentinthegiven samples of water (One ground water and one surface / tap water) using Std. $AgNO_3$solution.

11. Conduct the test using titrimetric / electrometric method to determine. Dissolved Oxygen (D.O) in the given water samples (One sample from closed container and one from open container / tap water) by Std. Hypo solution.

12. Conduct thetest ongivensamplesof water/solutions(likesoftdrinks, sewage, etc.)todetermine their pH using standard pH meter.

13. Conductthetestongivensamplesofwater/ solutions.
    a) todetermineconductivity.
    b) toadjusttheionicstrengthof thesampletothedesiredvalue.

14. Conductthe testongivensamplesofsolutions(colouredandnon-coloured)todeterminetheir turbidity in NTU.

15. Determinethetotalsolidspresentingivensamplesofwater (Onegroundwaterandone surface / tap water).

CompetenciesandKeycompetenciestobeachievedbythestudent

NameoftheExperiment (No of Periods)	**Competencies**	**Keycompetencies**
Recognition of chemical substancesandsolutions. Familiarization of methods for Volumetric analysis. (03)	-	--
PreparationofStd.Na_2CO_3solution and making solutions of different dilutions. (03)	▪ Weighingthesalttotheaccuracy of .01 mg. ▪ Measuring the water with volumetricflask,measuringjar, volumetric pipette and graduated pipette. ▪ Makingappropriatedilutions.	▪ Weighingthesalttothe accuracy of 0.01 mg. ▪ Measuring the water with volumetricflask,measuring jar, volumetric pipette and graduated pipette. ▪ Makingappropriate dilutions.
EstimationofHCl solution usingStd.Na_2CO_3solution. (03)	▪ Cleaningtheglasswareand rinsing with appropriate solutions. ▪ Makingstandardsolutions. ▪ Measuring accurately the standardsolutionsandtitrants. ▪ Fillingtheburettewithtitrant. ▪ Fixingtheburettetothestand. ▪ EffectivelyControllingtheflowof the titrant. ▪ Identifyingtheendpoint. ▪ Makingaccurateobservations. ▪ Calculatingtheresults.	▪ Makingstandardsolutions. ▪ Measuringaccuratelythe standard solutions and titrants. ▪ EffectivelyControllingthe flow of the titrant. ▪ Identifyingtheendpoint. ▪ Makingaccurate observations.
EstimationofNaOHusing Std.HClsolution.(03)		
Determinationofacidityof watersample.(03)		
Determinationofalkalinity ofwatersample.(03)		
EstimationofMohr'sSalt usingStd.$KMnO_4$solution. (03)		
EstimationofFerrousion byusing Std.$K_2Cr_2O_7$solution(03)		
Determinationoftotal hardnessofwaterusing Std.EDTAsolution.(03)		
EstimationofChlorides presentinwatersample usingStd.$AgNO_3$solution (03)		
EstimationofDissolved Oxygen(D.O)inwater sample(By titration method)(03)		
DeterminationofpHusing pH meter.(03)	▪ Familiarizewithinstrument. ▪ Chooseappropriate'Mode'/	▪ Prepare standard solutions / buffers, etc.

Determination of conductivity of water and adjustingionicstrengthto required level. (03)	'Unit'. ▪ Prepare standard solutions / buffers, etc. ▪ Standardize the instrument with appropriate standard solutions. ▪ Plotthestandardcurve. ▪ Make measurements accurately. ▪ FollowSafetyprecautions.	▪ Standardize the instrument with appropriate standard solutions. ▪ Plotthestandardcurve. ▪ Make measurements accurately.
Determinationofturbidity of water.(03)		
Estimationoftotalsolids presentinwatersample. (03)	▪ Measuring the accurate volume and weight of sample. ▪ Filtering and air drying without losing any filtrate. ▪ Accuratelyweighingthe filter paper, crucible and filtrate.	▪ Measuring the accurate volume and weight of sample. ▪ Filtering and air drying without losing any filtrate. ▪ Accurately weighing the filter paper, crucible and

SCHEMEOFVALUATION

A) WritingChemicals,apparatus,principleandprocedure. 5M

B) Demonstratedcompetencies. 20M
Makingstandardsolutions.
Measuringaccuratelythestandardsolutionsandtitrants. Effectively controlling the flow of the titrant.
Identifying the end point.
Makingaccurateobservations.

