CURRICULUM - 2023

C -23

DIPLOMA IN CLOUD COMPUTING AND BIG DATA ENGINEERING

STATE BOARD OF TECHNICAL EDUCATION & TRAINING

ANDHRA PRADESH

DIPLOMA IN CLOUD COMPUTING AND BIG DATA ENGINEERING CURRICULUM- 2023 (C-23)

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PREAMBLE

Technical Education is a key driver of economic development and plays a crucial role in providing individuals with the skills and knowledge necessary to thrive in the workplace. As technological advancements continue to reshape industries and create new opportunities, 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, critical thinking, and problem-solving. We believe that these skills are essential for success in both academic and professional spheres. The revamping of the technical education curriculum is made with collaborative effort from educators, industry experts, policymakers, and students.

At the heart of the curriculum, is the belief that the technical education should be **student-centered**, empowering learners to take ownership of their learning and pursue their passions. We aim to create a learning environment that is safe, supportive, and nurturing, where every student has the opportunity to reach their fullest potential. We acknowledge that learning is a lifelong journey, and our curriculum is designed to provide a solid foundation for continued 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, and responsive to the changing needs of the industry and society.** As such, it has been the practice of SBTET, A.P., to keep the curriculum abreast with the advances in technology through systematic and scientific analysis of current curriculum and bring out an updated revised version at regular intervals.

The design of Curriculum C-23 was started in the month of January - 2023. Feedback was collected from all stake holders: Students, Lecturers, Senior Lecturers, Head of Sections and Principals for all programmes for this purpose. Accordingly, a workshop was convened on 15th February 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 the workshop, emphasized the necessity of industrial training and on-hand experience, that the students need to undergo to support the industries and the Gaps in the Curriculum need 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 Institutions and Faculty of Polytechnics are informed to study the possibility of incorporating the following aspects while preparation of the curriculum so as to improve employability.

- **To bring out industry oriented Diploma Engineers.**
- **Internet of Things (IoT) for all branches**
- **Theoretical & Practical subjects 50: 50 Ratio**
- **Industry 4.0 concepts.**
- **5G Technology.**
- **Critical Thinking (Quantitative Aptitude, Data Interpretation, Quantitative reasoning etc) to face the written tests conducted by the industries during placements. Dynamic, Student centric to suit the needs of the industry.**
- **Dynamic, Student centric to suit the needs of the industry.**

In continuation, series of workshops with subject experts followed in the subsequent 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 with the active participation of the members of the faculty teaching in the Polytechnics of Andhra Pradesh, and duly reviewed by Expert Committee constituted of academicians and representatives from industries. Thus, the primary objective of the curriculum change is to produce employable diploma holders in the country by correlating the growing needs of the industries with relevant academic input.

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.

The Revised Curriculum i.e., Curriculum–2023 (C-23) is approved by 45th Academic Committee of SBTET, A.P for its implementation with effect from Academic Year 2023-24. Also, the SBTET, A.P under the aegis of the Department of Technical Education, Andhra Pradesh in it's 62nd Board Meeting held on 13-07-2023 (vide item no: 17) Approved to update the Polytechnic Curriculum C-23 with effect from the academic year 2023-2024 onwards after revamping the present C-20 curriculum, to meet the latest industrial technological developments including Industry 4.0 concepts.

2. HIGHLIGHTS OF CURRICULUM C-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) The Weightage of Theory & Practical in 50:50.
2) A new subject Big Data & Cloud Computing incorporated to meet the requirements of Industry.
3) Industrial Training (CISCO) is replaced with training in Industry or two online certificate courses.

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.

We are grateful to Sri. S. Suresh Kumar, I.A.S, Principal Secretary, Skills Development & 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 15th February, 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, Guntur involving faculty from Polytechnics, Premier Engineering Colleges & 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. V. Padma Rao, Joint Director of Technical Education, Sri K.V. Ramana Babu, Secretary, SBTE&T, Andhra Pradesh, Sri K. Vijaya Bhaskar, Deputy Director (Academic) , Andhra Pradesh, officials of Directorate of Technical Education and the State Board of Technical Education, Andhra Pradesh and all teaching fraternity from the Polytechnics who are directly or indirectly involved in preparation of the curricula.

4. RULES AND REGULATIONS OF C-23 CURRICULUM

4.1 Duration and pattern of the courses

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 year wise pattern in the first year, and the remaining two or two & half years are run in the semester pattern. In respect of few courses like Diploma in Bio-Medical course, the training will be in the seventh semester. **Run-through system is adopted for all the Diploma Courses, subject to eligibility conditions.**

4.2 Procedure for Admission into the Diploma Courses:

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

a) Candidates who wish to seek admission in any of the Diploma courses will have to appear 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 production of proof of their passing the qualifying examination in one attempt or compartmentally at the time of admission.
    b. Admissions are made based 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. For admission into the following Diploma Courses for which entry qualification is 10+2, candidates need not appear for POLYCET. A separate notification will be issued for admission into these courses.
        i). D.HMCT ii).D. Pharmacy

4.3 Medium of Instruction

The medium of instruction and examination shall be English.

4.4 Permanent Identification Number (PIN)

A cumulative / academic record is to be maintained of the Marks secured in sessional work and end examination of each year for determining the eligibility for promotion etc., A Permanent Identification Number (PIN) will be allotted to each admitted candidate to maintain academic records.

4.5 Number of Working Days Per Semester / Year:

a) The Academic year for all the Courses shall be in accordance with the Academic Calendar.
b) The Working days in a week shall be from Monday to Saturday
c) There shall be 7 periods of 50 minutes duration each on all working days.
d) The minimum number of working days for each semester / year shall be 90 / 180 days excluding examination days. If this prescribed minimum is not achieved due to any reason, special arrangements shall be made to conduct classes to complete the syllabus.

4.6 Eligibility (Attendance to Appear for the End Examination)

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 and below 75%) in each semester or 1st year may be granted on medical grounds.
c) A stipulated fee shall be payable towards condonation for shortage of attendance.
d) Candidates having less than 65% attendance shall be detained.
e) Students whose shortage of attendance is not condoned in any semester / 1st year 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 / 1st year when offered in the next subsequent academic semester/year.

For INDUSTRIAL TRAINING:
i) During Industrial Training the candidate shall put in a minimum of 90% attendance.
ii) If the student fails to secure 90% attendance during industrial training, the student shall reappear for 6 months industrial training at his own expenses.

4.7 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) For Industrial Training: before commencement of the Industrial training.
b) Within 30 days after commencement of class work in any year (including D. Pharmacy course or first year course in Engineering and Non-Engineering Diploma streams). Otherwise, such cases shall not be considered for readmission for that semester / year and are advised to seek readmission in the next subsequent 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.

4.8 Scheme of Evaluation

a) First Year

Theory Courses: Each Course carries Maximum marks of 80 with an end examination of 3 hours duration, along with internal assessment for Maximum of 20 marks. (Sessional marks). However, there are no minimum marks 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, VI and VII Semesters:

Theory Courses: End semester evaluation shall be of 3 hours duration and for a maximum of 80 marks.

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

4.9 Internal Assessment Scheme

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.	Type of Assessment	Weightage Assigned
(i)	Testing of knowledge through mid-examination for year/sem as (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 & Greening of Campus etc.*	*5*
	T O T A L	50

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

At least one assignment should be completed for each unit which carries 10 marks. The total assignment marks should be reduced to 5.

The dynamic learning activity is to be conducted which carries 10 marks. The total marks should be reduced to 5.

The total 50 marks assigned to internal assignment is to be scaled down to 20 marks.

b) Practical Courses:

(i) **Drawing Courses:**

The award of Sessional marks for internal Assessment shall be as given in the following table:

Distribution of Marks for the Internal Assessment Marks			
First Year (Total:40 Marks)		**Semesters (Total:40 Marks)**	
Max:20 Marks	Max:20 Marks	Max:20 Marks	Max:20 Marks
From the Average of THREE Unit Tests.	From the Average of Assessment of Regular Class work Exercises.	From the Average of TWO Unit Tests.	From the Average of Assessment of Regular Class work Exercises.

- For first year engineering drawing each unit test will be conducted for a duration of 2 hours with maximum marks of 40.
- (Part - A: 4 questions x 5 marks = 20 Marks; Part –B: 2 questions x 10 marks = 20 marks).
- For the semester drawing examinations, Two Unit tests shall be conducted as per 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) Laboratory Courses:

(a) Student's performance in Laboratories / Workshop shall be assessed during the year/ semester of study for 40 marks in each practical Course.

(b) Evaluation for Laboratory Courses, other than Drawing courses:

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, prepared by SBTET, AP & NITTTR- ECV and posted in SBTET website.

ii. Internal assessment for Laboratory shall be done on the basis of task/s performed by the student as delineated in the laboratory sheets, prepared by 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 be prepared and distributed by SBTET as done in case of theory courses 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) Nearby Industry

ii) Govt / Semi Govt organization like R & B, PWD, PR, Railways, BSNL, APSRTC, APSEB etc.

iii) Govt / University Engg College.

iv) HoD/Senior Lecture (Selection Grade-II) from the Govt. Polytechnic

Internal examiner shall be the person concerned with internal assessment as in (c) above. The end examination shall be held along with all theory papers in respect 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	Based on	Max Marks
1	12 weeks	1.The faculty concerned (Guide) and 2. Training in charge (Mentor) of the industry	Learning outcomes as given in the scheme of assessment ,for Industrial Training	120
2	22 weeks			120
3. Final summative Evaluation	24 week	1.The faculty member concerned, 2.HoD concerned and 3.An external examiner	1.Demonstration of any one of the skills listed in learning outcomes	30
			2.Training Report	20
			3.Viva Voce	10
			TOTAL	**300**

h) Each staff member including Head of Section shall be assigned a batch of students 10 to 15 for making assessment during industrial training.

4.10 Minimum Pass Marks

a) Theory Examination:

For passing a theory Course, a candidate has to secure a minimum of 35% in end examination and a combined minimum of 35% of both Sessional and end examination marks put together.

b) Practical Examination:

For passing a practical Course, a candidate has to secure a minimum of 50% in end examination and a combined minimum of 50% of both sessional and practical end 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) Industrial Training:

I. Monitoring: Similar to project work each teacher may be assigned a batch of 10-15 students irrespective of the placement of the students to facilitate effective monitoring of students learning during industrial training.

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 summative assessment at institution level.

III. In-Plant Industrial Training for 3-Year Diploma (C-23) Courses is scheduled as per the Academic Calendar of the SBTET every year.

4.11. Provision for Improvement

Improvement is allowed only after he / she has completed all the Courses from First Year to Final semester of the Diploma.

a) Improvement is allowed in any 4 (Four) Courses of the Diploma.
b) The student can avail of this improvement chance **ONLY ONCE**, that too within the succeeding two examinations after the completion of Diploma. However, the duration 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) Improvement is not allowed in respect of the candidates who are punished under Mal-practice in any Examination.
f) Examination fee for improvement shall be paid as per the notification issued by State Board of Technical Education and Training from time to time.
g) All the candidates who wish to appear for improvement of performance shall deposit 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.

4.12. Rules of Promotion From 1ST YEAR TO 3rd, 4th, 5th, 6th and 7th Semesters:

A) For Diploma Courses of 3 Years duration

i). A candidate shall be permitted to appear for first year examination provided he / she puts 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 candidate who could not pay the first year examination fee has to pay the promotion fee as prescribed by State Board of Technical Education and Training, AP from time to time before commencement of 3rd semester.

A candidate is eligible to appear for the 3rd semester examination if he/she puts the required percentage of attendance in the 3rd semester and pays the examination fee.

iii) 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 fee as prescribed by State Board of Technical Education and Training AP from 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.

iv) A candidate shall be promoted to 5th semester provided he / 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.

A candidate is eligible to appear for the 5th semester examination if he/she puts the required percentage of attendance in the 5th semester 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 5th semester and pay the examination fee/ promotion fee as prescribed by SBTET.
A candidate is eligible to appear for Industrial Training assessment (Seminar/Viva-voce) puts the required percentage of attendance, i.e., 90% in 6th semester Industrial Training.

For IVC & ITI Lateral Entry 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 fee as prescribed by State Board of Technical Education and Training AP from 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) A candidate shall be promoted to 5th semester provided he / 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.

A candidate is eligible to appear for the 5th semester examination if he/she puts the required percentage of attendance in the 5th semester 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 5th semester and pay the examination fee/ promotion fee as prescribed by SBTET.
A candidate is eligible to appear for Industrial Training assessment (Seminar/Viva-voce) puts the required percentage of attendance, i.e., 90% in 6th semester Industrial Training and pays the examination fee.

B) For Diploma Courses of 3 ½ Years duration (MET/ CH/ CHPP/ CHPC/ CHOT/ TT):

i. A candidate shall be permitted to appear for 1st year examination provided he / she puts in 75% attendance (which can be condoned on Medical grounds upto 10%) i.e. attendance after condonation on Medical grounds should not be less than 65% 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 1st year and pays the examination fee. A candidate who could not pay the 1st year 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 3rd semester.
iii. 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 fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 4th semester.
A candidate is eligible to appear for the 4th semester exam if he/she puts the required percentage of attendance in the 4th semester

<u>For IVC & ITI Lateral Entry students</u>:

a) Puts the required percentage of attendance in the 4th semester

iv. A candidate shall be promoted to 5th semester industrial training provided he / 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. Promotion from 5th to 6th semester is automatic (i.e., from 1st spell of Industrial 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. A candidate shall be promoted to 7th semester of the course provided he/she has successfully completed both the spells of Industrial Training.
A candidate is eligible to appear for 7th semester examination if he/she
a) Puts in the required percentage of attendance in the 7th semester

For IVC & ITI Lateral Entry students:

a) Puts in the required percentage of attendance in the 7 th semester .

C) For Diploma Courses of 3 ½ Years duration (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) after the 6th semester (3 years) of the course.

i. A candidate shall be permitted to appear for first year examination provided he / she puts in 75% attendance (which can be condoned on Medical grounds upto 10%) i.e. attendance after condonation on Medical grounds should not be less than 65% 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 candidate who could not pay the first year 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 3rd semester.

iii. 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 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 4th semester.

A candidate is eligible to appear for the 4th semester examination if he/she

a) Puts in the required percentage of attendance in the 4th semester

For IVC & ITI Lateral Entry Students:

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

iv. A candidate shall be promoted to 5th semester provided he / 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.

A candidate is eligible to appear for the 5th semester exam if he/she

a) Puts in the required percentage of attendance in the 5th semester.

For IVC & ITI Lateral Entry students:

a) Puts in the required percentage of attendance in the 5th semester.

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

A candidate who could not pay the 5th 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 6th semester.

A candidate is eligible to appear for 6th semester examination

a) Puts in the required percentage of attendance in 6th semester

IVC & ITI Lateral Entry students:

a) Puts in the required percentage of attendance in 6th semester.

vi. A candidate shall be promoted to 7th semester provided he/she puts in the required percentage of attendance in 6th semester and pay the examination fee. A candidate, who could not pay the 6th semester examination fee, has to pay the promotion fee prescribed by SBTET from time to time before commencement of the 7th semester (Industrial Training).

A candidate is eligible to appear for 7th semester Industrial Training assessment (Seminar/Viva-voce) if he/she

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

For IVC & ITI Lateral Entry students:

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

4.13. Students Performance Evaluation

Successful candidates shall be awarded the Diploma under the following divisions of pass.

a) First Class with Distinction shall be awarded to the candidates who secure an overall aggregate of 75% marks and above.
b) First Class shall be awarded to candidates who secure overall aggregate of 60% marks and above and below 75% marks.
c) Second Class shall be awarded to candidates who secure a pass with an overall 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 3rd and subsequent Semesters.
    ii. In respect IVC & ITI Lateral Entry candidates who are admitted directly into diploma course at the 3rd semester (i.e., second year) level the aggregate of (100%) marks secured at the 3rd and 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) Second Class shall be awarded to all students, who fail to complete the Diploma in the regular 3 years/ 3 ½ years and four subsequent examinations from the year of first admission.

4.14. EXAMINATION FEE SCHEDULE:

The examination fee should be as per the notification issued by State Board of Technical Education and Training, AP from time to time.

4.15. Structure of Examination Question Paper:

I. Formative assessment (Internal examination)

a) For theory Courses:

Three-unit tests for first year and two-unit tests for semesters shall be conducted with a duration of 90 minutes for each test for maximum marks of 40. It consists of part A and Part B.

Part A contains five questions and carries 16 marks. Among these five questions first question consists of four objective items like one word or phrase 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 each question carries 8 marks.

The sum of marks of 3 tests for I year and 2 tests for semesters including assignments and Dynamic learning activities (50 marks) shall be reduced to 20 marks in each Course for arriving at final sessional marks.

b) For drawing Courses:

For I year:

Three-unit tests with duration of 90 minutes and for maximum marks of 40 marks 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 based on the student's performance during regular class exercise.

For semester: Two-unit tests with duration of 90 minutes and for maximum marks of 40 marks shall be conducted. The sum of marks obtained in 2-unit test marks shall 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 performance during 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 the remaining 50% shall be based on the sum of the marks obtained by the students in two tests.

II. Summative assessment (End examination)

The question paper for theory examination is patterned in such a manner that the Weightage of periods/marks allotted for each of the topics for a particular Course be considered. End Examination paper is of 3 hours duration.

a) **Each theory paper consists of Section 'A' and 'B'**
Section 'A' with Max marks of 30, contains 10 short answer questions. All questions are to be answered and each carry 3 marks, i.e., 10 x 3 = 30.

Section 'B' with Max marks of 50 contains 8 essay type questions. Only 5 questions are to be answered and each carry 10 marks, i.e., Max. Marks: 5 x 10 = 50.

Thus, the total marks for theory examination shall be: 80.

b) **For Engineering Drawing Course (107) consist of section 'A' and section 'B'**.

Section 'A' with max marks of 20, contains four (4) questions. All questions in section 'A' are to be answered to the scale and each carries 5 marks, ie. 4 x 5=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) **Practical Examinations**
For Workshop practice and Laboratory Examinations, Each student has to pick up a question paper distributed by Lottery System.

Max. Marks for an experiment / exercise	:	50
Max. Marks for VIVA-VOCE	:	10
Total Max. Marks	:	60

In case of practical examinations with 50 marks, the marks shall be distributed as

Max. Marks for an experiment / exercise	:	25
Max. Marks for VIVA-VOCE	:	05
Total Max. Marks	:	30

In case of any change in the pattern of question paper, the same shall be informed sufficiently in advance to the candidates.

d) **Note: Evaluation for Laboratory Courses, other than Drawing courses**:

I. Instruction (teaching) in laboratory courses (except for the course on Drawing) hereafter shall be task/competency based as delineated in the 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.

4.16. ISSUE OF MEMORONDUM OF MARKS

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 memorandum of marks have to pay the prescribed fee to the Secretary, State Board of Technical Education and Training, A.P. for each duplicate memo from time to time.

4.17. MAXIMUM PERIOD FOR COMPLETION OF DIPLOMA PROGRAMMES:

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 after that date). This rule applies for all Diploma courses of 3 years and 3 ½ years of engineering and non-engineering courses.

4.18. ELIGIBILITY FOR AWARD OF DIPLOMA

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

i. He / She pursued a course of study for not less than 3 / 3 ½ academic years & not more than 6 / 7 academic years.
ii. He / she have completed all the Courses.
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.

For IVC & ITI Lateral Entry students:

i. He / She pursued a course of study for not less than 2 / 2 ½ academic years & not more than 4 / 5 academic years.
ii. He / she has completed all the Courses.
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.

4.19. ISSUE OF PHOTO COPY OF VALUED ANSWER SCRIPT, RECOUNTING& REVERIFICATION:

A) FOR ISSUE OF PHOTO COPIES OF VALUED ANSWER SCRIPTS

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. Photo copies of valued answer scripts will be issued to all theory Courses and 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. No application can be entertained from third parties.