C) Viva-voce. 5M

Total **30M**

COMPUTERFUNDAMENTALSLABORATORY

Course code	CourseTitle	No. of Periods/Weeks	TotalNo.of periods	Marksfor FA	Marksfor SA
EE-111	COMPUTER FUNDAMENTALS LABORATORY	3	90	40	60

Timeschedule:

S.No.	Chapter/UnitTitle	No.ofsessions each of 3 periods duration	No. of Periods	CO's Mapped
1.	ComputerhardwareBasics	2	6	CO1
2.	WindowsOperatingSystem	2	6	CO1
3.	MSWord	8	24	CO2
4.	MSExcel	7	21	CO3
5.	MSPowerPoint	5	15	CO4
6	AdobePhotoshop	6	18	CO5
Totalperiods		**30**	**90**	

COURSE OBJECTIVES	i) ToknowHardwareBasics ii) Tofamiliarizeoperatingsystems iii) To use MS Office effectively to enable to students use these skills in futurecourses iv) TouseAdobePhotoshopinimageediting.

	Attheendofthecoursestudentswillbeableto		
COURSE OUTCOMES	CO1	CM-111.1	Identifyhardwareandsoftwarecomponents
	CO2	CM-111.2	Preparedocumentswithgivenspecificationsusingword processingsoftware
	CO3	CM-111.3	UseSpreadsheetsoftwaretomakecalculationandto drawvariousgraphs/ charts.
	CO4	CM-111.4	Use Power point software to develop effective presentationforagiventhemeortopic.
	CO5	CM-111.5	EditdigitalorscannedimagesusingPhotoshop

LEARNINGOUTCOMES:

I. ComputerHardwareBasics

1. a)ToFamiliarizewithComputersystemandhardwareconnections
   b) ToStartandShutdownComputercorrectly
   c) Tochecckthesoftwaredetailsofthecomputer
2. Tocheckthehardwarepresentinyourcomputer

II. Windows'soperatingsystem

3. ToExploreWindowsDesktop
4. WorkingwithFilesandFolders
5. WindowsAccessories:Calculator–Notepad–WordPad–MSPaint

III. PracticewithMS-WORD

6. TofamiliarizewithRibbonlayoutofMSWord
   Home–Insert-Pagelayout–References–Review-View.
7. TopracticeWordProcessingBasics
8. TopracticeFormattingtechniques
9. Toinsertatableofrequirednumberofrowsandcolumns
10. ToinsertObjects,ClipartandHyperlinks
11. TouseMailMergefeatureofMS Word
12. TouseEquationsandsymbolsfeatures

IV. PracticewithMS-EXCEL

13. TofamiliarizewithMS-EXCELlayout
14. Toaccessandenterdatainthecells
15. Toeditaspreadsheet-Copy,Cut,Paste,andselectingCells
16. TousebuiltinfunctionsandFormattingData
17. TocreateExcelFunctions,FillingCells
18. Toenter aFormulaforautomaticcalculations
19. Tosortandfilterdataintable.
20. TopresentdatausingExcelGraphsand Charts.
21. Todeveloplabreportsofrespectivediscipline.
22. ToformataWorksheetinExcel,PageSetupandPrint

V. PracticewithMS-POWERPOINT

23. TofamiliarizewithRibbonlayoutfeaturesofPowerPoint2007.
24. TocreateasimplePowerPointPresentation
25. Toset upaMasterSlideinPowerPoint
26. ToinsertTextand Objects
27. ToinsertaFlowCharts
28. ToinsertaTable
29. ToinsertaCharts/Graphs
30. Toinsertvideoand audio

31. TopracticeAnimatingtextandobjects
32. ToReview presentation

VI. Practicewith AdobePhotoshop

33. Tofamiliarizewithstandardtoolbox
34. Toeditaphotograph.
35. ToinsertBordersaroundphotograph.
36. TochangeBackgroundofaPhotograph.
37. TochangecolorsofPhotograph.
38. Topreparea coverpagefor thebookinyour subjectarea.
39. Toadjustthebrightnessandcontrastofthepicturesothatitgivesanelegantlook.
40. Totypeawordandapplytheshadowembosseffects.