B) FOR RE-COUNTING (RC) and RE-VERIFICATION(RV) OF THE VALUED ANSWER SCRIPT

i. A candidate desirous of applying for Re-verification of valued answer script should apply within prescribed date from the date of the declaration of the result.

ii. Re-verification of valued answer script shall be done for all theory Courses' and Drawing Course(s).

iii. The Re-verification committee constituted by the Secretary, SBTETAP with Course experts shall re-verify the answer scripts.

I. **RE-COUNTING**

The Officer of SBTET will verify the marks posted and recount them in the already valued answer script. The variations if any will be recorded separately, without making any changes on the already valued answer script. 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) Initially single member shall carry out the re-verification.

(iii) On re-verification by single member, if the variation is less than 12% of maximum marks, and if there is no change in the STATUS in the result of the candidate, such cases will not be referred to the next level ie., 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) If the 2-Tier evaluation confirms variation in marks as more than 12% of maximum marks, the variation is considered as follows:

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) If the candidate is failed and obtains more than 12% of the maximum marks on Re-verification and secured pass marks on re-verification, then the status of the candidate changes to PASS.

c) If a candidate is failed and obtains more 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) After Re-verification of valued answer script the same or change if any therein on Re-verification, will be communicated to the candidate.

(viii) On Re-verification of Valued Answer Script if the candidate's marks are revised, the fee paid by the candidate will be refunded or else the candidate has to forfeit the fee amount.

Note: No request for Photo copies/ Recounting /Re-verification of valued answer script would be entertained from a candidate who is reported to have resorted to Malpractice in that examination.

4.20. Mal Practice Cases:

If any candidate resorts to Mal Practice during examinations, he / she shall be booked and the Punishment shall be awarded as per SBTETAP rules and regulations in vogue.

4.21. Discrepancies/ Pleas:

Any Discrepancy /Pleas regarding results etc., shall be represented to the SBTETAP within one month from the date of issue of results. Thereafter, no such cases shall be entertained in any manner.

4.22. Issue of Duplicate Diploma

If a candidate loses his/her original Diploma Certificate and desires a duplicate to be issued he/she should produce written evidence to this effect. He / she may obtain a duplicate from the Secretary, State Board of Technical Education and Training, A.P., on payment of prescribed fee and on production of an affidavit signed before a First Class Magistrate (Judicial) and non-traceable certificate from the Department of Police. In case of damage of original Diploma Certificate, he / she may obtain a duplicate certificate by surrendering the original damaged certificate on payment of prescribed fee to the State Board of Technical Education and Training, A.P.

In case the candidate cannot collect the original Diploma within 1 year from the date of issue of the certificate, the candidate has to pay the penalty prescribed by the SBTET AP from time to time.

4.23. Issue of Migration Certificate and Transcripts:

The Board on payment of prescribed fee will issue these certificates for the candidates who intend to prosecute Higher Studies in India or Abroad.

4.24. 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. All legal matters pertaining to the State Board of Technical Education and Training, 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.

DIPLOMA IN CLOUD COMPUTING & BIG DATA ENGINEERING
SCHEME OF INSTRUCTIONS AND EXAMINATION
CURRICULUM-2023

(FIRST YEAR)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Year	Scheme Of Examinations			
		Theory	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
CBD-101	English-I	3	-	90	3	20	80	100
CBD-102	Engineering Mathematics - I	5	-	150	3	20	80	100
CBD-103	Engineering Physics	3	-	90	3	20	80	100
CBD-104	Engineering Chemistry and Environmental studies	3	-	90	3	20	80	100
CBD-105	Basics of computers, Cloud computing & Big data Engineering	4	-	120	4	20	80	100
CBD-106	Programming in C	5	-	150	3	20	80	100
PRACTICAL SUBJECTS								
CBD-107	Engineering Drawing		3	90	3	40	60	100
CBD-108	Programming in C		6	180	3	40	60	100
CBD-109	Physics Lab		3	90	1.5	20	30	50
	Chemistry Lab				1.5	20	30	50
CBD-110	Computer Fundamentals Lab		4	120	4	40	60	100
	Activities		**3**	**90**	**3**			
	Total	**23**	**19**	**1260**	**-**			**1000**

- **CBD-101,102,103,104,109,110 common with all branches**
- **CBD-106,107 is common with CME branch**

DIPLOMA IN CLOUD COMPUTING & BIG DATA ENGINEERING
SCHEME OF INSTRUCTIONS AND EXAMINATION

CURRICULUM-2023 (III Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods P	Scheme Of Examinations			
		Theory	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
CBD-301	Mathematics –II	4		60	3	20	80	100
CBD-302	OOP through JAVA	5	-	75	3	20	80	100
CBD-303	Computer Networks	4	-	60	3	20	80	100
CBD-304	Data Structures through C	5	-	75	3	20	80	100
CBD-305	Cloud Computing Architecture & Design	4	-	60	3	20	80	100
PRACTICAL SUBJECTS								
CBD-306	Java Programming Lab	-	4	60	3	40	60	100
CBD-307	Computer Hardware & Networking Lab	-	4	60	3	40	60	100
CBD-308	Data Structures through C Lab	-	6	90	3	40	60	100
CBD-309	Cloud Computing Architecture & Design Lab		3	45	3	40	60	100
	ACTIVITIES		3	45				
	Total	22	20	630		260	640	900

- **CBD-301 COMMON WITH CM-301**
- **CBD-304 COMMON WITH CM-304**

DIPLOMA IN CLOUD COMPUTING & BIG DATA ENGINEERING
SCHEME OF INSTRUCTIONS AND EXAMINATION

CURRICULUM-2023
(IV Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods P	Scheme Of Examinations			
		Theory	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
CBD-401	Data warehousing & Data Mining	4	-	60	3	20	80	100
CBD-402	Web Technologies	5	-	75	3	20	80	100
CBD-403	Operating Systems & Computer Organization	4	-	60	3	20	80	100
CBD-404	PythonProgramming	5	-	75	3	20	80	100
CBD-405	DBMS	5	-	75	3	20	80	100
PRACTICAL SUBJECTS								
CBD-406	Web Technologies Lab	-	6	90	3	40	60	100
CBD-407	Python ProgrammingLab	-	4	60	3	40	60	100
CBD-408	Communication Skills	-	3	45	3	40	60	100
CBD-409	DBMS Lab	-	3	45	3	40	60	100
	ACTIVITIES		3	45				
	Total	23	19	630	-	260	640	900

- CBD-402 IS COMMON WITH CM-402

DIPLOMA IN CLOUD COMPUTING & BIG DATA ENGINEERING
SCHEME OF INSTRUCTIONS AND EXAMINATION

CURRICULUM-2023

(V Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Semester	Scheme Of Examinations			
		Theory	Pract-icals		Duration (hrs)	Sessio-nal Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
CBD-501	Industrial Management and Entrepreneurship	5		75	3	20	80	100
CBD-502	Advanced Cloud Computing	4		60	3	20	80	100
CBD-503	Software Engineering	5	-	75	3	20	80	100
CBD-504	Internet Of Things	4	-	60	3	20	80	100
CBD-505	Big Data Analytics	5		75	3	20	80	100
PRACTICAL SUBJECTS								
CBD-506	Cloud Computing Lab		4	60	3	40	60	100
CBD-507	Big Data Analytics Lab		6	90	3	40	60	100
CBD-508	Life Skills		3	45	3	40	60	100
CBD-509	Project work		3	45	3	40	60	100
	Activities		3	45				
	Total	23	19	630		260	640	900

- **CBD-501 IS COMMON WITH CM-501**
- **CBD-504 IS COMMON WITH CM-504**

DIPLOMA IN COMPUTER ENGINEERING

SCHEME OF INSTRUCTIONS AND EXAMINATION

CURRICULUM-2020

(VI Semester)

CM-601 Industrial Training

Course Code	Course title	No of periods/week	Duration	Marks for FA	Marks for SA
CM-601	INDUSTRIAL TRAINING (Online Certificate courses / Industry)	42	6 months	240	60

DIPLOMA IN CLOUD COMPUTING & BIG DATA ENGINEERING
SCHEME OF INSTRUCTIONS AND EXAMINATION
CURRICULUM-2023

(FIRST YEAR)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Year	Scheme Of Examinations			
		Theory	Practicals		End exam Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
CBD-101	English-I	3	-	90	3	20	80	100
CBD-102	Engineering Mathematics - I	5	-	150	3	20	80	100
CBD-103	Engineering Physics	3	-	90	3	20	80	100
CBD-104	Engineering Chemistry and Environmental studies	3	-	90	3	20	80	100
CBD-105	Basics of computers, Cloud computing & Big data Engineering	4	-	120	3	20	80	100
CBD-106	Programming in C	5	-	150	3	20	80	100
PRACTICAL SUBJECTS								
CBD-107	Engineering Drawing		3	90	3	40	60	100
CBD-108	Programming in C		6	180	3	40	60	100
CBD-109	Physics Lab		3	90	1.5	20	30	50
	Chemistry Lab				1.5	20	30	50
CBD-110	Computer Fundamentals Lab		4	120	3	40	60	100
	Activities		**3**	**90**	**3**			
	Total	**23**	**19**	**1260**	**-**			**1000**

- **CBD-101,102,103,104,109,110 common with all branches**
- **CBD-106,107 is common with CME branch**

C23 CBD-101 English

Course Code	Course Title	No. of Periods per Week	Total No. of Periods	Marks for FA	Marks for SA
CBD-101	English	3	90	20	80

S. No.	Title of the Unit	No of Periods	COs Mapped
1	English for Employability	8	CO1, CO2, CO3, CO4,CO5
2	Living in Harmony	8	CO1, CO2, CO3, CO4,CO5
3	Connect with Care	8	CO1, CO2, CO3, CO4,CO5
4	Humour for Happiness	8	CO1, CO2, CO3, CO4, CO5
5	Never Ever Give Up!	8	CO1, CO2, CO3, CO4, CO5
6	Preserve or Perish	9	CO1, CO2, CO3, CO4, CO5
7	The Rainbow of Diversity	8	CO1, CO2, CO3, CO4, CO5
8	New Challenges- Newer Ideas	8	CO1, CO2, CO3, CO4, CO5
9	The End Point First	8	CO1, CO2, CO3, CO4, CO5
10	The Equal Halves	8	CO1, CO2, CO3, CO4, CO5
11	Dealing with Disaster	9	CO1, CO2, CO3, CO4, CO5
Total Periods		**90**	

Course Objectives	- To improve grammatical knowledge and enrich vocabulary.
	- To develop effective reading, writing and speaking skills.
	- To comprehend themes related to Personality, Society, Environment to exhibit Universal Human Values.

CO No.	Course Outcomes
CO1	Learn and apply various grammatical concepts to communicate in academic, professional and everyday situations
CO2	Use appropriate vocabulary in various contexts
CO3	Read and comprehend different forms of academic, professional and general reading material
CO4	Communicate effectively in speaking and writing in academic, professional and everyday situations.
CO5	Display human values by applying the knowledge of themes related to Self, Society, Environment, Science and Technology for holistic development and harmonious living through communication.

CO-PO Matrix

<table>
<tr><td>Course Code
Common-101</td><td colspan="4">Course Title: English
Number of Course Outcomes: 5</td><td>No. of Periods: 90</td></tr>
<tr><td rowspan="2">Pos</td><td rowspan="2">Mapped CO No.</td><td colspan="2">CO Periods Addressing PO in Column 1</td><td rowspan="2">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">Not directly Applicable for English course, however, the language 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>Level 1</td><td rowspan="3">Up to 20%: Level 1
21%-50%: Level 2
>50%: Level 3</td></tr>
<tr><td>PO6</td><td>CO1, CO2, CO3, CO4,</td><td>52</td><td>58%</td><td>Level 3</td></tr>
<tr><td>PO7</td><td>CO1, CO2, CO3, CO4,CO5</td><td>22</td><td>24%</td><td>Level 2</td></tr>
</table>

Level 3 – Strongly Mapped, Level 2- Moderately Mapped; Level 1- Slightly Mapped

Learning Outcomes

1. English for Employability

1.1. Perceive the need for improving communication in English for employability

1.2. Use adjectives and articles effectively while speaking and in writing

1.3. Write simple sentences

2. Living in Harmony

2.1. Develop positive self-esteem for harmonious relationships

2.2. Use affixation to form new words

2.3. Use prepositions and use a few phrasal verbs contextually

3. Connect with Care

3.1. Use social media with discretion
3.2. Speak about abilities and possibilities
3.3. Make requests and express obligations
3.4. Use modal verbs and main verbs in appropriate form
3.5. Write short dialogues about everyday situations

4. Humour for Happiness

4.1. Realize the importance of humour for a healthy living
4.2. Improve vocabulary related to the theme
4.3. Inculcate reading and speaking skills
4.4. Frame sentences with proper Subject – Verb agreement
4.5. Understand the features of a good paragraph and learn how to gather ideas as a preliminary step for writing a good paragraph.

5. Never Ever Give Up!

5.1. Learn to deal with failures in life
5.2. Use the present tense form for various every day communicative functions such as speaking and writing about routines, professions, scientific descriptions and sports commentary
5.3. Write paragraphs with coherence and other necessary skills

6. Preserve or Perish

6.1. Understand the ecological challenges that we face today and act to save the environment.
6.2. Narrate / Report past events and talk about future actions
6.3. Develop vocabulary related to environment
6.4. Write e-mails

7. The Rainbow of Diversity

7.1. Appraise and value other cultures for a happy living in multi-cultural workspace
7.2. Understand the usage of different types of sentences
7.3. Ask for or give directions, information, instructions
7.4. Use language to express emotions in various situations
7.5. Write letters in various real life situations

8. New Challenges – Newer Ideas

8.1. Understand the functional difference between Active Voice and Passive Voice
8.2. Use Passive Voice to speak and write in various contexts
8.3. Understand the major parts and salient features of an essay
8.4. Learn about latest innovations and get motivated

9. The End Point First!

9.1. Understand the importance of setting goals in life
9.2. Report about what others have said both in speaking and writing
9.3. Write an essay following the structure in a cohesive and comprehensive manner
9.4. Apply the words related to Goal Setting in conversations and in life

10. The Equal Halves

10.1. Value the other genders and develop a gender-balanced view towards life
10.2. Identify the use of different conjunctions in synthesising sentences
10.3. Write various types of sentences to compare and contrast the ideas
10.4. Apply the knowledge of sentence synthesis in revising and rewriting short essays
10.5. Develop discourses in speech and writing

11. Dealing with Disasters

11.1. be aware of different kinds of disasters and the concept of disaster management
11.2. Generate vocabulary relevant to disaster management and use it in sentences
11.3. Analyze an error in a sentence and correct it
11.4. Learn and write different kinds of reports

Textbook: **'INTERACT'** (A Text book of English for I Year Engineering Diploma Courses) - by SBTET, AP

Reference Books:

Martin Hewings:*Advanced Grammar in Use,* Cambridge University Press
Murphy, Raymond :*English Grammar in Use,*Cambridge University Press
Sidney Greenbaum :*Oxford English Grammar*, Oxford University Press
Wren and Martin (Revised by N.D.V. Prasad Rao) : *English Grammar and Composition*, Blackie ELT Books, S. Chand and Co.
Sarah Freeman: *Strengthen Your Writing*, Macmillan

	End Exam (80 Marks)	**1,2,3 Unit Tests (20 Marks each)**
Part A	10 Question @ 3 Marks	5 Questions @ (1Q X4M) + (4Q X3M =12)
	Total = 30 Marks	Total = 16 Marks
Part B	5 Questions (+ 3 Choice) @10 Marks	3 Questions (with internal choice) @ 8 Marks
	Total = 50 Marks	Total = 24 marks
Grand Total	**80 Marks**	**40 Marks**

Time Schedule : C23-Common- 101 : ENGLISH

S.no.	Title of the Unit	Periods allotted	Weightage of Marks	No. of Short answer questions	No. of Long Answer questions	Mapping of COs
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	Connect with Care	8	26	2		CO1, CO2, CO3, CO4, CO5
4	Humour for Happiness	8				CO1, CO2, CO3, CO4, CO5
5	Never Ever Give Up!	8	10		1	CO1, CO2, CO3, CO4,

				1		CO5
6	Preserve or Perish	9	23		2	CO1, CO2, CO3, CO4, CO5
7	The Rainbow of Diversity	8		2		CO1, CO2, CO3, CO4, CO5
8	New Challenges -Newer Ideas	8	19		1	CO1, CO2, CO3, CO4, CO5
9	The End Point First	8		1		CO1, CO2, CO3, CO4, CO5
10	The Equal Halves	8	16	1	1	CO1, CO2, CO3, CO4, CO5
11	Dealing with Disaster	9		1		CO1, CO2, CO3, CO4, CO5
	Total	**90**	**110**	**30**	**80**	

C-23 M-102

ENGINEERING MATHEMATICS-I

(Common to all Branches)

Course Code	Course Title	No. of Periods/week	Total No. of periods	Marks for FA	Marks for SA
CBD-102	Engineering Mathematics-I	5	150	20	80

S.No.	Unit Title	No. of periods	COs mapped
1	Algebra	31	CO1
2	Trigonometry	44	CO2
3	Co-ordinate Geometry	23	CO3
4	Differential Calculus	34	CO4
5	Applications of Derivatives	18	CO5
Total Periods		**150**	

Course Objectives	(i) To apply the principles of Algebra, Trigonometry and Co-ordinate Geometry to real-time problems in engineering. (ii) To comprehend and apply the concept of Differential Calculus in engineering applications.

Course Outcomes	CO1	Identify functions as special relations, resolve partial fractionsand solve problems on matrices and determinants.
	CO2	Solve problems using the concept of trigonometric functions, their inverses and complex numbers.
	CO3	Find the equations and properties of straight lines, circles and conic sections in coordinate system.
	CO4	Evaluate the limits and derivatives of various functions.
	CO5	Find solutions for engineering problems using differentiation.

Learning Outcomes:

UNIT - I

C.O. 1 Identify functions, resolve partial fractions and solve problems on matrices and determinants.

L.O. 1.1 Define Set, Ordered pair and Cartesian product of two sets - examples.

1.2 Explain Relations and Functions – examples

1.3 Find Domain & Range of functions – simple examples.

1.4 Define one-one and onto functions.

1.5 Find the inverse of a function – simple examples.

1.6 Define rational, proper and improper fractions of polynomials.

1.7 Explain the procedure of resolving proper fractions of the types mentioned below into partial fractions

$i)\quad \dfrac{f(x)}{(ax+b)(cx+d)} \qquad ii)\quad \dfrac{f(x)}{(ax+b)^2(cx+d)}$

1.8 Define a matrix and order of a matrix.

1.9 State various types of matrices with examples (emphasis on 3rd order square matrices).

1.10 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.

1.11 Define the transpose of a matrix and state its properties – examples.

1.12 Define symmetric and skew-symmetric matrices with examples. Resolve a square matrix into a sum of symmetric and skew-symmetric matrices and provide examples.

1.13 Define determinant of a square matrix; minor, co-factor of an element of a 3x3 square matrix with examples. Expand the determinant of a 3 x 3 matrix using Laplace expansion formula. State and apply the properties o determinants to solve problems.

1.14 Distinguish singular and non-singular matrices. Define multiplicative inverse of a matrix and list properties of adjoint and inverse. Compute adjoint and multiplicative inverse of a square matrix.

1.15 Solve a system of 3 linear equations in 3 unknowns using Cramer's rule and matrix inversion method.

UNIT - II

C.O. 2 Solve problems using the concept of trigonometric functions, their inverses and complex numbers.

L.O. 2.1 Define trigonometric ratios of any angle - List the values of trigonometric ratios at specified values.