KEYCOMPETENCIES:

Expt No	Nameof Experiment	Competencies	Keycompetencies
1 (a).	To familiarize with Computersystemand hardwareconnections	a. Identify the parts of a Computersystem:i).CPUii). MotherBoardiii)Monitoriv) CD/DVD Drive v) Power Switch vi) Start Button vii) ResetButton b. Identifyandconnectvarious peripherals c. Identify and connect the cablesusedwithcomputer system d. IdentifyvariousportsonCPU and connect Keyboard & Mouse	Connect cables to externalhardwareand operate the computer
1 (b).	ToStartandShutdown Computer correctly	a. Loginusingthe password b. Startandshutdownthe computer c. UseMouseandKeyBoard	a. Loginandlogoutas per the standard procedure b. Operatemouse &KeyBoard
1 (c).	To Explore Windows Desktop	a. FamiliarizewithStartMenu, Taskbar,Iconsand Shortcuts b. Accessapplicationprograms using Start menu, Task manager c. UseHelpsupport	a. Access application programsusingStart menu b. UsetaskbarandTask manager

2.	To check the software detailsofthecomputer	a. FindthedetailsofOperating System being used b. FindthedetailsofService Packinstalled	Access the properties of computerandfind thedetails
3.	Tocheckthehardware present in your computer	a. FindtheCPUnameand clock speed b. FindthedetailsofRAMand Hard disk present c. AccessDevicemanagerusing Control Panel and check the status of devices like mouse and key board d. Use My Computer to check thedetailsofHarddrivesand partitions e. Usethe Taskbar	a. Access device managerandfind the details b. Type /Navigate the correct path and Selecticonrelatedto the details required
4.	WorkingwithFilesand Folders	a. Create folders and organizing files in different folders b. Use copy / paste move commandstoorganizefiles and folders	a. Create files and folders Rename, arrangeandsearch for the required folder/file
	WorkingwithFilesand Folders Continued....	c. Arrangeicons–namewise, size, type, Modified d. Searchafileorfolderand find its path e. Create shortcut to files and folders (in other folders) on Desktop f. Familiarizewiththeuseof My Documents g. Familiarizewiththeuseof RecycleBin	b.Restoredeletedfiles from Recycle bin
5.	TouseWindows Accessories: Calculator–Notepad– WordPad – MS Paint	a. Familiarizewiththeuseof Calculator b. AccessCalculatorusingRun command c. Create Text Files using Notepad and WordPad and observethedifferenceinfile size	a. Use windows accessories and select correct text editorbasedonthe situation. b. Use MS paint to create/Editpictures

		d.UseMSpaintandcreate .jpeg,.bmpfilesusingMS Paint	and save in the requiredformat.
6.	To familiarize with Ribbon layout of MS word.–Home–Insert-page layout-References-Review-View	a. Create/Openadocument b. UseSaveandSaveas features c. Work on two Word documentssimultaneously d. ChoosecorrectPapersize andPrintingoptions	a. CreateaDocument and name appropriately and save b. Setpapersizeand print options
7.	TopracticeWord ProcessingBasics	a. Typingtext b. Keyboardusage c. Usemouse(Leftclick/Right click / Scroll) d. UseKeyboardshortcuts e. UseFindandReplace featuresinMS-word f. UseUndoandRedoFeatures g. Usespellchecktocorrect Spellings and Grammar	a. Use key board and mousetoenter/edit text in the document. b. Use shortcuts c. Use spell check/ Grammar features forautocorrections.
8.	TopracticeFormatting techniques	a. FormattingText b. FormattingParagraphs c. SettingTabs d. FormattingPages e. TheStylesofWord f. Insertbulletsandnumbers g. ThemesandTemplates h. Insertpagenumbers,header and footer	a. Format Text and paragraphsanduse various text styles. b. Use bullets and numberstocreate lists c. Use Templates /Themes d. Insertpage numbers date,headersand footers
9.	To insert a table of requirednumberof rows and columns	a. Edit the table by adding the fields – Deleting rows and columns –inserting sub table –marking borders. Merging andsplittingofcellsinaTable b. Changingthebackground colour of the table c. Usetabledesign tools d. Use auto fit – fixed row/ columnheight/length–Even distribution of rows / columns features e. ConvertTexttotableand	a. Insert table in the worddocumentand edit b. Usesortoptionfor arranging data.