2.2 Draw graphs of trigonometric functions - Explain periodicity of trigonometric functions.

2.3 Define compound angles and state the formulae of sin(A±B), cos(A±B),tan(A±B) and cot(A±B).

2.4 Give simple examples on compound angles to derive the values of $\sin 15^0$,$\cos 15^0$, $\sin 75^0$, $\cos 75^0$, $\tan 15^0$, $\tan 75^0$ etc.

2.5 Derive identities like $\sin(A+B)\sin(A-B) = \sin^2 A - \sin^2 B$ etc.

2.6 Solve simple problems on compound angles.

2.7 Derive the formulae of multiple angles 2A, 3A etc and sub multiple angleA/2 in terms of angle A of trigonometric functions.

2.8 Derive useful allied formulae like $\sin^2 A = (1 - \cos 2A)/2$ etc.

2.9 Solve simple problems using the multiple and submultiple formulae.

Syllabus for Unit test-I completed

2.10 Derive the formulae on transforming sum or difference of two trigonometric ratios into a product and vice versa - examples on these formulae.

2.11 Solve problems by applying these formulae to sum or difference or product of two terms.

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

2.13 Define inverses of six trigonometric functions along with their domains and ranges.

2.14 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.

2.15 State various properties of inverse trigonometric functions and identities like

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

2.16 Apply formulae like $\tan^{-1}x+\tan^{-1}y=\tan^{-1}\left(\frac{x+y}{1-xy}\right)$, *where* $x\geq 0, y\geq 0, xy<1$ etc., to solve Simple problems.

2.17 Explain what is meant by solution of trigonometric equations and find the general solutions of sin x=k, cos x =k and tan x=k with appropriate examples.

2.18 Solve models of the type a $\sin^2$ x + b sin x +c=0 and a sin x + b cos x=c.

2.19 State sine rule, cosine rule, tangent rule and projection rule and solve a triangle using these formulae.

2.20 List various formulae for the area of a triangle with examples.

2.21 Define a complex number, its modulus, conjugate, amplitude and list their properties.

2.22 Define arithmetic operations on complex numbers with examples.

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

UNIT - III

Coordinate Geometry

C.O. 3 Find the equations and properties of straight lines, circles and conic sections in coordinate system.

L.O. 3.1 Write different forms of a straight line – general form, point-slope form, slope-intercept form, two-point form, intercept form and normal form (or perpendicular form).

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

3.3 Define locus of a point and circle.

3.4 Write the general equation of a circle and find its centre and radius.

3.5 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).

3.6 Define a conic section - Explain the terms focus, directrix, eccentricity, axes and latus-rectum of a conic with illustrations.

3.7 Find the equation of a conic when focus, directrix and eccentricity are given.

3.8 Describe the properties of Parabola, Ellipse and Hyperbola in standard forms whose axes are along the co-ordinate axes and solve simple examples on these conics.

Syllabus for Unit test-II completed

C.O.4Evaluate the limits and derivatives of various functions.

L.O. 4.1 Explain the concept of limit and meaning of $\lim_{x\to a} f(x)=l$ and state the properties of limits.

4.2 Evaluate the limits of the type $\lim_{x\to a}\frac{f(x)}{g(x)}$ and $\lim_{x\to\infty}\frac{f(x)}{g(x)}$

4.3 State the Standard limits $\lim_{x\to a}\frac{x^n-a^n}{x-a}$, $\lim_{x\to 0}\frac{\sin x}{x}$, $\lim_{x\to 0}\frac{\tan x}{x}$, $\lim_{x\to 0}\frac{a^x-1}{x}$, $\lim_{x\to 0}\frac{e^x-1}{x}$, $\lim_{x\to 0}(1+x)^{\frac{1}{x}}$, $\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$ (without proof) and solve simple problems using these standard limits.

4.4 Explain the concept of continuity of a function at a point and on an interval

4.5 State the concept of derivative of a function y = f(x) – definition, first principle as $\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ and also provide standard notations to denote the derivative of a function.

4.6 Explain the significance of derivative in scientific and engineering applications.

4.7 Find the derivative of standard algebraic, logarithmic, exponential and trigonometric functions using the first principle.

4.8 Find the derivatives of inverse trigonometric, hyperbolic and inverse hyperbolic functions.

4.9 State the rules of differentiation of sum, difference, scalar multiplication, product and quotient of functions with simple illustrative examples.

4.10 Explain the method of differentiation of a function of a function (Chain rule) with illustrative examples.

4.11 Explain the method of differentiation of parametric functions with examples.

4.12 Explain the procedure for finding the derivatives of implicit functions with examples.

4.13 Explain the need of taking logarithms for differentiating some functions of $[f(x)]^{g(x)}$ type – examples on logarithmic differentiation.

4.14 Explain the concept of finding the second order derivatives with examples.

4.15 Explain the concept of functions of several variables, finding partial derivatives and difference between the ordinary and partial derivatives with simple examples.

4.16 Explain the concept of finding second order partial derivatives with simple problems.

C.O. 5 Evaluate solutions for engineering problems using differentiation

L.O. 5.1 State the geometrical meaning of the derivative - Explain the concept of derivative to find the slopes of tangent and normal to a given curve at any point on it with examples.

5.2 Find the equations of tangent and normal to to a given curve at any point on it – simple problems.

5.3 Explain the derivative as a rate of change in distance-time relations to find the velocity and acceleration of a moving particle with examples.

5.4 Explain the derivative as a rate measurer in the problems where the quantities like areas, volumesvary with respect to time- illustrative examples.

5.5 Define the concept of increasing and decreasing functions - Explain the conditions to find points where the given function is increasing or decreasing with illustrative examples.

5.6 Explain the procedure to find the extreme values (maxima or minima) of a function of single variable- simple problems for quadratic and cubic polynomials.

5.7 Apply the concept of derivatives to find the errors and approximations - simple problems.

Syllabus for Unit test-III completed

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 = Strongly mapped (High), **2 =**moderately mapped (Medium), **1 =**slightly mapped (Low)

Note: The gaps in CO/PO mapping can be met with appropriate activities as follows:

For PO5: Appropriate quiz programmes may be conducted at intervals and duration as decided by concerned faculty.
For PO6: Seminars on applications of mathematics in various engineering disciplines are to be planned and conducted.
For PO7: Plan activities in such a way that students can visit the Library to 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 – Mapping strength

PO No	Mapped with CO no	CO periods addressing PO in column I		Level (1,2 or 3)	Remarks
		No	%		
1	CO1, CO2, CO3, CO4, CO5	150 (31+44+23+34+18)	100%	3	>40% Level 3 Highly addressed 25% to 40% Level 2 Moderately addressed 5% to 25% Level 1 Low 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	
PSO 1	CO1, CO2, CO3, CO4, CO5	150 (31+44+23+34+18)	100%	3	
PSO 2	CO1, CO2, CO3, CO4, CO5	62 (10+14+9+14+15)	41.3%	3	
PSO 3	CO1, CO2, CO3, CO4, CO5	62 (10+14+9+14+15)	41.3%	3	

COURSE CONTENT

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. **Partial Fractions:**

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

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

3. **Matrices:**
Definition of a matrix, types of matrices - Algebra of matrices, equality of two matrices, sum, difference, scalar multiplication and product of matrices. Transpose of a matrix, 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. **Trigonometric ratios:**
Definition of trigonometric ratios of any angle, values of trigonometric ratios at specified values, draw graphs of trigonometric functions, periodicity of trigonometric functions.
5. **Compound angles:**
Formulas of sin(A±B), cos(A±B), tan(A±B), cot(A±B), and related identities.
6. **Multiple and sub multiple angles:**
Formulae for trigonometric ratios of multiple angles 2A, 3A and sub multiple angle A/2.
7. **Transformations:**
Transformations of products into sums or differences and vice versa.
8. **Inverse trigonometric functions:**
Definition, domains and ranges-basic properties.
9. **Trigonometric equations:**
Concept of a solution, principal value and general solution of trigonometric equations:
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. **Properties of triangles:**
Relations between sides and angles of a triangle- sine rule, cosine rule, tangent rule and projection rule-area of a triangle.
11. **Complex Numbers:**
Definition of a complex number, modulus, conjugate and amplitude of a complex number-Arithmeticoperations on complex numbers - Modulus-Amplitude (polar) form, Exponential form (Euler form) of a complex number.

UNIT-III
Coordinate geometry

12 **Straight lines:**Various forms of a straight line - Angle between two lines, perpendicular distance from a point, intersection of non-parallel lines and distance between parallel lines.
13. **Circle:**Locus of a point, Circle definition-Circle equation given (i) centre and radius, (ii) two ends of a diameter (iii) three non-collinear points of type (0,0), (a,0), (0, b) - General equation of a circle –its centre and radius.
14. Definition of a conic section - Equation of a conic when focus, directrix and eccentricity are given - Properties of parabola, ellipse and hyperbola in standard forms.

UNIT-IV
Differential Calculus

15. **Concept of Limit-** Definition and Properties of Limits and Standard Limits -Continuity of a function at a point.
16. **Concept of derivative-** Definition (first principle)- different notations- Derivatives of standard algebraic, logarithmic, exponential, trigonometric, inverse trigonometric, 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

Applications of Derivatives

17. Geometrical meaning of the derivative, equations of tangent and normal to a curve at any point.

18. Physicalapplications of derivatives – Velocity, acceleration, derivative as a rate measurer.

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

20. Absolute, relative and percentage errors - Approximate values due to errors in measurements.

Textbook:

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

Reference Books:

1. Shanti Narayan, A Textbook of matrices, S.Chand&Co.
2. Robert E. Moyer & Frank Ayers Jr., Schaum's Outline of Trigonometry, 4th Edition, Schaum's Series.
3. G.B.Thomas, R.L.Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.
4. Frank Ayers & Elliott Mendelson, Schaum's Outline of Calculus, Schaum's Series.
5. M.Vygodsky, Mathematical Handbook, Mir Publishers, Moscow.

TIME SCHEDULE

S.No.	Chapter	No. of Periods	Marks Allotted	Short type	Essay type	COs mapped
Unit - I: Algebra						
1	Functions	6	3	1	0	CO1
2	Partial Fractions	5	3	1	0	CO1
3	Matrices and Determinants	20	16	2	1	CO1
Unit - II: Trigonometry						
4	Trigonometric Ratios	2	0	0	0	CO2
5	Compound Angles	5	3	1	0	CO2
6	Multiple and Submultiple angles	8	3	1	0	CO2
7	Transformations	6	5	0	1/2	CO2
8	Inverse Trigonometric Functions	6	5	0	1/2	CO2
9	Trigonometric Equations	6	5	0	1/2	CO2
10	Properties of triangles	5	5	0	1/2	CO2
11	Complex Numbers	6	3	1	0	CO2
Unit III: Co-ordinate Geometry						
12	Straight Lines	5	3	1	0	CO3
13	Circles	6	5	0	1/2	CO3
14	Conic Sections	12	5	0	1/2	CO3
Unit – IV: Differential Calculus						
15	Limits and Continuity	6	3	1	0	CO4
16	Differentiation	28	23	1	2	CO4
Unit – V: Applications of Derivatives						
17	Geometrical Applications	4	5	0	1/2	CO5

18	Physical Applications	6	5	0	1/2	CO5
19	Maxima and Minima	4	5	0	1/2	CO5
20	Errors and Approximations	4	5	0	1/2	CO5
	Total	150	110	10	8	
			Marks	30	80	

Unit Test Syllabus

Unit Test	Syllabus
Unit Test-I	From L.O. 1.1 to L.O. 2.9
Unit Test-II	From L.O. 2.10 to L.O. 3.8
Unit Test-III	From L.O.4.1 to L.O. 5.7

C-23 CBD-103 ENGINEERING PHYSICS

Course code	Course title	No.of periods per week	Total no. of periods	Marks for FA	Marks for SA
CBD -103	Engineering Physics	03	90	20	80

TIME SCHEDULE

S.No	Major topics	No. of Periods	Weightage of Marks	Short Answer type (3 marks)	Essay type (10 marks)	COs mapped
1.	Units and measurements	09	03	1		CO1
2.	Statics	11	13	1	1	
3.	Gravitation	12	20	1	2	CO2
4.	Concepts of energy	10	13	1	1	
5.	Thermal physics	10	13	1	1	CO3
6.	Sound	12	16	2	1	
7.	Electricity &Magnetism	13	16	2	1	CO4
8.	Modern physics	13	16	2	1	
	Total:	**90**	110	10	8	

Course title : Engineering Physics	
Course objectives	(1) To understand the basic concepts of physics for various Engineering applications as required for industries. (2) To equip the students with the scientific advances in technology and make the student suitable for any industrial or scientific organization.

COURSE OUTCOMES	CO1	Familiarize with various physical quantities, their SI units and errors in measurements; understand the concepts of vectors and various forces in statics.
	CO2	Understand the concepts of gravitation with reference to applications in satellites, provide the knowledge of various forms of energy and their working principles.
	CO3	Familiarize with the knowledge of transmission of heat and gas laws; provide the knowledge on musical sound and noise as pollution and also the concepts of echo and reverberation.
	CO4	Provide basic knowledge of electricity and concepts of magnetism and magnetic materials; familiarize with the advances in Physics such as photoelectric ell, optical fibers, semiconductors, superconductors and nanotechnology.

MATRIX SHOWING MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES

CO-PO Mapping Strength

Course code Common - 103	**Engineering Physics No of Course Objectives : 4**				**No of periods 90**
POs	Mapped with CO No	Co periods addressing PO in Col 1 NO	%	1,2,3	remarks
PO1	O1 ,CO2,CO3,CO4	44	48.9 %	3	>40% level 3 (highly addressed)
PO2	CO1,CO2, CO4	11	12.2%	1	25% to 40% level 2 (moderately addressed)
PO3	O1, CO2,CO3, CO4	10	11.1%	1	5% to 25% level 1 (Low addressed)
PO4	CO1, CO2,CO4	8	8.9%	1	< 5% (not addressed)
PO5	CO2,CO3, CO4	8	8.9%	1	

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3

PO6					
PO7	O1, CO2, CO3, CO4	9	10.0%	1	

CO-PO MATRIX:

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

3 = strongly mapped, 2 = moderately mapped, 1 = slightly mapped

Note: The gaps in CO and PO mapping will be achieved by one or more appropriate activities from the following.

(i) Seminars (ii) Tutorials (iii) Guest Lecturers (iv) Assignments
(v) Quiz competitions (vi) Industrial visits (vii) Tech fest (viii) Mini project
(ix) Group discussions (x) Virtual classes (xi) Library visit for e-books

Learning outcomes

Upon completion of the course the student shall be able to

1.0 Understand the concept of units and measurements
1.1 Explain the concept of units
1.2 Define the terms
a) Physical quantity b) Fundamental physical quantities and
c) Derived physical quantities
1.3 Define unit
1.4 Define fundamental units and derived units
1.5 State SI units with symbols for fundamental and some derived quantities
1.6 State Multiples and Submultiples in SI system
1.7 State rules of writing S.I units
1.8 State advantages of SI units
1.9 What are direct and indirect measurements?
1.10 Define accuracy and least count
1.11 Define error in measurement
1.12 Define absolute, relative and percentage errors with their formulae
1.13 Solve simple problems on absolute, relative and percentage errors

2.0 Understand the concepts of statics
2.1 Explain the concept of Vectors
2.2 Define scalar and vector quantities with examples
2.3 Represent vectors geometrically
2.4 Define the types of vectors (equal, negative, unit, co-initial, co-planar, position vector)
2.5 Resolve the vector into rectangular components
2.6 State and explain triangle law of addition of vectors
2.7 Define concurrent forces, co-planar forces and equilibrant.
2.8 State and explain Lami's theorem
2.9 State the parallelogram law of addition of forces with diagram.
2.10 Write the expressions for magnitude and direction of resultant (no derivation)
2.11 Illustrate parallelogram law with examples (i) flying of bird and (ii) working of sling.
2.12 Define moment of force and couple.
2.13 Write the formulae and S.I units of moment of force and couple.
2.14 Solve simple problems on (i) Resolution of force and

(ii) Parallelogram law of forces (finding R, α and θ).

3.0 Understand the concepts of Gravitation

3.1 State and explain Newton's universal law of gravitation.
3.2 Define G and mention its value.
3.3 Explain the acceleration due to gravity (g)
3.4 Explain the factors affecting the value of g
3.5 Derive the relationship between g and G.
3.6. State and explain the Kepler's laws of planetary motion
3.7 Define a satellite.
3.8 What are natural and artificial satellites, Give examples.
3.9 Define orbital velocity and write its formula.
3.10 Define escape velocity and write its formula.
3.11 Write a brief note on Polar satellites.
3.12 Write a brief note on Geo-stationary satellites.
3.13 Mention the applications of artificial satellites.
3.14 Solve simple problems on (i) Newton's law of gravitation and (ii) calculation of orbital and escape velocities.

4.0 Understand the concepts of Energy.

4.1 Define work done and energy. Mention their SI units.
4.2 List various types of energy.
4.3 Define P.E with examples. Write its equation.
4.4 Define K.E with examples. Write its equation.
4.5 Derive relationship between K.E and momentum.
4.6 State the law of conservation of energy. Give various examples.
4.7 Write a brief note on solar energy.
4.8 Explain the principle of solar thermal conversion.
4.9 Explain the principle of photo voltaic effect
4.10 Solve simple problems on (i) work done (ii) P.E & K.E and (iii) Relation between K.E & momentum.

5.0 Understand the concepts of thermal physics

5.1 Define the concepts of heat and temperature
5.2 State different modes of transmission of heat
5.3 Explain conduction, convection and radiation with two examples each.
5.4 State and explain Boyle's law
5.5 Define absolute zero temperature
5.6 Explain absolute scale of temperature
5.7 State the relationship between degree Celsius, Kelvin and Fahrenheit temperatures
5.8 State Charle's law and write its equation
5.9 State Gay-Lussac's law and write its equation
5.10 Define ideal gas
5.11 Derive ideal gas equation
5.12 Explain why universal gas constant (R) is same for all gases in nature
5.13 Calculate the value of R for 1 gram mole of gas.
5.14 Solve simple problems on (i) Inter conversion of temperatures between °C, K and F (ii) Gas laws and (iii) Ideal gas equation.

6.0 Understand the concepts of Sound

6.1 Define the term sound
6.2 Define longitudinal and transverse waves with one example each
6.3 Explain the factors which affect the velocity of sound in air
6.4 Distinguish between musical sound and noise

6.5 Explain noise pollution and state SI unit for intensity of sound
6.6 Explain sources of noise pollution
6.7 Explain effects of noise pollution
6.8 Explain methods of minimizing noise pollution
6.9 Define Doppler effect.
6.10 List the Applications of Doppler effect
6.11 Define reverberation and reverberation time
6.12 Write Sabine's formula and name the physical quantities in it.
6.13 Define echoes and explain the condition to hear an echo.
6.14 Mention the methods of reducing an echo
6.15 Mention the applications of an echo
6.16 What are ultrasonics ?
6.17 Mention the applications of ultrasonics, SONAR
6.18 Solve simple problems on echo

7.0 Understand the concepts of Electricity and Magnetism
7.1 Explain the concept of P.D and EMF
7.2 State Ohm's law and write the formula
7.3 Explain Ohm's law
7.4 Define resistance and specific resistance. Write their S.I units.
7.5 State and explain Kichoff's first law.
7.6 State and explain Kirchoff's second law.
7.7 Describe Wheatstone bridge with legible sketch.
7.8 Derive an expression for balancing condition of Wheatstone bridge.
7.9 Describe Meter Bridge experiment with necessary circuit diagram.
7.10 Write the formulae to find resistance and specific resistance in meter bridge
7.11 Explain the concept of magnetism
7.12 What are natural and artificial magnets (mention some types)
7.13 Define magnetic field and magnetic lines of force.
7.14 Write the properties of magnetic lines of force
7.15 State and explain the Coulomb's inverse square law of magnetism
7.16 Define magnetic permeability
7.17 Define para, dia, ferro magnetic materials with examples
7.18 Solve simple problems on (i) Ohm's law (ii) Kirchoff's first law (iii) Wheatstone bridge (iv) meter bridge and (v) Coulomb's inverse square law

8.0 Understand the concepts of Modern physics
8.1 State and explain Photo-electric effect.
8.2 Write Einstein's Photo electric equation and name the physical quantities in it.
8.3 State laws of photo electric effect
8.4 Explain the Working of photo electric cell
8.5 List the Applications of photoelectric effect
8.6 Recapitulate refraction of light and its laws
8.7 Define critical angle
8.8 Explain the Total Internal Reflection
8.9 Explain the principle and working of Optical Fiber
8.10 List the applications of Optical Fiber
8.11 Explain the energy gap based on band structure
8.12 Distinguish between conductors, semiconductors and insulators based on energy gap
8.13 Define doping
8.14 Explain the concept of hole
8.15 Explain the types of semiconductors , Intrinsic and extrinsic
8.16 Explain n-type and p-type semiconductors
8.17 Mention the applications of semiconductors

8.18 Define superconductor and superconductivity
8.19 List the applications of superconductors
8.20 Nanotechnology definition, nano materials and applications

COURSE CONTENT

1. **Units and measurements**
   Introduction – Physical quantity – Fundamental and Derived quantities – Fundamental and derived units - SI units – Multiples and Sub multiples – Rules for writing S.I. units- Advantages of 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 – Concept of acceleration due to gravity (g) – Factors affecting the value of g – Relation between g and G- Kepler's laws – Satellites : Natural and artificial – Orbital velocity and escape velocity – Polar and geostationary satellites – Applications of artificial satellites – Problems.
4. **Concepts of energy**
   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. **Thermal physics**
   Modes of transmission of heat – Expansion of Gases - Boyle's law – Absolute scale of temperature - Thermometric scales and their inter conversion - Charle's law - Gay-Lussac's law - Ideal gas equation - Universal gas constant (R) - Problems.
6. **Sound**
   Sound - Nature of sound - Types of wave motion, Longitudinal and transverse – Factors affecting the velocity of sound in air - musical sound and noise - Noise pollution – Causes & effects - Methods of reducing noise pollution - Doppler effect - Echo- Reverberation - Reverberation time-Sabine 's formula – Ultrasonics & applications – SONAR - Problems.
7. **Electricity & Magnetism**
   Concept of P.D and EMF - Ohm's law and explanation-Specific resistance - Kirchoff's laws – Wheat stone's bridge - Meter bridge.
   Natural and artificial magnets – magnetic field and magnetic lines of force – Coulomb's inverse square law – Permeability – Magnetic materials – Para, dia, ferro – Examples – Problems.
8. **Modern Physics**
   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 : Based on Energy gap – Doping – Hole - Intrinsic and extrinsic semiconductors (n-type & p-type) – Applications of semiconductors – Superconductivity – applications – Nanotechnology definition, nano materials, applications.

REFERENCES

1. Intermediate physics - Volume - I & 2 — Telugu Academy (English version)
2. Unified physics Volume 1, 2, 3 and 4 — Dr. S.L Guptha and Sanjeev Guptha
3. Concepts of Physics, Vol 1 & 2 — H.C. Verma
4. Text book of physics Volume I & 2 — Resnick & Halliday

5. Fundamentals of physics — Brijlal & Subramanyam
6. Text book of applied physics — Dhanpath Roy
7. NCERT Text Books of physics — Class XI & XII Standard
8. e-books/e-tools/websites/Learning Physics software/eLMS

Table showing the scope of syllabus to be covered for unit tests

Unit test	Learning outcomes to be covered
Unit test - 1	From 1.1 to 3.14
Unit test - 2	From 4.1 to 6.18
Unit test - 3	From 7.1 to 8.20

C-23 CBD-104 Engineering Chemistry and Environmental Studies (C-23)

CBD-104

Course code	Course Title	No. of Periods per week	Total No. of Periods	Marks for FA	Marks for SA
CBD-104	Engineering Chemistry and Environmental Studies	3	90	20	80

S.No	Unit Title/Chapter	No. of Periods	COs Mapped
1	Fundamentals of Chemistry	14	CO1
2	Solutions, Acids and Bases	16	CO1
3	Electrochemistry	12	CO2
4	Corrosion	8	CO2
5	Water Treatment	8	CO3
6	Polymers& Engineering Materials	12	CO4
7	Fuels	6	CO4
8	Environmental Studies	14	CO5
	Total	90	

Course Objectives

Course Title: Engineering Chemistry & Environmental Studies	
Course Objectives	1. To familiarize with the concepts of chemistry involved in the process of various Engineering Industrial Applications. 2. To know the various natural and man-made environmental issues and concerns with an interdisciplinary approach that include physical, chemical, biological and socio cultural aspects of environment. 3. to reinforce theoretical concepts by conducting relevant experiments/exercises

Course outcomes

Course Outcomes	CO1	n Bohr`s atomic model, chemical bonding, mole concept, acids and bases, P^H and Buffer solutions.
	CO2	n electrolysis, Galvanic cell, batteries and corrosion
	CO3	n the chemistry involved in the treatment of hardness in water.
	CO4	n the methods of preparation and applications of Polymers and Elastomers, chemical composition and applications of Alloys, Composite Materials, Liquid Crystals , Nano Materials and Fuels.
	CO5	n Global impacts due to air pollution, causes , effects and controlling methods of water pollution and understand the environment, forest resources, e-Pollution and Green Chemistry Principles.

CBD-104	Engineering. Chemistry and Environmental studies No of Course Outcomes:5				No Of periods 90
Pos	Mapped with CO No	CO periods addressing PO in Col NO. 1	%	Level 1,2,3	remarks
PO1	CO1,CO2,CO3	42	46.7 %	3	>40% level 3 (highly addressed) 25% to 40% level 2(moderately addressed) 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-POs mapping strength (as per given table)

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

3=strongly mapped 2= moderately mapped 1= slightly mapped

Note: The gaps in CO and PO mapping will be achieved by one or more appropriate activities 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

Model Blue Print with Weightage for Blooms category and questions for each chapter and COs mapped

S.No	Unit Title/Chapter	No of Periods	Weightage of marks	Question wise distribution		Mapped with CO
				Essay	Short	
1	Fundamentals of Chemistry	14	21	1½*	2	CO1
2	Solutions, Acids and Bases	16	21	1½*	2	CO1
3	Electrochemist	12	13	1	1	CO2

	ry					
4	Corrosion	8	13	1	1	CO2
5	Water Treatment	8	13	1	1	CO3
6	Polymers & Engineering materials.	12	13	1	1	CO4
7	Fuels	6	3	0	1	CO4
8	Environmental Studies	14	13	1	1	CO5
Total		90	110	8	10	

***One question of 10 marks should be given with 50% weightage from unit title 1and 2**

Upon completion of the course, the student shall be able to learn out

ENGINEERINGCHEMISTRY AND ENVIRONMENTAL STUDIES

1.0 Atomic structure

1.1 Explain the charge, mass of fundamental particles of an atom (electron, proton and neutron) and the concept of atomic number and mass number.

1.2 State the Postulates of Bohr's atomic theory and its limitations.

1.3 Explain the significance of four Quantum numbers and draw the atomic structures of Silicon and Germanium.

1.4 Define Orbital of an atom and draw the shapes of s,p and d-orbitals.

1.5 Explain 1.Aufbau principle, 2.Pauli's exclusionprinciple3. Hund's principle.

1.6 Write the electronic configuration of elements up to atomic number 30.

1.7 Explain the significance of chemical bonding.

1.8 Explain the Postulates of Electronic theory of valency.

1.9 Define and explain Ionic and Covalent bonds with examples of NaCl , *H_2,*O_2 and *N_2.(* Lewis dot method).

1.10 List out the Properties of Ionic compounds and covalent compounds and distinguish between their properties.

2.0 Solutions, Acids and Bases

2.1 Define the terms 1. Solution,2. Soluteand3. Solvent.

2.2 Classify solutions based on solubility.

2.3 Define the terms 1. Atomic weight, 2. Molecular weight and 3. Equivalent weight. Calculate Molecular weight and Equivalent weight of the given acids (HCl, H_2SO_4, H_3PO_4) Bases (NaOH, $Ca(OH)_2$, $Al(OH)_3$ and Salts (NaCl, Na_2CO_3, $CaCO_3$).

2.4 Define mole and solve numerical problems on mole concept.

2.5 Define molarity, normality and solve numerical problems on molarity and normality.
a) Calculate the molarity or Normality, if weight of solute and volume of solution are given.
b) Calculate the weight of solute, if molarity or Normality with volume of solution are given.
c) Problems on dilution to convert high concentrated solutions to low concentrated solutions.

2.6 Explain Arrhenius theory f Acids and Bases and give its limitations.

2.7 Define ionic product of water, pH and solve numerical problems on pH (Strong Acids and Bases).

2.8 Define buffer solution and classify buffer solutions with examples. Give its applications.

3.0 Electrochemistry

3.1 Define the terms1. Conductor 2. Semiconductor 3. Insulator,4. Electrolyte5. Non-electrolyte.Give two examples each.

3.2 Distinguish between Metallic conduction and Electrolytic conduction.

3.3 Explain electrolysis by taking an example of used NaCl and list out the applications of electrolysis.

3.4 Define Galvanic cell. Explain the construction and working of Galvanic cell.

3.5 Distinguish between electrolytic cell and galvanic cell.

3.6 Define battery and list the types of batteries with examples.

3.7 Explain the construction, working and applications of i) Dry cell (Leclanche cell), ii) Lead storage battery, iii) Lithium-Ion battery and iv) Hydrogen-Oxygen fuel cell.

4.0 Corrosion

4.1 Define the term corrosion.

4.2 state the Factors influencing the rate of corrosion.

4.3 Describe the formation of (a)composition cell (b) stress cell (c)concentration cell during corrosion.

4.4 Define rusting of iron and explain the mechanism of rusting of iron.

4.5 Explain the methods of prevention of corrosion by
(a)Protective coatings (anodic and cathodic coatings).
(b) Cathodic protection (Sacrificial anode process and Impressed-voltage process).

5. 0 Water Treatment

5.1 Define soft water and hard water with respect to soap action.

5.2 Define and classify the hardness of water.

5.3 List out the salts that causing hardness of water(with Formulae).

5.4 State the disadvantages of using hard water in industries.

5.5 Define Degree of hardness and units of hardness (mg/L and ppm).

5.6 Solve numerical problems on hardness.

5.7 Explain the methods of softening of hard water by (i) Ion-exchange process and (ii) Reverse Osmosis process.

6.0 Polymers& Engineering materials.

A) Polymers

6.1 Explain the concept of polymerization.

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

6.3 Define plastic. Explain a method of preparation and uses of the following plastics:
1. PVC 2. Teflon3. Polystyrene 4. Nylon 6,6.

6.4 Define elastomers. Explain a method of preparation and applications of the following:
1. Buna- S 2. Neoprene.

B) Engineering Materials

6.5 Define an alloy. Write the composition and applications of the following:
1.Nichrome2. Duralumin 3.Stainless Steel.

6.6 Define Composite Materials and give any two examples. State their Properties and applications.

6.7 Define Liquid Crystals and give any two examples. State their Properties and applications.

6.8 Define Nano Materials and give any two examples. State their Properties and applications.

7.0 Fuels

7.1 Define the term fuel.

7.2 Classify the fuels based on occurrence.

7.3 Write the composition and uses of the following:
1. LPG 2. CNG 3.Biogas 4.Power alcohol

7.4 Write the commercial production of Hydrogen as future fuel. Give its advantages and disadvantages.

8.0 ENVIRONMENTAL STUDIES

8.1 Explain the scope and importance of environmental studies.
8.2 Define environment. Explain the different segments of environment.
1.Lithosphere2. Hydrosphere3. Atmosphere4. Biosphere
8.3 Define the following terms:
1. Pollutant 2.Pollution 3.Contaminant 4. Receptor 5. Sink6. Particulates7. Dissolvedoxygen (DO)8. ThresholdLimit Value (TLV) 9. BOD 10.COD 11. Eco system12. Producers13. Consumers14. Decomposers with examples.
8.4 State the renewable and non- renewable energy sources with examples.
8.5 State the uses of forest resources.
8.6 Explain the causes and effects of deforestation.
8.7 Define air pollution and explain its Global impacts 1. Green house effect, 2. Ozone layer depletion and 3. Acidrain.
8.8 Define Water pollution. Explain the causes, effects and controlling methods of Water pollution.
8.9 Define e-Pollution, State the sources of e-waste. Explain its health effects and control methods.
8.10 Define Green Chemistry. Write the Principles and benefits of Green Chemistry.

COURSE CONTENT

ENGINEERING CHEMISTRY AND ENVIRONMENTAL STUDIES

1. **Fundamentalsof Chemistry**

   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, Acids and Bases**

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

   Acids and Bases: Arrhenius theory of acids and bases – Ionic product of water- pH–Numerical problems on pH–Buffer solutions – Classification- applications.

3. **Electrochemistry**

   Conductors, semiconductors, insulators, electrolytes and non-electrolytes – Electrolysis of fused NaCl–Applications of electrolysis - Galvanic cell – 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. **Water treatment**

   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 & Engineering materials**

   Polymers:

   Concept of polymerization – Types of polymerization – Addition, condensation with examples – Plastics - Preparation and uses of i).PVC ii) Teflon iii) Polystyrene and iv) Nylon 6,6.

   Elastomers: Preparation and application of i)Buna-s and ii) Neoprene.

   Engineering Materials:

   Alloys- Composition and applications of i) Nichrome, ii)Duralumin and iii) Stainless Steel.

   Composite Materials- Properties and applications.

   Liquid Crystals- Properties and applications.

Nano Materials- Properties and applications.

7. **Fuels**

Definition and classification of fuels – Composition and uses of i) LPG ii) CNG iii) Biogas and iv) Power alcohol – Hydrogen as a future fuel-production- advantages and disadvantages.

8. **ENVIRONMENTALSTUDIES**

Scope and importance of environmental studies – Environment - Important terms related to environment–Renewable and non-renewable energy sources–Forest resources – Deforestation – Air pollution–Global impacts on environment –Water pollution – causes – effects – control measures- e-Pollution –Sources of e-waste - Health effects - Control methods - Green Chemistry- Principles -Benefits.

Table specifying the scope of syllabus to be covered for Unit Test- 1, Unit Test- 2 and Unit Test -3

Unit Test	**Learning outcomes to be covered**
Unit Test – 1	**From 1.1 to 2.8**
Unit Test – 2	**From 3.1 to 5.7**
Unit Test – 3	**From 6.1 to 8.10**

REFERENCEBOOKS

1. Telugu Academy — Intermediate chemistry Vol. 1&2
2. Jain & Jain — Engineering Chemistry
3. O.P. Agarwal, Hi-Tech. — Engineering Chemistry
4. D.K.Sharma — Engineering Chemistry
5. A.K. De — Engineering Chemistry

C-23 CBD-105 Basics Of Cloud computing & Big data Engineering

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-105	**Basics Of Cloud computing & Big data Engineering**	4	120	20	80

TIME SCHEDULE:

S.No.	Chapter/Unit Title	No. of Periods	Weightage of marks	No.of short answer questions	No.of essay questions	CO's Mapped
1.	Fundamentals of Computers	20	16	2	1	CO1,CO3,CO4
2.	Programming Methodology	15	26	2	2	CO2
3.	Operating System basics	30	26	2	2	CO1,CO3
4.	Computer Hardware and Networking Basics	30	26	2	2	CO1,CO4,CO5
5.	Basics of Cloud Computing , Big data & Ethical hacking	25	16	2	1	CO2,CO6
Total		120	110	10	8	

Course Objectives	i)To know the fundamentals of Computers ii)To familiarize programming methodologies like algorithms and flowcharts iii)To understand Operating system basics iv)To familiarize Emerging Technologies

Course Outcomes	At the end of the course the student able to learn following:		
	CO1	CBD-105.1	Explain computer fundamentals
	CO2	CBD-105.2	Analyse various flowchart, algorithm methods
	CO3	CBD-105.3	Explain the importance of Basic Computer operating systems
	CO4	CBD-105.4	Analyse functioning of various Hardware components and Networking .
	CO5	CBD-105.5	Explain basics of Data structures and emerging technologies in the world

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3

CBD-105.1	**3**				**1**		**1**	**3**	**1**	**1**
CBD-105.2	**3**	**2**	**2**	**1**	**2**	**3**		**3**	**3**	**1**
CBD-105.3	**3**	**1**		**1**		**1**	**1**	**3**	**1**	**1**
CBD-105.4	**3**		**2**	**2**	**1**	**1**	**1**	**3**	**1**	**2**
CBD-105.5	**3**	**2**	**1**	**1**	**2**	**1**	**2**	**3**	**2**	**1**
Average	**3**	**1**	**1**	**1**	**1**	**1.2**	**1**	**3**	**1.6**	**1.2**

3=Strongly mapped, 2=moderately mapped, 1=slightly mapped

Learning Outcomes:

1.0 Fundamentals of Digital Computer

1.1. Define various terms related to computers – Computer, Hardware , Software, Firmware, High Level Language , Low Level Language
1.2. Draw and explain block diagram of a Computer in detail
1.3. Describe the current family of CPUs used in Computers.
1.4. State the use of storage devices used in a Computer.
1.5. List the two types of memory used in a Computer.
1.6. State the importance of cache memory.
1.7. Explain the generations of computers.
1.8. Classification of computers - based on a) size, b) processor.
1.9. State the importance of binary number system for use in Digital Computers

2.0 Implement Programming Methodology.

2.1. State the different steps involved in problem solving.
2.2. Define algorithm.
2.3. List four characteristics of algorithm.
2.4. Define a program
2.5. Differentiate between program and algorithm.
2.6. State the steps involved in algorithm development.
2.7. Differentiate between algorithm and flowchart.
2.8. Develop algorithms for simple problems.
2.9. Draw the symbols used in flowcharts.
2.10. Draw flowcharts for simple problems.

3.0 Operating Systems basics

3.1. Describe the need for an operating system.
3.2. List the various operating systems used presently.
3.3. List and explain
  3.3.1.Types of dos commands
  3.3.2.Any 10 Internal Commands
  3.3.3.Any 5 External Commands
  3.3.4.Features of Windows desktop.
  3.3.5.Components of a Window.
3.4. State the function of each component of a Window.
3.5. Describe the Method of starting a program using start button
3.6. Explain usage of maximize, minimize, restore down and close buttons.
3.7. State the meaning of a file ,folder.
3.8. Describe the Method of viewing the contents of hard disk drive using Explorer
3.9. Describe the Method of finding a file using search option.
3.10. Use control panel for
  3.10.1. installing and uninstalling software
  3.10.2. installing and uninstalling hardware
  3.10.3. Changing the system date and time

3.10.4. Installing a printer

3.11. ExplainDrive space using system tool option of Accessories group

3.12. Explain Disk defragmentation using System tools

3.13. Explain the procedure for changing resolution, color, appearance, screensaver options of the display

4.0 Computer Hardware and Networking Basics

4.1 Hardware Basics

4.1.1 Identify hardware used for I/P, O/P & inside computer case, system board components used for communication among devices

4.1.2 Software - 3 types of Software:ROM BIOS, OS, application software

4.1.3 Explain Functions of BIOS

4.1.4 Explain boot process

4.1.5 Explain POST and important beep codes

4.1.6 Describe about different connectors.

4.2 Networking Basics

4.1.1.Explain meaning of a computer network.

4.1.2.Describe the concept of a Local Area Network,Wide Area Network

4.1.3.Compare Internet and Intranet

4.1.4.Describe about internet service provider.

4.1.5.Explain the role of a modem in accessing the Internet.