		TabletoText f.UseSortfeatureofthe Table to arrange data in ascending/descendingorder	
10.	To Insert objects, clipartandHyperlinks	a. Createa2-pagedocument. &Insert hyperlinks and t Bookmarks. b. Createanorganizationchart c. Practice examples like preparing an Examination schedule notice with a hyperlinktoExamschedule table.	a. Inserthyperlinks &Bookmarks b. Createorganization charts/flow charts
11.	To Use Mail merge featureofMSWord	a. Use mail merge to prepare individuallyaddressedletters b. Usemailmergeto print envelopes.	UseMailmerge feature
12.	TouseEquationsand symbols features.	a. Explorevarioussymbols available in MS Word b. Insertasymbolinthetext c. Insert mathematical equationsinthedocument	Enter Mathematical symbolsandEquations in the word document
13.	ToPracticewithMS-EXCEL	a. Open /create an MS Excel spreadsheetandfamiliarize with MS Excel 2007 layout like MS office Button- b. UseQuickAccessToolbar-Title Bar- Ribbon-Worksheets-FormulaBar-StatusBar	a. Familiarize with excellayoutanduse b. Usevariousfeatures available in toolbar
14.	ToaccessandEnter data in the cells	a. MoveAroundaWorksheets-Quickaccess-SelectCells b. Enter Data-Edit a Cell-Wrap Text-DeleteaCellEntry-Save a File-Close Excel	a. Access and select therequiredcellsby various addressing methods b. Enterdataandedit
15.	To edit spread sheet Copy,Cut,Paste,and selecting cells	a. InsertandDeleteColumns andRows-CreateBorders-MergeandCenter b. Add Background Color-ChangetheFont,FontSize, and Font Color c. FormattextwithBold, Italicize,andUnderline-Work	Formattheexcelsheet

		withLongText-Changea Column'sWidth	
16.	Tousebuiltinfunctions and Formatting Data	a. Perform Mathematical Calculationsverify-AutoSum b. PerformAutomatic Calculations-AlignCellEntries	Usebuiltinfunctions in Excel
17.	ToenteraFormulafor automaticcalculations	a. Enterformula b. UseCellReferencesin Formulae c. Use Automatic updating functionofExcelFormulae d. UseMathematicalOperators in Formulae e. UseExcelErrorMessageand Help	Enter formula for automaticcalculations
18.	To Create Excel Functions,FillingCells	a. UseReference Operators b. Workwithsum,Sumif,Count and Count If Functions c. FillCellsAutomatically	a. CreateExcelsheets involving cross references and equations b. Usetheadvanced functions for conditional calculations
19.	Tosortandfilterdata in table	a. Sortdatainmultiplecolumns b. Sortdata inarow c. SortdatausingCustomorder d. Filterdatainworksheet	a. Refinethedataina worksheet and keep it organized b. Narrowaworksheet byselectingspecific choice
20.	To Practice Excel GraphsandCharts	a. ProduceanExcelPieChart b. Produce c. ExcelColumnChart	a. Use data inExcel sheet to Create technical charts and graphsProduceExcel Line Graph b. ProduceaPictograph in Excel
21.	Todeveloplabreports ofrespectivediscipline	CreateLabreportsusingMS Word and Excel	a. Insert Practical subject name in Headerandpage numbersinFooter
22.	To format a Worksheet inExcel,pagesetupand print	a. Shadealternaterowsofdata b. Addcurrencyandpercentage symbols	a. FormatExcelsheet b. Insertheaders& footersandprint

		c. Changeheightofarowand width of a column d. Changedataalignment e. InsertHeadersandFooters f. SetPrintOptionsandPrint	
23.	Tofamiliarizewith Ribbon layout &features of PowerPoint 2007.	Usevariousoptionsin PowerPoint a. Home b. Insert c. Design d. Animation e. Slideshow f. View g. Review	Access required optionsinthetoolbar
24.	Tocreateasimple PowerPoint Presentation	a. InsertaNewSlideinto PowerPoint b. ChangetheTitleofa PowerPoint Slide c. PowerPointBullets d. AddanImagetoa PowerPoint Slide e. AddaTextboxtoa PowerPointslide	a. Create simple PowerPoint presentation with photographs/ClipArt and text boxes b. Usebulletsoption
25.	To Set up a MasterSlideinPowerPoi ntand add notes	a. CreateaPowerPointDesign Template b. Modifythemes c. SwitchbetweenSlidemaster view and Normal view d. FormataDesignTemplate Master Slide e. AddaTitleSlidetoaDesign Template f. TheSlideShowFooterin PowerPoint f.AddNotestoaPowerPoint Presentation	a. SetupMasterslide and format b. Addnotes
26.	ToInsertTextand Objects	a. InsertTextandobjects b. SetIndentsandlinespacing c. Insertpictures/clipart d. Formatpictures e. Insertshapesandwordart f. Use3dfeatures g. Arrangeobjects	InsertTextandObjects Use 3d features