4.1.6.Describe address format and IP address

4.1.7.What is browser and List various browsers

4.1.8.Explain the role of search engines with examples.

4.1.9.Explain Internet Security.

5.0 Basics of Cloud Computing , Big data & Ethical hacking

5.1. Introduction to Cloud Computing

5.1.1 Define Cloud

5.1.2 Use of Cloud

5.1.3 Types of Cloud

5.1.4 Explain cloud components with a diagram

5.1.5 List any five applications of cloud computing

5.2. Introduction to Big data

5.2.1 Define and list sources of Big data

5.2.2 Evolution of data/big data

5.2.3 List and explain the characteristics of big data – the three V's of big data

5.2.4 Describe Storing and selecting of Big Data

5.2.5 State the Need of Big Data

5.2.6 List types of tools used in Big Data

5.2.7 List applications of big data

5.2.8 Basics of Ethical Hacking

5.3. Define Ethical Hacking and List the categories of Hackers

5.4. Describe Roles and responsibilities of Ethical Hackers

5.5. List and explain the phases in Ethical Hacking and Explain Penetrate testing

COURSE CONTENT

1.0 Fundamentals of Digital Computer

Block diagram of a digital computer, functional parameters of CPU, Clock speed and word length, Functional blocks of a CPU: ALU and Control unit, types of memory RAM, ROM, purpose of cache memory

2.0 Programming Methodology.

Steps involved in problem solving - Define algorithm , Program - Characteristics of algorithm - Differentiate between program and algorithm- Steps involved in algorithm development - Differentiate algorithm and flowchart - Algorithms for simple problems - Symbols used in flowcharts -Flowcharts for simple problems.

3.0 Understand Operating Systems

Need for an operating system - List the various operating systems - Types of commands, Internal & External Commands Features of Windows desktop - Components of a Window - Function of each component of a Window - Method of starting a program using start button - Maximize, minimize, restore down and close buttons- Meaning of a file and folder -Viewing the contents of hard disk drive using explorer -Finding a file - Formatting a floppy disk using explore option - Installing and uninstalling new software using control panel - installing and un installing a new hardware using control panel - Drive space - disk defragmentation - Installing a printer - Changing resolution, colour, appearance and screensaver options of the display - Changing the system date and time

4.0 Computer Hardware and Networking Basics

Hardware Basics- I/P, O/P - inside computer case- system board components - 3 types of Software - BIOS- boot process - POST - different connectors. Networking Basics - computer network - Local Area Network - Wide Area Network - Compare Internet and Intranet - internet service provider - role of a modem - address format and IP address - browser - search engines with examples -Describe Internet Security.

5.0 Basics of Data structures & Emerging Trends in Computer Technology

Overview of Data Structures-Definition-Classification-Basic concepts of Stacks,Queues,Lists,Trees and Graphs.

Introduction to Cloud Computing- Definition-Usage-Types of Cloud-Cloud components-Applications.

Introduction to Big data - Big data-Evolution -characteristics – the three V's -Storing -Selecting - Need of Big Data -sources of big data -types of tools used – applications.

Basics of Ethical Hacking - categories of Hackers - Penetrate testing -Roles and responsibilities of Ethical Hackers- phases in Ethical Hacking

REFERENCE BOOKS

1. Information Technology - Curtin.
2. Computer Science Theory & Application - E. Balaguruswamy, B. Sushila
3. Introduction to Computers (Special Indian Edition) - Peter Norton
4. Cloud Computing : Principles and Paradigms -RajkumarBuyya, James Broberg and AndrzejGoscinski
5.Big Data Basics part1 and 2 in www.mssqltips.com
6.http://www.ijeset/media(for Basics of EthicalHacking)

Table specifying the scope of syllabus to be covered for Unit Test- 1, Unit Test- 2 and Unit Test -3

Unit Test	**Learning outcomes to be covered**
Unit Test – 1	**From 1.1 to 2.10**
Unit Test – 2	**From 3.1 to 4.1**
Unit Test – 3	**From 4.2 to 5.6**

C-23 CBD-106 Programming in C

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-106	Programming in C	5	150	20	80

TIME SCHEDULE:

S.No.	Chapter/Unit Title	No.of Periods	Weightage of marks	No.of short questions	No.of essay questions	CO's Mapped
1.	Introduction to C Language	20(10,10)	16	2	1	CO1,CO2
2.	Input and output statements, Operators and Expressions in C.	25(8,12, 5)	16	2	1	CO1,CO2,C3
3.	Decision making, iterative and other control statements	40(5,20,15)	26	2	2	CO1,CO2,CO3
4.	Arrays and strings, Structures and Unions	30(5,15,10)	26	2	1	CO1,CO2,CO3
5.	User defined functions, pointers, file management and pre-processor directives.	35(3,5,10,10,7)	26	2	1	CO1,CO2,CO3 ,CO4,CO5
Total		150	110	10	8	

Course Objectives	• To Relate basics of programming language constructs using C Language • To classify and implement data types, derived data types, pointers, files, statements • To analyse and develop effective modular programming • To construct mathematical, logical and scientific problems and real time applications using C language

CO NO		COURSE OUTCOMES
CO1	CBD-106.1	Develop, compile and debug programs using C- fundamentals and

		different programming statements in C language.
CO2	CBD-106.2	Evaluate various operations using primary and derived data types in C.
CO3	CBD-106.3	Analyse programs using predefined functions, modules and recursive techniques
CO4	CBD-106.4	Write scientific and logical programs using pointers, file pointers
CO5	CBD-106.5	Develop programs using information passing

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-106.1	**3**		**2**	**2**				**3**	**2**	
CBD-106.2				**2**				**3**	**3**	
CBD-106.3		**2**	**3**	**3**				**3**	**1**	**2**
CBD-106.4	**3**		**1**	**1**	**2**			**3**	**2**	**2**
CBD-106.5			**2**	**2**		**2**	**2**	**3**	**2**	**3**
Average	**3**	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**2**	**2.3**

3=Strongly mapped , 2=moderately mapped, 1=slightly mapped

Learning Objectives

1.0 Introduction to C-Language

1.1 Describe the history of C-language, structure of C-language program

1.2 Describe the programming style of C language

1.3 Explain the steps involved in Editing, compiling ,executing and debugging of C program

1.4 Describe character set, C-Tokens, Keywords, Identifiers, Constants, Variables

1.5 Define Data Type

1.6 Classify Data Types and explain them with examples.

1.7 Explain declaration of constants and variables

1.8 Explain initializing values to variables in declaration

1.9 Explain about user defined data types with a simple program

1.10 Explain the usage of type qualifiers

2.0 Input and output statements, Operators and Expressions in C

2.1 Explain the importance of Pre-processor Directive #include

2.2 Illustrate 1) Reading a character using getch(), getche() and getchar()
2) writing a character using putch(), putchar()
3) Formatted input using scanf() & write sample programs using it.
4) Formatted output using printf()& write sample programs using it.

2.3 Explain character functions

2.4 Define an operator, an expression

2.5 Explain 1) Various arithmetic operators and explain the evaluation of arithmetic expressions with example.
2) Various relational operators and discuss evaluation of relational expressions
3) Various logical operators and discuss evaluation of logical expressions

2.6 Explain the difference between unary and binary operators

2.7 Describe various assignment operators, increment and decrement operators

2.8 Illustrate nested assignment

2.9 Explain conditional operators with an example

2.10 Explain 1) Bit-wise operators and explain each with an example
2) Special operators with examples
3) Precedence and Associativity of operators

2.11 Describe evaluation of compound expression

2.12 Illustrate type conversion techniques

2.13 Write sample programs by using all the operators

3.0 Decision making, iterative and other control statements

3.1 Explain decision making statements and its need in programming

3.2 Explain
1. Simple if and if-else statement with syntax and sample program
2. Nested if..else statements with syntax and sample program
3. if-else-if ladder with syntax and sample program
4. switch statement with syntax and sample program

3.3 State the importance of break statement with switch and illustrate

3.4 Compare
1. Conditional operator with if-else statement
2. if-else with switch statement

3.5 Define looping or iteration

3.6 List and explain iterative statements with syntax and examples

3.7 Compare different loop statements

3.8 What is nested loop and illustrate.

3.9 Explain the usage of goto, break and continue statements with loop statements

3.10 Differentiate break and continue statements.

3.11 Define structured programming.

4.0 Arrays, strings, Structures and Unions

4.1 Define Array

4.2 Describe
1. Declaration and initialization of One Dimensional(1D) Array with syntax and sample programs.
2. Accessing the elements in 1D-Array with sample programs.
3. Reordering an array in ascending order.

4.3 Explain declaration and initialization and usage of two Dimensional(2D)Arrays.

4.4 Illustrate the concept of arrays with sample programs on matrix addition, subtraction and matrix multiplication

4.5 Define String

4.6 Describe

1. Declare and initialize of String variables.
2. gets() and puts()
3. Reading and displaying of strings from terminal with sample programs.
4. Explain about various String handling functions with sample programs.

4.7 Explain Character arithmetic.

4.8 Define a structure.

4.9 Explain

1. Initializing structure, Declaring structure, Declaring Structure Variables.
2. Accessing of the structure members
3. Structure assignment.
4. How to find size of a structure.
5. Nested structure concept.
6. Structures containing arrays
7. Array of structures

4.10 Define Union, declare, initialize and use of union.

4.11 Distinguish between Structures and Unions

4.12 Write sample programs for all the concepts of structures and unions

5.0 User defined functions, pointers, file management and pre-processor directives

5.1 Explain

1. Need of user defined functions
2. Advantages of the functions
3. Elements of function
4. Return values and their types

5.2 Define a function call, function prototype

5.3 Explain

1. Function declaration in programs
2. Functions with no arguments and no return values with sample programs
3. Functions with arguments with no return values with sample programs
4. Functions with arguments with return values with sample programs
5. Functions with no arguments with return values with sample programs
6. Functions that return multiple values with sample programs
7. Recursion with sample programs
8. Passing arrays to functions with sample programs
9. Structure as function arguments and structures as function values.
10. Structures containing pointers.
11. Self referential structures with examples.
12. Storage classes-auto, register, static, extern
13. Scope, visibility and lifetime of variables in functions

5.4 Differentiate Local and External variables

5.5 Define Global variable

5.6 Discuss passing the global variables as parameters using sample programs

5.7 Explain

1. Declaration and initialization of Pointers.
2. Accessing the address of a variable using &operator
3. Accessing the value of a variable through pointer
4. Pointer Arithmetic
5. Precedence of address and de-referencing operators.

6. Relationship between arrays and pointers.
7. Accessing array elements using pointers
8. Pointers as function arguments
9. Pointer arrays with examples.

5.8 Differentiate between address and de-referencing operators.

5.9 Explain

1. Dynamic memory management functions with examples.
2. Structures containing pointers.
3. Pointer to structure.
4. Self referential structures with examples.

5.10 Explain

1. Files and how to declare file pointer to a file
2. Illustrate the concept of file opening using various modes
3. Illustrate the concept of closing of a file
4. Illustrate the concept of Input / Output operations on a file
5. Illustrate the concept of random accessing files
6. Explain different file handling functions

5.11 Explain

1. Preprocessor directives
2. Need of preprocessor directives.

5.12 Write

1. Simple programs using preprocessor directives.
2. Simple program using command line arguments(argc and argv)

COURSE CONTENT

1. **Introduction to C Language**: History of C language - importance of C Define language - structure of C language - programming style of C language - steps involved in executing the C program-Character set - C Tokens - Keywords and Identifiers- Constants and Variables - Data Types and classification - declaration of constants and variables-initializing values to variables-user defined data types-usage of type qualifiers.
2. **Input and output statements, Operators and Expressions in C:** importance of Pre-processor #include-reading and writing a single character functions- formatted input and output statements-operators-classification of operators-operator precedence and associativity-expressions and expression evaluation-type conversion techniques.
3. **Understand Decision making, iterative and other control statements :**simple if,if-else, if else ladder, nested if-else-switch statement - else if, nested if , else if ladder, switch statements- Classification of various loop statements- while statement – do.. while statement ram - for loop statement - nesting of loops- Comparisons of different loop statements –goto statement-break and continue statements –concept of structured programming

4. **Understand Arrays and strings , basics of Structures and Unions:** Arrays -One Dimensional Arrays – array programs -two Dimensional Arrays- programs on matrix - Strings –- String handling functions - Structure- Array of structures - Nested structures- pointer to structure Self referential structures - Union and illustrate use of a union – difference between Structures and Union
5. **Understand User defined functions, basics of pointers, file management and pre-processor directives:** Function – user defined functions – Advantages - Recursion concept - parameter passing –storage classes - scope, visibility and lifetime of variables in functions- Local and External variables -Global variable- - Pointer - Differentiate address and de-referencing operators - Pointer Arithmetic- precedence of address and de- referencing operators - -Relationship between Arrays and Pointers - Pointers as Function Arguments - Dynamic memory management-
6. Files - file pointers - file opening in various modes - Concept of closing of a file –operations on files - Need of Pre-processor directives - Various Pre-processor directives- Macros – Command line arguments

REFERENCE BOOKS

1	Programming in ANSI C	E. Balaguruswamy	TataMcGrawHill
2	Programming with C	Gottfried	Tata McGraw Hill
3	C The complete Reference	Schildt	Tata McGrawHill

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 2.13
Unit test-2	From 3.1 to 4.6
Unit test-3	From 4.7 to 5.12

C-23 CBD-107 ENGINEERING DRAWING

Course code	Course Title	No. of periods /week	Total No. of periods	Marks for FA	Marks for SA
CBD-107	ENGINEERING DRAWING	3	90	40	60

TIME SCHEDULE:

S.No	Unit Title	No. of periods	Weightage of marks	No.of short questions	No.of essay questions	CO's Mapped
1	Use of Drawing Instruments, Free Hand Lettering and Dimensioning Practice	10	**10**	**1**	**½**	**CO1**
	Principles of Geometric Constructions	15	**15**	**1**	**1**	**CO2**
3	Projections of points, lines, planes and solids	20	**25**	**1**	**2**	**CO3**
4	Sectional Views	20	**10**	**1**	**½**	**CO4**
5	Orthographic projection	25	**20**	**0**	**2**	**CO5**
	Total	**90**	**80**	**4**	**6**	

Course Objectives and Course Outcomes

Course Objectives	Upon completion of the course the student shall be able to understand the basic graphic skills and use them in preparation, reading and interpretation of engineering drawings.

Course	**CO 1**	BD-107.1	Practice the use of engineering drawing instruments and Familiarise with the conventions to be followed in

Outcomes			engineering drawing as per BIS
	CO 2	3D-107.2	Construct the i) basic geometrical constructions ii) engineering curves
	CO 3	3D-107.3	Visualise and draw the projections of i) Points ii) Lines iii) Regular Planes iv) Regular Solids
	CO 4	ECBD-107.4	Visualise and draw the sectional views of components
	CO 5	ECBD-107.5	Visualise and draw the orthographic projections of components

CO-PO Mapping

CBD-107	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2		1		1	2	3	1
CO2	3	2	2			2	1	2	3	1
CO3	3	2	2	1	1		1	2	3	1
CO4	3	2	2	1		2	1	2	3	1
CO5	3	2	2	1	1	2	1	2	3	1
CO6	3	2	2	1	1	2	1	2	3	1
AVERAGE	**3**	**3**	**3**	**1**	**1**	**2**	**1**	**2**	**3**	**1**

LEARNING OUTCOMES

Upon completion of the course the student shall able to

1.0 **Use of Drawing Instruments, Free Hand Lettering and Dimensioning Practice**

1.1 State the importance of drawing as an engineering communication medium
1.2 Select the correct instruments to draw the different lines / curves.
1.3 Use correct grade of pencil and other instruments to draw different types of lines and for different purposes
1.4 Identify the steps to be taken to keep the drawing clean and tidy.
1.5 Write titles using vertical and slopping (inclined) lettering and numerals of 7mm, 10mm and 14mm height.
1.6 Acquaint with the conventions, notations, rules and methods of dimensioning in engineering drawing as per the B.I.S.

1.7 Dimension a given drawing using standard notations and desired system of dimensioning.

2.0 Principles of Geometric Constructions

2.1 Practice the basic geometric constructions like i) dividing a line into equal parts
i) Exterior and interior tangents to the given two circles
ii) Tangent arcs to two given lines and arcs
2.2 Draw any regular polygon using general method when i) side length is given
i) Inscribing circle radius is given ii) describing circle radius is given
2.3 Draw the engineering curves like i) involute ii) cycloid

3.0 Projections of points, lines, planes and solids (All in first quadrant only)

3.1 Explain the basic principles of the orthographic projections
3.2 Visualise and draw the projection of a point with respect to reference planes (HP & VP)
3.3 Visualise and draw the projections of straight lines with respect to two reference Planes (up to lines parallel to one plane and inclined to other plane)
3.4 Visualise and draw the projections of planes (up to planes perpendicular to one plane and inclined to other plane)
3.5 Visualise and draw the projections of regular solids like Prisms, Pyramids, Cylinder, Cone (up to axis of solids parallel to one plane and inclined to other plane)

4.0 Sectional Views

4.1 Identify the need to draw sectional views.
4.2 Draw sectional views of regular solids by applying the principles of hatching.

5.0 Orthographic projection

5.1 Draw the orthographic views of an object from its pictorial drawing.
5.2 Draw the minimum number of views needed to represent a given object fully.

Competencies and Key competencies to be achieved by the student

S.No	Major topic	Key Competency
1.	Use of Drawing Instruments, Free Hand Lettering and Dimensioning Practice	• Explain the linkages between Engineering drawing and other subjects of study in Diploma course.
		• Select the correct instruments to draw various entities in different orientation
		• Write titles using sloping and vertical lettering and numerals as per B.I.S (Bureau of Indian standards)
		• Dimension a given drawing using standard notations and desired system of dimensioning

2.	Geometrical construction	• Dividing a line into equal parts, tangents to circles, Construct involute, cycloid from the given data.
3.	Projection of points, Lines, Planes & Solids	• Draw the projections of points, straight lines, planes & solids with respect to reference planes (HP& VP)
4.	Sectional Views	• Differentiate between true shape and apparent shape of section • Apply principles of hatching. • Draw simple sections of regular solids
5.	Orthographic Projection	• Draw the minimum number of views needed to represent a given object fully.

COURSE CONTENTS:

NOTES: 1. B.I.S Specification should invariably be followed in all the topics.

2. A-3 Size Drawing Sheets are to be used for all Drawing Practice Exercises.

1.0 Use of Drawing Instruments, Free Hand Lettering and Dimensioning Practice

Explanation of the scope and objectives of the subject of Engineering Drawing . Its importance 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 f```````or 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 - Use of lettering stencils- Purpose of engineering Drawing, Need of B.I.S code in dimensioning -Shape description of an Engineering object -Definition of Dimensioning size description -Location of features, surface finish, fully dimensioned Drawing -Notations or tools of dimensioning, dimension line extension line, leader line, arrows, symbols, number and notes, 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 Geometric Constructions

Division of a straight line into given number of equal parts –Drawing interior and exterior tangents to two circles of given radii and centre distance-Drawing tangent arc of given radius to 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

circles internally and externally-Construction of any regular polygon by general method for given side length, inscribing circle radius and describing/superscripting circle radius - Involute, Cycloid, explanations as locus of a moving point, their engineering application, viz., Gear tooth profile, screw threads, springs etc. – their construction

3.0 Projection of points, lines and planes and Solids (All in first quadrant only)

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)Perpendicular to one of the planes and (c) Inclined to one plane and parallel to other 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 the planes, (b) Axis parallel to VP and inclined to HP and vice versa.

4.0 Sectional Views

Need for drawing sectional views – what is a sectional view - Hatching – Section of regular solids inclined to one plane and parallel to other plane

5.0 Orthographic Projections

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 - Concept of front view, top view, and side view sketching these views for a number of engineering objects - Explanation of first angle projection. – Positioning of three views in First angle projection -Projection of points as a means of locating the corners of the surfaces of an object – 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.

REFERENCE BOOKS

1 Engineering Graphics by P I Varghese – (McGraw-hill)
2 Engineering Drawing by Basant Agarwal & C.M Agarwal - (McGraw-hill)
3 Engineering Drawing by N.D.Bhatt.
4 T.S.M. & S.S.M on " Technical Drawing" prepared by T.T.T.I., Madras.
5 SP-46-1998 – Bureau of Indian Standards.

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit Test – I	From 1.1 to 2.3
Unit Test – II	From 3.1 to 3.5
Unit Test – III	From 4.1 to 5.2

CBD-108 Programming in C Lab

Course Code	Course title	No of periods/week	Total no of periods	Marks for FA	Marks for SA
CBD-108	**Programming in C Lab**	**06**	180	40	60

S No	Chapter/ Unit Title	No. of Periods	COs Mapped
1.	**Fundamentals and Input/Output statements**	15	CO1,CO2
2.	**Control statements**	45	CO1,CO2,CO4
3.	**Arrays, structures and unions**	60	CO1,CO2,,CO3,CO4
4.	**User defined functions, storage classes,pointers, files and macros**	60	CO1,CO2,CO3,CO4,CO5, CO6
	Total	**180**	

COURSE OBJECTIVES	**Upon completion of the course the student shall be able to** Edit, compile and debug execution of C-Programs 1. Learn the syntax of all the statements, keywords, user defied identifiers and usage of writing statements in C-Program. 2. Evaluate all the expressions using different primary types of data, derived data, operators and with their precedence, 3. Write C-programs using I/O statements, decision making statements. 4. Write structured and modular C-programs 5. Write C-programs on text files using different file operating modes and file pointers. 6. Write C-programs to implement dynamic memory allocation using pointer concepts

CO No		COURSE OUTCOMES
CO 1	CBD-108.1	Perform Edit, compile and debug and execution of C-Programs (12)

CO 2	CBD-108.2	Develop programs using different predefined functions, keywords, user defined identifiers (18)
CO 3	CBD-108.3	Evaluate different expressions using available C-operators and valid data supported by C-language (24)
CO 4	CBD-108.4	Develop C-programs using control statements, array's, structures, unions, files (90)
CO 5	CBD-108.5	Develop C-programs using user defined functions and recursion (24)
CO 6	CBD-108.6	Develop C-programs to implement dynamic memory concept(12)

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-108.1	**2**	**2**			**1**			**2**		
CBD-108.2	**2**	**3**		**2**					**2**	**2**
CBD-108.3					**2**			**2**		**3**
CBD-108.4	**2**		**3**	**2**	**3**	**3**	**2**		**2**	**2**
CBD-108.5	**2**			**2**	**3**	**2**			**2**	**2**
CBD-108.6				**2**	**3**				**2**	**2**
Average	**2**	**2.5**	**3**	**2**	**2.4**	**2.5**	**2**	**2**	**2**	**2.2**

3=Strongly mapped , 2=moderately mapped, 1=slightly mapped

LEARNING OUTCOMES:

Fundamentals and Input / Output statements

1. Exercise on structure of C Program
2. Exercise on Keywords and identifiers
3. Exercise on constants and variables
4. Execution of simple C program
5. Exercise on operators and expressions
6. Exercise on special operators
7. Exercise on input and output of characters
8. Exercise on formatted input and output
9. Exercise on escape sequence characters

Control statements

(Note: Every statement must be repeated with at least 5 different applications)

10. Exercise on simple if statement
11. Exercise on if..else statement
12. Exercise on if..else..if ladder statement
13. Exercise on switch statement
14. Exercise on conditional operator comparing with if-else statement
15. Exercise on while statement
16. Exercise on for statement
17. Exercise on do. While statement

Arrays, structures and unions

18. Exercise on one dimensional arrays
19. Exercise on two dimensional arrays
20. Exercise on strings
21. Exercise on structure
22. Exercise on union
23. Exercise on array of structures

User defined functions, storage classes, pointers, files, and macros

24. Exercise on user-defined function
25. Exercise on storage classes
26. Exercise on parameter passing techniques
27. Exercise on recursion
28. Exercise on pointers
29. Exercise on text files
30. Exercise on macros

The competencies and key competencies to be achieved by the student

S. No.	Name of the experiment	Objectives	Key Competencies
1	Exercise on structure of C program	For a given C program, identify the different building blocks	❖ Identify different building block in a C program
2	Exercise on Keywords and identifiers	For a given C program identify the keywords and identifiers	❖ Identify different keywords ❖ Check whether the keywords are in lowercase ❖ Differentiate identifiers and keywords
3	Exercise on constants and variables	For a given C program identify the constants and variables	❖ Identify the constants ❖ Identify the variables ❖ Declare variables with proper names ❖ Know the assignment of values to variables
4	Execution of simple C program	Execute a simple C program	❖ Acquaint with C program editing ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program

5	Exercise on operators and expressions	Write a C program that uses different arithmetic operators	❖ Identify different arithmetic operators ❖ Build arithmetic expressions ❖ Identify the priorities of operators ❖ Evaluate arithmetic expression ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program ❖ Check the output for its correctness
6	Exercise on special operators	Write a C program that uses special operators	❖ Identify different special operators ❖ Build expressions using special operators ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program ❖ Check the output for its correctness
7	Exercise on input and output of characters	Write a C program for reading and writing characters	❖ Know the use of get char() function ❖ Know the use of put char() function ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program ❖ Check whether the correct output is printed for the given input
8	Exercise on formatted input and output	Write a C program using formatted input and formatted output	❖ Know the use of format string for different types of data in scan f() function ❖ Know the use of format string for different types of data in print f() function ❖ Check whether the data is read in correct format ❖ Check whether the data is printed in correct format
9	Exercise on Escape Sequence Characters	Write a C program using Escape Sequence Characters	❖ Know the use of Escape sequence characters ❖ Use the Escape sequence characters ❖ Check whether the data is read in correct format ❖ Rectify the syntax errors ❖ Check the output for correctness
10	Exercise on simple if statement	Write a C program using simple if statement	❖ Build a relational expression ❖ Use the if statement for decision making ❖ Rectify the syntax errors ❖ Check the output for correctness
11	Exercise on if..else statement	Write a C program using if..else statement	❖ Build a relational expression ❖ Use the if..else statement for decision making ❖ Rectify the syntax errors ❖ Check the output for correctness

12	Exercise on else..if ladder statement	Write a C program using else..if ladder statement	❖ Use else..if ladder statements with correct syntax ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check the output for correctness
13	Exercise on switch statement	Write a C program using switch statement	❖ Use switch statement with correct syntax ❖ Identify the differences between switch and else..if ladder ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check the output for correctness
14	Exercise on conditional operator	Write a C program using (**?** **:**) conditional operator	❖ Build the three expressions for conditional operator ❖ Use conditional operator with correct syntax ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Differentiate conditional operator and if..else statement
15	Exercise on while statement	Write a C program using while statement	❖ Build the termination condition for looping ❖ Use while statement with correct syntax ❖ Check whether correct number of iterations are performed by the while loop ❖ Rectify the syntax errors ❖ Debug logical errors
16	Exercise on **for** statement	Write a C program using for statement	❖ Build the initial, increment and termination conditions for looping ❖ Use for statement with correct syntax ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check whether correct number of iterations are performed by the **for** loop ❖ Differentiate **for** and **while** statements
17	Exercise on **do..while** statement	Write a C program using do statement	❖ Build the termination condition for looping ❖ Use do statement with correct syntax ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check whether correct number of iterations are performed by the while loop ❖ Differentiate **do..while, while** and **for** statements
18	Exercise on one dimensional arrays	Write a C program to create and access one dimensional array	❖ Create a one dimensional array with correct syntax ❖ Store elements into array ❖ Read elements from array ❖ Validate boundary conditions while accessing elements of array

			❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
19	Exercise on two dimensional arrays	Write a C program to create and access two dimensional array	❖ Create a two dimensional array with correct syntax ❖ Store elements into array ❖ Read elements from array ❖ Validate boundary conditions while accessing elements of array ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
20	Exercise on strings	Write a C program for reading and writing strings	❖ Declare and initialize string variables ❖ Read strings from keyboard ❖ Print strings to screen
21	Exercise on structure	Write a C program using structure	❖ Define a structure with correct syntax ❖ Identify different members of a structure ❖ Declare a structure variable ❖ Access different members of structure ❖ Observe the size of the structure ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
22	Exercise on union	Write a C program using union	❖ Define a union with correct syntax ❖ Identify different members of a union ❖ Declare a union variable ❖ Access different members of union ❖ Observe the size of the union ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
23	Exercise on array of structures	Write a C program to create an array of structures and store and retrieve data from that array	❖ Define a structure with correct syntax ❖ Identify different members of a structure ❖ Declare a structure variable ❖ Create an array of structure ❖ Access individual element of the array of structure ❖ Access different members of structure ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
24	Exercise on user-defined function	Write a C program to define and call user-	❖ Identify the different parts of function declaration ❖ Define function with correct syntax

		defined functions	❖ Classify functions based on it parameters and return types ❖ Identify parameters passed ❖ Identify parameter passing method used ❖ Identify return value ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
25	Exercise on storage classes	Write a C program using different storage classes	❖ Know the use of different storage classes ❖ Use the different storage classes ❖ Check whether the scope of variables is correctly defined or not. ❖ Rectify the syntax errors ❖ Check the output for correctness
26	Exercise on parameter passing techniques	Write a C program using parameter passing techniques	❖ Know the use of parameter passing ❖ Use the different parameter passing techniques ❖ Check whether the parameters passed correctly or not. ❖ Rectify the syntax errors ❖ Check the output for correctness
27	Exercise on recursion	Write a C program using recursion	❖ Identify where recursive call is made in the function ❖ Validate the termination condition ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
28	Exercise on pointers	Write a C program using pointer data type	❖ Declare pointer variable ❖ Initialize pointer variable ❖ Access a variable through its pointer ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
29	Exercise on text files	Write a C program to create a text file, write data into it and read data from it	❖ Define a file pointer ❖ Use the various modes of file opening ❖ Close the file ❖ Write text into file ❖ Read text from file ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
30	Exercise on macros	Write a C program using macros	❖ Know the need of macros ❖ Use the macros/pre processor directives ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input

C-23 CBD-109 ENGINEERING PHYSICS LAB

SUBJECT	SUBJECT CODE	TOTAL PERIODS	NUMBER OF PERIODS PER WEEK
PHYSICS LAB	COMMON -109	45	03

Course objectives	(1) To provide strong practical knowledge of Physics to serve as a tool for various device applications in Engineering. (2) To enhance scientific skills of the students by incorporating new experiments so as to enrich the technical expertise of the students as required for industries.

COURSE OUTCOMES	CO1	Improving accuracy in various measurements; understanding the nature of the forces keeping the body in equilibrium.
	CO2	Estimating the acceleration caused by the gravity of earth; Practical study of the concepts of refraction of light at curved/plane surface
	CO3	Understanding the pressure of the gas as function of its volume; study of the combined magnetic field of the earth and an artificial magnet to estimate its pole strength; Estimating the velocity of sound in air through resonance phenomenon.
	CO4	Applying Kirch off's laws to evaluate the specific resistance of a wire; Study of exchange of heat from system to surrounding by graphical analysis; Conversion of light energy to micro currents as potential engineering application.

CO-PO MAPPING

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-PO Mapping Strength

Course code Common - 109	**Engineering Physics No of Course Objectives : 4**				**No of periods 45**
Pos	Mapped with CO No	CO periods addressing PO in Col 1 NO	%	1,2,3	Remarks
PO1	CO1,CO2,CO3,CO4	15	33.3 %	2	>40% level 3 (highly addressed) 25% to 40% level 2 (moderately addressed) 5% to 25% level 1 (Low addressed) < 5% (not addressed)
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 = strongly mapped, 2 = moderately mapped, 1 = slightly mapped

Note: The gaps in CO and PO mapping will be achieved by one or more appropriate activities from the following.

(i) Seminars (ii) Viva-voce (iii) Assignments
(iv) Quiz competitions (v) Industrial visits (vi) Tech fest (vii) Mini project
(viii) Group discussions (ix) Virtual labs (x) Library visit for e-books

ENGINEERING PHYSICS LAB

Subject Title : Engineering Physics Lab
Subject Code : Common-109
Periods per week : 03
Total periods per year : 45

TIMESCHEDULE

S.No	List of experiments	No.of Periods
1.	Vernier callipers	03
2.	Micrometer (Screw gauge)	03
3.	Verification of Lami's theorem using concurrent forces	03
4.	Determination of 'g' using simple pendulum	03
5.	Focal length and focal power of convex lens	03
6.	Refractive index of solid using travelling microscope	03
7.	Verification of Boyle's law using Quill tube	03
8	Determination of pole strength of the bar magnet through magnetic field lines	03
9	Resonance apparatus – Determination of velocity of sound in air	03
	Experiments for demonstration	
10	Meter bridge – Determination of resistance and specific resistance of a wire	03
11	Verification of Newton's law of cooling	03
12	Photo electric cell – Study of its characteristics	03
	Revision	06
	Test	03
	Total:	**45**

Learning Outcomes

Upon completion of the course the student shall be able to

1.0 Practice with Vernier calipers to determine the volumes of cylinder and sphere.

2.0 Practice with Screw gauge to determine thickness of a glass plate and cross sectional area of a wire.
3.0 Verify the Lami's theorem using concurrent forces.
4.0 Determine the value of acceleration due to gravity (g) using Simple Pendulum. To verify the result from $l\text{-}T^2$ graph.
5.0 Calculate the Focal length and focal power of convex lens using distant object method and U-V method. To verify the result from U-V graph and 1 / U – 1 / V graph methods.
6.0 Determine the refractive index of a solid using travelling microscope
7.0 Verify the Boyle's law using Quill tube. To draw a graph between P and 1/l.
8.0 Determination of magnetic pole strength of a bar magnet by drawing magnetic lines of force and locating null points (either N - N or N - S method)
9.0 Determine the velocity of sound in air at room temperature and its value at zero degree Centigrade using resonance apparatus.
10.0 Determine the resistance and specific resistance of material of a wire using Meter Bridge
11.0 To verify the Newton's law of cooling.
12..0 To study the characteristics of photo electric cell.

Course Outcomes

S.No	List of experiments	No.of Periods	COs
1.	Vernier callipers	03	CO1
2.	Micrometer (Screw gauge)	03	
3.	Verification of Lami's theorem using concurrent forces	03	
4.	Determination of g using simple pendulum	03	CO2
5.	Focal length and power of convex lens	03	
6.	Refractive index of solid using travelling microscope	03	
7.	Verification of Boyle's law using Quill tube	03	CO3
8	Determination of pole strength of the bar magnet through magnetic field lines	03	
9	Resonance apparatus – Determination of velocity of sound in air	03	
10	Meter bridge – Determination of resistance and specific resistance of a wire	03	CO4
11	Verification of Newton's law of cooling	03	
12	Photo electric cell – Study of its characteristics	03	

Competencies and Key competencies to be achieved by the student

Name of the Experiment (Nu	Competencies	Key competencies

1 . Practice on Vernier Calipers (03)	• Find the Least count • Fix the specimen in position • Read the scales • Calculate the physical quantities of given object	• Read the scales • Calculate the requisite physical quantities of given objects • Calculating volumes of the cylinder and sphere
2. Practice on Screw gauge(03)	• Find the Least count • Fix the specimen in position • Read the scales • Calculate thickness of glass plate and cross section of wire from radius	• Read the scales • Noting zero error • Calculate thickness of given glass plate • Calculate cross section of wire from radius
3. Verification of Lami's theorem forces(03)	• Making experimental set up • Fix suitable weights • Note the positions of threads on drawing sheet • Find the angles between the concurrent forces • Changing weights appropriately • Verify Lami's theorem	•Measuring angles between the forces • Marking the directions f forces on a paper • Verifying Lami's theorem from the weights and easured angles etween the forces.
4. Simple pendulum(03)	• Fix the simple pendulum to the stand • Adjust the length of pendulum • Find the time for number of oscillations (say 20) • Find the time period • Calculate the acceleration due to gravity • Draw l-T^2 graph	• Find the time for number of oscillations • Find the time period • Calculate the acceleration due to gravity • Verify form l-T^2 graph
5. Focal length and Focal power of convex lens (03)	• Fix the object distance • Find the Image distance • Calculate the focal length and power of convex lens • Draw u-v and 1/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
6 Refractive index of solid using traveling microscope(03)	• Find the least count of Vernier on microscope • Place the graph paper below microscope • Read the scales	• Reading the scales on Microscope. • Fiding real and apparent thickness of the slab • Calculate the refractive

7 . Boyle's law verification (03)	• Note the atmospheric pressure • Fix the Quill tube to retort stand • Find the length of air column • Find the pressure of enclosed air • Find and compare the calculated 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 • Find the values of Px l • Verify Boyle's law.
8. Mapping of magnet lines of force (03)	• Draw magnetic meridian • Place the bar magnet in N-N or N-S directions • Draw magnetic lines of force • Locate the neutral points	• Draw the pattern of magnetic lines of force • Locate the neutral points • Calculating pole strength of the bar magnet
9. Velocity of sound in air – Resonance method (03)	• Arrange the resonance apparatus • Adjust the reservoir level for booming sound • Find the first and second resonating lengths • Calculate velocity of sound .	• Adjust the reservoir level • Find the first and second resonating lengths • Calculate velocity of sound at room temperature and at 0^0 C
10. Meter bridge(03)	• Make the circuit connections • Find the balancing length • Calculate unknown resistance • Find the radius of wire • Calculate the specific resistance	• Making connections as per circuit diagram. • Find the balancing length • Calculate unknown resistance • Calculate the specific resistance of the given wire
11. Verification of Newton's law of Cooling (03)	• Heating liquid in a beaker using a heating element • Inserting thermometer in liquid in calorimeter • Stirring liquid • Measuring temperatures as a function of time using thermometer • Plotting a cooling curve	• Measuring temperature of a liquid as function of time. • Plotting a cooling curve. • Verifying Newton's law of cooling.

12. Photo electric cell – Study of its Characteristics (03)	• Experimental set up and making connections • Verifying intensity of light by varying distances between light source and photocell. • Measuring Voltage and current values.	• Making connections for experimental set up. • Varying distances appropriately • Measuring Voltage and current values. • Study of V- I Characteristics form graph.

Scheme of Valuation for End Practical Examination:

Activity	Marks
For writing, Apparatus, formulae, least count (if applicable)	5
Procedure & precautions	5
Drawing Tables	3
Readings, calculations, graph (if applicable), reporting the findings	12
Viva-voce	5
Total marks	**30**

CHEMISTRYLABORATORY
(C-23 curriculum common to all Branches)

Subject Title : Chemistry Laboratory
Subject Code : Common -109
Periods per week : 03
Total periods per year : 45

CO1	Operate and practice volumetric apparatus and preparation of standard solution.
CO2	Evaluate and judge the neutralization point in acid base titration.
CO3	Evaluate the end point of reduction and oxidation reaction.
CO4	Judge the stable end point of complex formation, stable precipitation.
CO5	Judge operate and demonstrate and perform precise operations with instrument for investigation of water pollution parameters.