27.	ToinsertaFlowChart/ Organizational Charts	a. CreateaFlowChartin PowerPoint b. GroupandUngroupShapes c. Usesmartart	Create organizational chartsandflowcharts using smart art
28.	ToinsertaTable	a. PowerPointTables b. FormattheTableData c. ChangeTableBackground d. FormatSeriesLegend	Inserttablesand format
29.	To insert a Charts/Graphs	a. Create3DBarGraphsin PowerPoint b. WorkwiththePowerPoint Datasheet c. FormataPowerPointChart Axis d. FormattheBarsof a Chart e. CreatePowerPointPieCharts f. UsePieChartSegments g. Create2DBarChartsin PowerPoint h. Formatthe2DChart e.FormataChartBackground	Create charts and Bar graphs,PieChartsand format.
30.	ToInsert audio & video,Hyperlinksina slide Addnarrationtothe slide	a. Insertsoundsintheslideand hide the audio symbol b. Adjustthevolumeinthe settings c. Insertvideofile inthe format supportedbyPowerPointina slide d. Useautomaticandonclick options e. Addnarrationtothe slide f. InsertHyperlinks	a. InsertSoundsand Video in appropriate format. b. Addnarrationto the slide c. Use hyperlinks to switchtodifferent slides and files
31.	ToPracticeAnimation effects	a. Applytransitionstoslides b. To explore and practice specialanimationeffectslike *Entrance, Emphasis, Motion Paths&Exit*	Addanimationeffects
32.	Reviewingpresentation	a. Checkingspellingand grammar b. Previewingpresentation c. Setupslideshow d. Setupresolution	a. UseSpellcheck and Grammar feature b. Setupslideshow c. Addtimingtothe slides

		e. ExercisewithRehearse Timings feature in PowerPoint f. UsePowerPointPenTool during slide show g. Saving h. Printingpresentation (a) Slides (b) Hand-out	d. Setupautomatic slide show
33	To familiarize withstandardtoolbox	a. OpenAdobePhotoshop b. Usevarioustoolssuchas i. TheLayerTool ii. TheColor&SwatchesTool iii. CustomFonts&TheText Tool iv. BrushTool v. TheSelectTool vi. TheMoveTool vii. TheZoom Tool viii. TheEraser ix. TheCropTool x. TheFillTool	photographandsaveit in Photoshop
34	Toedita photograph	a. UsetheCroptool b. Trimedges c. Changetheshapeandsizeof a photo d. Remove the part of photographincludinggraphics andtext	toeditimagebyusing corresponding tools.
35	To insert Borders aroundphotograph	a. Startwithasinglebackground layer b. Bringthebackgroundforward c. Enlargethecanvas d. Createabordercolor e. Sendthebordercolortothe back f. Experimentwithdifferent colors	Abletocreateaborder or frame around an image to add visual interest to a photo
36	TochangeBackground of a Photograph	a. opentheforegroundand background image b. Usedifferentselectiontools to paint over the image c. Copybackgroundimageand pasteiton theforeground.	Able to swap backgroundelements using the Select and Masktool andlayers.

		d.Resizeand/ordragthe background image to reposition. e.IntheLayerspanel,dragthe backgroundlayerbelowthe foregroundimagelayer.	
37	Tochangecolorsof Photograph	a.Changecoloursusing: i) ColourReplacementtool ii) Hue/Saturationadjustment layer tool	Abletocontrolcolor saturation
38	To prepare a cover pageforthebookin subject area	a. open a file with height 500 andwidth400forthecover page. b. applytwodifferentcolourstо work area by dividing it into two parts using Rectangle tool. c. Copy any picture and place it onworkarea→resizeitusing free transform tool. d. Typetextandapplycolorand style e. Applyeffectsusing blended options	Abletopreparecover page for the book
39	To adjust the brightnessandcontrast of picture to give an elegant look	a. opena file b. Gotoimage→adjustments→ Brightness/Contrast. f.adjustthebrightnessand contrast g.savethe image	Able to control brightness/contrast.
40	Totypeawordand apply the shadow emboss effects	a. opena file b. Selectthetexttoolandtype text. c. Selectthe typedtextgoto layer→ layer style→ blended option→dropshadow,inner shadow,bevelandemboss→ contour→ satin→ gradient overlay d. Savetheimage.	Abletoapplyshadow emboss effects

Tablespecifyingthescopeofsyllabustobecoveredforunittests

UnitTest	Learningoutcomestobecovered
Unittest-1	From1to 8
Unittest-2	From9to 22
Unittest-3	From23to40