PO- CO mapping

urse code Common-110	**Chemistry Laboratory No. of CO's:5**				**No. of periods : 45**
POs	Mapped with CO No.	CO periods addressing PO in Col. No. 1	%	Level 1,2,3	Remarks
PO1	CO1,CO2,CO3, CO4,CO5	12	26.66	2	Level 3 (highly addressed)
PO2	CO1,CO2,CO3, CO4,CO5	9	20	1	
PO3					25% to 40%
PO4	CO1,CO2,CO3, CO4,CO5	12	26.66	2	2 (moderately addressed)
PO5	CO2,CO3, CO4,CO5	12	26.66	2	5% to 25%
PO6	-	-	-	-	Level1 (Low addressed)
PO7	-	-	-	-	< 5%(not addressed)

COs-POs mapping strength (as per given table)

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=strongly mapped2= moderately mapped1= slightly mapped

Note: The gaps in CO and PO mapping will be achieved by one or more appropriate activities from the following: i) Seminars ii) Tutorials iii) Guest Lectures iv) Assignments v) Quiz competitionsvi) Industrial visit vii) Tech Fest viii) Mini project ix) Group discussions x) Virtual classes xi) Library visit for e-books

TIMESCHEDULE

S.No	Name of the Experiment	No.of Periods	Mapped with COs
1.	a) Recognition of chemical substances and solutions used in the laboratory by senses. iliarization of methods for Volumetric analysis.	03	CO 1
2.	Preparation of Std.Na_2CO_3solution and making solutions of different	03	CO1
3.	EstimationofHClsolutionusingStd.Na_2CO_3solution.	03	CO2
4.	Estimation of NaOH using Std.HCl solution.	03	CO2
5.	Determination of acidity of water sample.	03	CO2
6.	Determination of alkalinity of water sample.	03	CO2
7.	Estimation of Mohr's Salt usingStd.$KMnO_4$ Solution.	03	CO3
8.	Estimation of Ferrous ion by using Std. $K_2Cr_2O_7$solution.	03	CO3
9.	Determination of total hardness of water sample using Std. EDTA solution	03	CO4
10.	Estimation of Chlorides present in water sample by using Std. $AgNO_3$ solution	03	CO4
11.	Estimation of Dissolved Oxygen (D.O) in water sample by using Std. hypo solution	03	CO5
12.	Determination of pH using pH meter.	03	CO 5
13.	Determination of conductivity of water and adjusting ionic strength	03	CO 5
14.	Determination of turbidity of water.	03	CO 5
15.	Estimation of total solids present in water sample.	03	CO 5
	Total:	**45**	

Objectives:

Upon completion of the course the student shall be able to

1.0 To identify the chemical compounds and solutions by senses.
Practice volumetric measurements (using pipettes, measuring jars, volumetric flask, burettes) and gravimetric measurements (using different types of balances), making dilutions, etc.

2.0 Practice making standard solutions with pre weighed salts and to make solutions of desired dilutions using appropriate techniques.

3.0 Conduct titrations adopting standard procedures and using Std. Na_2CO_3solutionfor estimation of HCl.

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

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

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

8.0 Conduct titrations adopting standard procedures and using Std.$K_2Cr_2O_7$ solutionfor estimation of Ferrous ion.
9.0 Conduct titrations adopting standard procedures to determine the total hardness of given samples of water (One ground water and one surface / tap water) using Std. EDTA solution.
10. Conduct titrations adopting standard procedures to determine the chloridespresent in the given 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 containerand one from open container / tap water) by Std. Hypo solution.
12. Conduct the test on given samples of water / solutions (like soft drinks, sewage, etc.) to determine their pH using standard pH meter.
13. Conduct the test on given samples of water / solutions.
    a) to determine conductivity.
    b) to adjust the ionic strength of the sample to the desired value.
14. Conduct the test on given samples of solutions (coloured and non-coloured)to determine their turbidity in NTU.
15. Determine the total solids present in given samples of water(One ground water and one surface / tap water).

Competencies and Key competencies to be achieved by the student

Name of the Experiment (No of Periods)	**Competencies**	**Key competencies**
Recognition of chemical substances and solutions. Familiarization of methods for Volumetric analysis.	-	--
Preparation of Std.Na_2CO_3 solution and making solutions of different dilutions. (03)	▪ Weighing the salt to the accuracy of .01 mg. ▪ Measuring the water with volumetric flask, measuring jar, volumetric pipette and graduated pipette. ▪ Making appropriate dilutions.	▪ Weighing the salt to the accuracy of 0.01 mg. ▪ Measuring the water with volumetric flask, measuring jar, volumetric pipette and graduated pipette. ▪ Making appropriate dilutions.
Estimation of HCl solution using Std. Na_2CO_3 solution. (03)	▪ Cleaning the glassware and rinsing with appropriate solutions. ▪ Making standard solutions. ▪ Measuring accurately the standard solutions and titrants. ▪ Filling the burette with titrant. ▪ Fixing the burette to the stand. ▪ Effectively Controlling the flow of the titrant. ▪ Identifying the end point. ▪ Making accurate observations. ▪ Calculating the results.	▪ Making standard solutions. ▪ Measuring accurately the standard solutions and titrants. ▪ Effectively Controlling the flow of the titrant. ▪ Identifying the end point. ▪ Making accurate observations.
Estimation of NaOH using Std.HCl solution. (03)		
Determination of acidity of water sample. (03)		
Determination of alkalinity of water sample. (03)		
Estimation of Mohr's Salt using Std.$KMnO_4$ solution. (03)		
Estimation of Ferrous ion by using Std.$K_2Cr_2O_7$ solution (03)		

Determination of total hardness of water using Std.EDTA solution. (03)		
Estimation of Chlorides present in water sample using Std. $AgNO_3$ solution (03)		
Estimation of Dissolved Oxygen(D.O) in water sample (By titration method) (03)		
Determination of pH using pH meter. (03)	▪ Familiarize with instrument. ▪ Choose appropriate 'Mode' / 'Unit'. ▪ Prepare standard solutions / buffers, etc. ▪ Standardize the instrument with appropriate standard solutions. ▪ Plot the standard curve. ▪ Make measurements accurately. ▪ Follow Safety precautions.	▪ Prepare standard solutions / buffers, etc. ▪ Standardize the instrument with appropriate standard solutions. ▪ Plot the standard curve. ▪ Make measurements accurately.
Determination of conductivity of water and adjusting ionic strength to required level. (03)		
Determination of turbidity of water. (03)		
Estimation of total solids present in water sample. (03)	▪ Measuring the accurate volume and weight of sample. ▪ Filtering and air drying without losing any filtrate. ▪ Accurately weighing the 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 filtrate

SCHEME OF VALUATION

A) Writing Chemicals, apparatus,principle and procedure. 5M

B) Demonstrated competencies. 20M
   Making standard solutions.
   Measuring accurately the standard solutions and titrants.
   Effectively controlling the flow of the titrant.
   Identifying the end point.
   Making accurate observations.

C) Viva-voce. 5M

Total **30M**

CBD-110 (common to all branches) Computer Fundamentals Lab

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-110 (common to all branches)	Computer Fundamentals Lab	4	120	40	60

Time schedule:

S.No.	Chapter/Unit Title	No. of sessions each of 4 periods duration	No.of Periods
1.	Computer hardware Basics	2	8
2.	Windows Operating System	2	8
3.	MS Word	8	32
4.	MS Excel	7	28
5.	MS PowerPoint	5	20
6.	Adobe Photoshop	6	24
	Total periods	**30**	**120**

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Computer hardware Basics	8	CO1
2.	Windows Operating System	8	CO1
3.	MS Word	32	CO2
4.	MS Excel	28	CO3
5.	MS PowerPoint	20	CO4
6	Adobe Photoshop	24	CO5
	Total periods	**120**	

Course Objectives	i)To know Hardware Basics ii)To familiarize operating systems iii)To use MS Office effectively to enable to students use these skills in future courses iv) To use Adobe Photoshop in image editing.

Course Outcomes	At the end of the course students will be able to		
	CO1	CBD -110.1	Identify hardware and software components
	CO2	CBD -110.2	Prepare documents with given specifications using word processing software
	CO3	CBD -110.3	Use Spread sheet software to make calculation and to draw various graphs / charts.
	CO4	CBD -110.4	Use Power point software to develop effective presentation for a given theme or topic.
	CO5	CBD -110.5	Edit digital or scanned images using Photoshop

CO-PO/PSO MATRIX

CO NO.	PO	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3

	1									
CBD-110.1	3	3	3	3	3	3	3	3	2	3
CBD - 110.2	3	3	3	3	3	3	3	3	2	3
CBD - 110.3	3	3	3	3	3	3	3	3	2	3
CBD - 110.4	3	3	3	3	3	3	3	3	2	3
CBD - 110.5	3	3	3	3	3	3	3	3	2	3
Average	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**

3=Strongly mapped , 2=moderately mapped, 1=slightly mapped

Learning Outcomes:

I. Computer Hardware Basics

1. a).To Familiarize with Computer system and hardware connections
   b).To Start and Shut down Computer correctly
   c).To check the software details of the computer
2. To check the hardware present in your computer

II. Windows's operating system

3. To Explore Windows Desktop
4. Working with Files and Folders
5. Windows Accessories: Calculator – Notepad – WordPad – MS Paint

III. Practice with MS-WORD

6. To familiarize with Ribbon layout of MS Word
   Home – Insert- Page layout – References – Review- View.
7. To practice Word Processing Basics
8. To practice Formatting techniques
9. To insert a table of required number of rows and columns
10. To insert Objects, Clipart and Hyperlinks
11. To use Mail Merge feature of MS Word
12. To use Equations and symbols features

IV. Practice with MS-EXCEL

13. To familiarize with MS-EXCEL layout
14. To access and enter data in the cells
15. To edit a spread sheet- Copy, Cut, Paste, and selecting Cells
16. To use built in functions and Formatting Data
17. To create Excel Functions, Filling Cells
18. To enter a Formula for automatic calculations
19. To sort and filter data in table.
20. To present data using Excel Graphs and Charts.
21. To develop lab reports of respective discipline.
22. To format a Worksheet in Excel, Page Setup and Print

V. Practice with MS-POWERPOINT

23. To familiarize with Ribbon layout features of PowerPoint 2007.
24. To create a simple PowerPoint Presentation

25. To set up a Master Slide in PowerPoint
26. To insert Text and Objects
27. To insert a Flow Charts
28. To insert a Table
29. To insert a Charts/Graphs
30. To insert video and audio
31. To practice Animating text and objects
32. To Review presentatio

VI. Practice with Adobe Photoshop

33.To familiarize with standard toolbox
34. To edit a photograph.
35. To insert Borders around photograph.
36. To change Background of a Photograph.
37. To change colors of Photograph.
38. To prepare a cover page for the book in your subject area.
39. To adjust the brightness and contrast of the picture so that it gives an elegant look.
40. To type a word and apply the shadow emboss effects.

Key competencies:

Expt No	Name of Experiment	Competencies	Key competencies
1 (a).	To familiarize with Computer system and hardware connections	a. Identify the parts of a Computer system: i). CPU ii). Mother Board iii) Monitor iv) CD/DVD Drive v) Power Switch vi) Start Button vii) Reset Button b. Identify and connect various peripherals c. Identify and connect the cables used with computer system d. Identify various ports on CPU and connect Keyboard & Mouse	Connect cables to external hardware and operate the computer
(b).	To Start and Shut down Computer correctly	a. Log in using the password b. Start and shut down the computer c. Use Mouse and Key Board	a. Login and logout as per the standard procedure b. Operate mouse &Key Board
(c).	To Explore Windows Desktop	a. Familiarize with Start Menu, Taskbar, Icons and Shortcuts b. Access application programs using Start menu, Task manager c. Use Help support	a. Access application programs using Start menu b. Use taskbar and Task manager
2.	To check the software details of the computer	a. Find the details of Operating System being used b. Find the details of Service Pack installed	Access the properties of computer and find the details

3.	To check the hardware present in your computer	a. Find the CPU name and clock speed b. Find the details of RAM and Hard disk present c. Access Device manager using Control Panel and check the status of devices like mouse and key board d. Use My Computer to check the details of Hard drives and partitions e. Use the Taskbar	a. Access device manager and find the details b. Type /Navigate the correct path and Select icon related to the details required
4.	Working with Files and Folders	a. Create folders and organizing files in different folders b. Use copy / paste move commands to organize files and folders	a. Create files and folders Rename , arrange and search for the required folder/file
	Working with Files and Folders Continued....	c. Arrange icons – name wise, size, type, Modified d. Search a file or folder and find its path e. Create shortcut to files and folders (in other folders) on Desktop f. Familiarize with the use of My Documents g. Familiarize with the use of Recycle Bin	b. Restore deleted files from Recycle bin
5.	To use Windows Accessories: Calculator – Notepad – WordPad – MS Paint	a. Familiarize with the use of Calculator b. Access Calculator using Run command c. Create Text Files using Notepad and WordPad and observe the difference in file size d. Use MS paint and create .jpeg, .bmp files using MS Paint	a. Use windows accessories and select correct text editor based on the situation. b. Use MS pain to create /Edit pictures and save in the required format.
6.	To familiarize with Ribbon layout of MS word. – Home – Insert- page layout- References- Review-View	a. Create/Open a document b. Use Save and Save as features c. Work on two Word documents simultaneously d. Choose correct Paper size and Printing options	a. Create a Document and name appropriately and save b. Set paper size and print options.
7.	To practice Word Processing Basics	a. Typing text b. Keyboard usage c. Use mouse (Left click / Right click / Scroll) d. Use Keyboard shortcuts e. Use Find and Replace	a. Use key board and mouse to enter/edit text in the document. b. Use shortcuts c. Use spell check/ Grammar features for

		features in MS- word f. Use Undo and Redo Features g. Use spell check to correct Spellings and Grammar	auto corrections.
8.	To practice Formatting techniques	a. Formatting Text b. Formatting Paragraphs c. Setting Tabs d. Formatting Pages e. The Styles of Word f. Insert bullets and numbers g. Themes and Templates h. Insert page numbers, header and footer	a. Format Text and paragraphs and use various text styles. b. Use bullets and numbers to create lists c. Use Templates /Themes d. Insert page numbers date, headers and footers
9.	To insert a table of required number of rows and columns	a. Edit the table by adding the fields – Deleting rows and columns –inserting sub table –marking borders. Merging and splitting of cells in a Table b. Changing the background colour of the table c. Use table design tools d. Use auto fit – fixed row/ column height/length – Even distribution of rows / columns features e. Convert Text to table and Table to Text f. Use Sort feature of the Table to arrange data in ascending/descending order	a. Insert table in the word document and edit b. Use sort option for arranging data.
10.	To Insert objects, clipart and Hyperlinks	a. Create a 2-page document. &Insert hyperlinks and t Bookmarks. b. Create an organization chart c. Practice examples like preparing an Examination schedule notice with a hyperlink to Exam schedule table.	a. Insert hyperlinks &Bookmarks b. Create organization charts/flow charts
11.	To Use Mail merge feature of MS Word	a. Use mail merge to prepare individually addressed letters b. Use mail merge to print envelopes.	Use Mail merge feature
12.	To use Equations and symbols features.	a. Explore various symbols available in MS Word b. Insert a symbol in the text c. Insert mathematical equations in the document	Enter Mathematical symbols and Equations in the word document

13.	To Practice with MS-EXCEL	a. Open /create an MS Excel spreadsheet and familiarize with MS Excel 2007 layout like MS office Button- b. Use Quick Access Toolbar- Title Bar- Ribbon-Worksheets- Formula Bar-Status Bar	a. Familiarize with excel layout and use b. Use various features available in toolbar
14.	To access and Enter data in the cells	a. Move Around a Worksheets-Quick access - Select Cells b. Enter Data-Edit a Cell-Wrap Text-Delete a Cell Entry-Save a File-Close Excel	a. Access and select the required cells by various addressing methods b. Enter data and edit
15.	To edit spread sheet Copy, Cut, Paste, and selecting cells	a. Insert and Delete Columns and Rows-Create Borders-Merge and Center b. Add Background Color-Change the Font, Font Size, and Font Color c. Format text with Bold, Italicize, and Underline-Work with Long Text-Change a Column's Width	Format the excel sheet
16.	To use built in functions and Formatting Data	a. Perform Mathematical Calculations verify - AutoSum b. Perform Automatic Calculations-Align Cell Entries	Use built in functions in Excel
17.	To enter a Formula for automatic calculations	a. Enter formula b. Use Cell References in Formulae c. Use Automatic updating function of Excel Formulae d. Use Mathematical Operators in Formulae e. Use Excel Error Message and Help	Enter formula for automatic calculations
18.	To Create Excel Functions, Filling Cells	a. Use Reference Operators b. Work with sum, Sum if , Count and Count If Functions c. Fill Cells Automatically	a. Create Excel sheets involving cross references and equations b. Use the advanced functions for conditional calculations
19.	To sort and filter data in table	a. Sort data in multiple columns b. Sort data in a row	a. Refine the data in a worksheet and keep it organized

		c. Sort data using Custom order d. Filter data in work sheet	b. Narrow a worksheet by selecting specific choice
20.	To Practice Excel Graphs and Charts	a. Produce an Excel Pie Chart b. Produce c. Excel Column Chart	a. Use data in Excel sheet to Create technical charts and graphs Produce Excel Line Graph b. Produce a Pictograph in Excel
21.	To develop lab reports of respective discipline	Create Lab reports using MS Word and Excel	a. Insert Practical subject name in Header and page numbers in Footer
22.	To format a Worksheet in Excel, page setup and print	a. Shade alternate rows of data b. Add currency and percentage symbols c. Change height of a row and width of a column d. Change data alignment e. Insert Headers and Footers f. Set Print Options and Print	a. Format Excel sheet b. Insert headers &footers and print
23.	To familiarize with Ribbon layout &features of PowerPoint 2007.	Use various options in PowerPoint a. Home b. Insert c. Design d. Animation e. Slideshow f. View g. Review	Access required options in the tool bar
24.	To create a simple PowerPoint Presentation	a. Insert a New Slide into PowerPoint b. Change the Title of a PowerPoint Slide c. PowerPoint Bullets d. Add an Image to a PowerPoint Slide e. Add a Textbox to a PowerPoint slide	a. Create simple PowerPoint presentation with photographs/ClipArt and text boxes b. Use bullets option
25.	To Set up a Master Slide in PowerPoint and add notes	a. Create a PowerPoint Design Template b. Modify themes c. Switch between Slide master view and Normal view d. Format a Design Template Master Slide e. Add a Title Slide to a	a. Setup Master slide and format b. Add notes

		Design Template f. The Slide Show Footer in PowerPoint g. Add Notes to a PowerPoint Presentation	
26.	To Insert Text and Objects	a. Insert Text and objects b. Set Indents and line spacing c. Insert pictures/ clipart d. Format pictures e. Insert shapes and word art f. Use 3d features g. Arrange objects	Insert Text and Objects Use 3d features
27.	To insert a Flow Chart / Organizational Charts	a. Create a Flow Chart in PowerPoint b. Group and Ungroup Shapes c. Use smart art	Create organizational charts and flow charts using smart art
28.	To insert a Table	a. PowerPoint Tables b. Format the Table Data c. Change Table Background d. Format Series Legend	Insert tables and format
29.	To insert a Charts/Graphs	a. Create 3D Bar Graphs in PowerPoint b. Work with the PowerPoint Datasheet c. Format a PowerPoint Chart Axis d. Format the Bars of a Chart e. Create PowerPoint Pie Charts f. Use Pie Chart Segments g. Create 2D Bar Charts in PowerPoint h. Format the 2D Chart e. Format a Chart Background	Create charts and Bar graphs, Pie Charts and format.
30.	To Insert audio & video, Hyperlinks in a slide Add narration to the slide	a. Insert sounds in the slide and hide the audio symbol b. Adjust the volume in the settings c. Insert video file in the format supported by PowerPoint in a slide d. Use automatic and on click options e. Add narration to the slide f. Insert Hyperlinks	a. Insert Sounds and Video in appropriate format. b. Add narration to the slide c. Use hyperlinks to switch to different slides and files
31.	To Practice Animation effects	a. Apply transitions to slides b. To explore and practice special animation effects like Entrance, Emphasis,	Add animation effects

		Motion Paths &Exit	
32.	Reviewing presentation	a. Checking spelling and grammar b. Previewing presentation c. Set up slide show d. Set up resolution e. Exercise with Rehearse Timings feature in PowerPoint f. Use PowerPoint Pen Tool during slide show g. Saving h. Printing presentation (a) Slides (b) Hand-out	a. Use Spell check and Grammar feature b. Setup slide show c. Add timing to the slides d. Setup automatic slide show
33	To familiarize with standard toolbox	a. Open Adobe Photoshop b. Use various tools such as i. The Layer Tool ii. The Color & Swatches Tool iii. Custom Fonts & The Text Tool iv. Brush Tool v. The Select Tool vi. The Move Tool vii. The Zoom Tool viii. The Eraser ix. The Crop Tool x. The Fill Tool	Open a photograph and save it in Photoshop
34	To edit a photograph	a. Use the Crop tool b. Trim edges c. Change the shape and size of a photo d. Remove the part of photograph including graphics and text	a. Able to edit image by using corresponding tools.
35	To insert Borders around photograph	a. Start with a single background layer b. Bring the background forward c. Enlarge the canvas d. Create a border color e. Send the border color to the back f. Experiment with different colors	Able to create a border or frame around an image to add visual interest to a photo
36	To change Background of a Photograph	a. open the foreground and background image	Able to swap background elements

		b. Use different selection tools to paint over the image c. Copy background image and paste it on the foreground. d. Resize and/or drag the background image to reposition. e. In the Layers panel, drag the background layer below the foreground image layer.	using the Select and Mask tool and layers.
37	To change colors of Photograph	a. Change colors using: i) Color Replacement tool ii) Hue/Saturation adjustment layer tool	Able to control color saturation
38	To prepare a cover page for the book in subject area	a. open a file with height 500 and width 400 for the cover page. b. apply two different colors to work area by dividing it into two parts using Rectangle tool. c. Copy any picture and place it on work area→ resize it using free transform tool. d. Type text and apply color and style e. Apply effects using blended options	Able to prepare cover page for the book
39	To adjust the brightness and contrast of picture to give an elegant look	a. open a file. b. Go to image→ adjustments→ Brightness/Contrast. c. adjust the brightness and contrast. d. save the image.	Able to control brightness/contrast.
40	To type a word and apply the shadow emboss effects	a. open a file b. Select the text tool and type text. c. Select the typed text go to layer→ layer style→ blended option→ drop shadow, inner shadow, bevel and emboss→ contour→ satin→ gradient overlay d. Save the image.	Able to apply shadow emboss effects

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1 to 8
Unit test-2	From 9 to 22
Unit test-3	From 23 to 40

DIPLOMA IN CLOUD COMPUTING & BIG DATA ENGINEERING
SCHEME OF INSTRUCTIONS AND EXAMINATION

CURRICULUM-2023 (III Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Semester	Scheme Of Examinations			
		Theory	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
CBD-301	Mathematics –II	4		60	3	20	80	100
CBD-302	OOP through JAVA	5	-	75	3	20	80	100
CBD-303	Computer Networks	4	-	60	3	20	80	100
CBD-304	Data Structures through C	5	-	75	3	20	80	100
CBD-305	Cloud Computing Architecture & Design	4	-	60	3	20	80	100
PRACTICAL SUBJECTS								
CBD-306	Java Programming Lab	-	4	60	3	40	60	100
CBD-307	Computer Hardware & Networking Lab	-	4	60	3	40	60	100
CBD-308	Data Structures through C Lab	-	6	90	3	40	60	100
CBD-309	Cloud Computing Architecture & Design Lab		3	45	3	40	60	100
	ACTIVITIES		3	45				
	Total	22	20	630		260	640	900

C-23 CM-301
ENGINEERING MATHEMATICS-II
(Common to CM/AIML/AMG/AMT/CAI/CCB/CCN/WD)

Course Code	Course Title	No. of Periods/week	Total No. of periods	Marks for FA	Marks for SA
CAI-301	Engineering Mathematics-II	4	60	20	80

S.No.	Unit Title	No. of periods	COs mapped
1	Integral Calculus	22	CO1
2	Differential Equations	8	CO2
3	Graph Theory and Probability	17	CO3
4	Statistics	13	CO4
	Total Periods	60	

Course Objectives	(iii) To understand the concepts of indefinite integration and definite integration. (iv) To understand the formation of differential equations and learn various methods of solving first order differential equations. (v) To comprehend the concepts of graph theory and probability. (vi) To learn different statistical techniques for data analysis.

Course Outcomes	CO1	Integrate various functions using different methods and evaluate definite integrals.
	CO2	Obtain differential equations and solve differential equations of first order and first degree.
	CO3	Able to define the basic concepts of Graph Theory and use the principles of Probability in computational systems.
	CO4	Apply various statistical techniques for data analysis.

C-23 CM-301
ENGINEERING MATHEMATICS – II
(Common to CM/AIML/AMG/AMT/CAI/CCB/CCN/WD)
L**earning Outcomes**

Unit-I
Integral Calculus

C.O. 1 Integrate various functions using different methods and evaluate definite integrals.

L.O.1.1. Explain the concept of Indefinite integral as an anti-derivative.

1.2. State the indefinite integral of standard functions and properties of $\int (u+v)\,dx$ and $\int k\,u\,dx$ where u, v are functions of x and k is constant.

1.3. Solve problems involvingstandard functions using these properties.

1.4. Evaluate integrals involving simple functions of the following type by the method of substitution.

i) $\int f(ax+b)\,dx$, *where f(x)*is in standard form.

ii) $\int (f(x))^n f'(x)\,dx,\ n \neq -1$

iii) $\int \frac{f'(x)}{f(x)}dx$

iv) $\int [f(g(x))]g'(x)dx$

1.5. Find the integrals of *tan x, cot x, sec x* and *cosec x* w.r.t. x.

1.6. Evaluate the Standard integrals of the functions of the type

i) $\frac{1}{a^2+x^2}, \frac{1}{a^2-x^2}, \frac{1}{x^2-a^2}$

ii) $\frac{1}{\sqrt{a^2+x^2}}, \frac{1}{\sqrt{a^2-x^2}}, \frac{1}{\sqrt{x^2-a^2}}$

iii) $\sqrt{a^2+x^2}, \sqrt{a^2-x^2}, \sqrt{x^2-a^2}$

1.7. Evaluate integrals using decomposition method.

1.8. Solve problems using integration by parts.

1.9. Use Bernoulli's rule for evaluating the integrals of the form $\int u.vdx$.

1.10. Evaluate the integrals of the form $\int e^x[f(x)+f'(x)]dx$

1.11. State the fundamental theorem of integral calculus

1.12. Explain the concept of definite integral.

1.13. Solve simple problems on definite integrals.

1.14. State various properties of definite integrals.

1.15. Evaluate simple problems on definite integrals using these properties.

Unit -II

Differential Equations

C.O. 2Obtain differential equations and solve differential equations of first order and first degree.

L.O.2.1. Define a differential equation, its order and degree

2.2 Find order and degree of a given differential equation.

2.3 Form a differential equation by eliminating arbitrary constants.

2.4 Solve the first order and first degree differential equations by variables separable method.

2.5 Solve linear differential equation of the form $\frac{dy}{dx}+Py=Q$, where P and Q are functions of x only or constants.

Syllabus for Unit test-I completed

Unit-III

Graph Theoryand Probability

C.O. 3Able to define the basic concepts of Graph Theory and use the principles of Probability in computational systems.

L.O. 3.1 Define a graph.

3.2 Explain the terminology of a graph, vertices, edges, parallel edges, adjacent vertices, self-loops.

3.3 State the significance of Graph Theory in Computer Science applications.

3.4 Explain incidence and degree of a graph.

3.5 Explain the relation between degree and edges of a graph.

3.6 Explain various types of graphs, null graph, trivial graph, simple graph, multi graph, directed graph, non-directed graph and cyclic graph.

3.7 Define walk, path, circuit, length of a graph, distance between two vertices.

3.8 Explain the formation of adjacency matrix of a graph.

3.9 Recall the basic probability principles.

3.10 Define permutations and combinations with examples.

3.11 State addition theorem of probability for two mutually exclusive and exhaustive events.

3.12 Solve simple problems on addition theorem.

3.13 Explain conditional event and conditional probability.
3.14 Solve simple problems on conditional probability.
3.15 Explain dependent, independent events and state multiplication theorem.
3.16 Solve simple problems on multiplication theorem.
3.17 Explain the concept of priori and posteriori probabilities.
3.18 State Bayes' theorem and solve simple problems.

Unit-IV
Statistics

C.O. 4Apply various statistical techniques for data analysis.

L.O. 4.1 Recall the measures of central tendency.
4.2 Explain the significance of measures of dispersion to determine the degree of heterogeneity of the data.
4.3 Find the measures of dispersion, Range, Mean Deviation and Standard Deviation for ungrouped data.
4.4 Explain the merits and demerits of these measures of dispersion
4.5 Explain bivariate data.
4.6 Explain the concept of covariance and correlation between two variables.
4.7Calculate Pearson's correlation coefficient between two variables.
4.8 Find Spearman's rank correlation coefficient.
4.9Explain predictor variables, outcome variables and simple linear regression.
4.10 Calculate the regression coefficients and regression equations with simple problems.

Syllabus for Unit test-II completed

C-23 CM-301
Engineering Mathematics – II
(Common to CM/AIML/AMG/AMT/CAI/CCB/CCN/WD)
CO/PO – Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	2				3	2	2
CO2	3	2	2	2				3	2	2
CO3	3	3	3	3				3	3	3
CO4	3	3	3	3				3	3	3
Avg.	3	2.5	2.5	2.5				3	2.5	2.5

3 =Strongly mapped (High), **2 =** Moderately mapped (Medium), **1 =** Slightly mapped (Low)

Note: The gaps in CO/PO mapping will be met with appropriate activities as follows:

For PO5: Appropriate quiz programmes may be conducted at intervals and duration as decided by concerned faculty.
For PO6: Seminars on applications of mathematics in various engineering disciplines are to be planned and conducted.
For PO7: Plan activities in such a way that students can visit the Library to 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.

(Common to CM/AIML/AMG/AMT/CAI/CCB/CCN/WD)
PO- CO – Mapping strength

PO no	Mapped with CO no	CO periods addressing PO in column I		Level (1,2 or 3)	Remarks
		Number	%		
1	CO1, CO2, CO3,CO4	60 (22+8+17+13)	100%	3	>40% Level 3 Highly addressed 25% to 40% Level 2 Moderately addressed 5% to 25% Level 1 Low addressed <5% Not addressed
2	CO1, CO2, CO3,CO4	38 (8+3+17+10)	63%	3	
3	CO1, CO2, CO3,CO4	38 (8+3+17+10)	63%	3	
4	CO1, CO2, CO3,CO4	38 (8+3+17+10)	63%	3	
5					
6					
7					
PSO 1	CO1, CO2, CO3,CO4	60 (22+8+17+13)	100%	3	
PSO 2	CO1, CO2, CO3,CO4	38 (8+3+17+10)	63%	3	
PSO 3	CO1, CO2, CO3,CO4	38 (8+3+17+10)	63%	3	

C-23 CM-301
ENGINEERING MATHEMATICS – II
(Common to CM/AIML/AMG/AMT/CAI/CCB/CCN/WD)

COURSE CONTENTS

Unit-I

Indefinite Integration:

1. Integration regarded as anti-derivative – Indefinite integrals of standard functions - Properties of indefinite integrals - Integration by substitution or change of variable - Integrals of tan x, cot x, sec x, cosec x.

Evaluation of integrals which are of the following forms:

$i)\ \frac{1}{a^2+x^2}, \frac{1}{a^2-x^2}, \frac{1}{x^2-a^2}$

$ii)\ \frac{1}{\sqrt{a^2+x^2}}, \frac{1}{\sqrt{a^2-x^2}}, \frac{1}{\sqrt{x^2-a^2}}$

$iii)\ \sqrt{a^2+x^2}, \sqrt{a^2-x^2}, \sqrt{x^2-a^2}$

Integration by decomposition of the integr and into simple rational, algebraic functions - Integration by parts, Bernoulli's rule and integrals of the form $\int e^x [f(x) + f'(x)]\, dx$.

Definite integral-fundamental theorem of integral calculus, properties of definite integrals, evaluation of simple definite integrals.

Unit -II

Differential Equations:

2. Definition of a differential equation, order and degree of a differential equation, formation of differential equations- Solutions of differential equations of first order and first degree using variables separable method and linear differential equation of the type $\frac{dy}{dx} + Py = Q$.

Unit-III

Graph Theory and Probability

3. Definition of a graph, terminology of a graph, significance in computer science applications - Incidence and degree, relationship between degree and edges - Various types of graphs, null graph, trivial graph, simple graph, multigraph, directed graph, non-directed graph and cyclic graph - Walk, path, circuit, length of a graph, distance between two vertices - Formation of adjacency matrix.

Permutations and Combinations - Addition theorem of probability, conditional probability, dependent and independent events with multiplication theorem - Priori and posteriori probability, Baye's theorem.

Unit III

Statistics

4. Measures of dispersion, range, mean deviation and standard deviation of ungrouped data, merits and demerits - Bivariate data, correlation, Pearson's correlation coefficient, Spearman's rank correlation coefficient - Predictor and outcome variables, simple linear regression coefficients and regression equations.

Textbook:

Engineering Mathematics-II, a textbook for second year third semester diploma courses, prepared & prescribed by SBTET, AP.

Reference Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. Schaum's Outlines Differential Equations, Richard Bronson & Gabriel B. Costa
3. Trembley and Manohar,Discrete Mathematical Structures with Applications to Computer Science, Tata-McGraw-Hill.
4. Narsing Deo, Graph Theory, PHI India.
5. Schaum's Outline: Introduction to Probability and Statistics, Seymour Lipschutz& John J. Schiller.

C- 23 Engineering Mathematics – II

Subject Title : **Engineering Mathematics – II**
Subject Code : **CM/AIML/AMG/AMT/CAI/CCB/CCN/WD-301**
Periods/Week : **04**
Periods/Semester : **60**

TIME SCHEDULE

S.No.	Chapter/Unit title	No. of Periods	Marks Allotted	Short Type	Essay Type	COs mapped
Unit – I: Integral Calculus						
1	Indefinite integration	17	26	2	2	CO1
2	Definite integrals	5	16	2	1	CO1
Unit – II: Differential Equations						
3	Introduction to Differential equations	2	3	1	0	CO2
4	Solutions of Differential equations of first order	6	10	0	1	CO2
Unit – III: Graph Theory and Probability						
5	Graph theory	5	6	2	0	CO3
6	Probability	12	26	2	2	CO3
Unit – IV : Statistics						
6	Measures of Central Tendency	1	0	0	0	CO4
7	Measures of Dispersion	3	3	1	0	CO4
8	Correlation	4	10	0	1	CO4
9	Simple linear regression	5	10	0	1	CO4
	Total	60	110	10	8	
			Marks	30	80	

C-23 CM-301
Engineering Mathematics – II
(Common to CM/AIML/AMG/AMT/CAI/CCB/CCN/WD)

Unit Test Syllabus

Unit Test	Syllabus
Unit Test-I	From L.O 1.1 to L.O 2.5
Unit Test-II	From L.O 3.1 to L.O 4.10

C-23 CBD-302 OOP through Java

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-302	**OOP through Java**	5	75	20	80

Time Schedule:

S.No.	Chapter/Unit Title	No.of Periods	**Weightage of Marks**	**Short questions**	**Essay questions**	CO's Mapped
1.	Object oriented programming conceptsand Basics of java,Overloading	13	13	1	1	CO1,CO2
2.	Concepts of inheritance, overriding, Interfaces and Packages	13	26	2	2	CO2
3.	I/O Streams and Collections.	15	21	2	1 ½	CO3
4.	Exception handling and Multi threaded programming.	14	21	2	1 ½	CO4
5.	Applets, AWT and Event Handling	20	29	3	2	CO4,CO5
Total		75	110	10	8	

Course Objectives	i) Toknow applying object oriented programming paradigm in problem solving on the platform of Sun MicroSystems. ii) Able to design multi-tasking application with the knowledge of multi threading. iii) Familiarized to develop graphical user interface with event handling mechanism.

Course Outcomes	At the end of the course the student able to learn following:		
	CO1	CBD-302.1	Know the object oriented programming concepts in problem solving. Use syntaxes and semantics of object oriented paradigm.
	CO2	CBD-302.2	Design optimized definition for an application with reusability features and packages in project development.
	CO3	CBD-302.3	Knows the IO Basics and collection framework.
	CO4	CBD-302.4	Demonstrate multithreading concepts to implement multitasking and multi programming applications.
	CO5	CBD-302.5	Demonstrate to design effective dynamic user interface for any front end applications using Applets and events.

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-302.1	**2**	**1**	**1**	**2**	**2**	**2**	**1**	**2**	**2**	**2**
CBD-302.2	**1**	**3**	**3**	**3**	**1**	**3**	**1**	**1**	**3**	**1**
CBD-302.3	**3**	**2**	**3**	**2**	**2**	**3**	**1**	**1**	**3**	**3**
CBD-302.4	**1**	**1**	**3**	**2**	**2**	**3**	**2**	**2**	**3**	**2**
CBD-302.5	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**2**	**3**	**3**
Average	**2**	**2**	**2.5**	**2.4**	**1.6**	**3**	**1.5**	**1.6**	**3**	**2.2**

3=Strongly mapped , 2=moderately mapped, 1=slightly mapped

Learning Outcomes:

1.0 Object oriented programming concepts and Basics of java and over loading

1.1 Know about object-oriented programming
1.2 Compare procedure-oriented programming and object-oriented programming
1.3 List and explain features of object-oriented programming
1.4 Importance of Java in Internet programming.
1.5 Explain features of Java. Define Byte codes of Java, JVM.
1.6 How to write and executing a Java program.List different keywords and comment statements in Java.
1.7 Explain data types ,scope and life time of variables.
1.8 Describe conversion and casting features.
1.9 Apply one-dimensional and two–dimensional arrays give example programs.
1.10 Illustrates usage of conditional and iteration statements of Java with an example programs.
1.12 Describe usage of jump statements, break, and continue statements.
1.13 Describe how to create classes and objects.
1.14 Demonstrate Usage of new operator and methods.
1.15 Explain usage of constructors with an example programs.
1.16 Apply method overloading and construction overloading in applications.
1.17 Describe usage of 'this' pointer with example.
1.18 Explain usage of static in variables, methods, and blocks.
1.19 Explain about string classes.
1.20 Usage of command-line arguments.

2.0 Concepts of inheritance,overriding,Interfaces and Packages

2.1 Explain implementation of inheritance with an example program.
2.2 Illustrate how to implement multilevel inheritance with an example program.
2.3 Explain method overriding and usage of super keyword.
2.4 Describe concept of Interfaces.
2.5 Define an Interface.
2.6 Differences between abstract classes and interface.
2.7 Explain how to implement interfaces with sample program.
2.8 Define a package.
2.9 Explain the concept of class path.
2.10 Describe concept of Access protection.
2.11 Illustrate the mechanism of importing packages.
2.12 Give simple application to design packages with sample programs.

3. I/O Streams and Collections.

3.1 List different types of I/O streams.
3.2 Explain how to read and write data through console input and output streams.
3.3 Explain various file access operation by using FileStreams.
3.4 Explain sample programs on above streams.
3.5 What is collection frame work and Hierarchy of collection frame work.
3.6 List Collection Interfaces and explain the following with examples

3.7.1.List
3.7.2.Set
3.7.3.Queue
3.7.4.Deque

3.7 List Collection classes and explain the following with examples
3.7.1.ArrayList
3.7.2.LinkedList
3.7.3.HashSet

3.8 Iterator
3.8.1 How to access a Collection via an Iterator?

4.0 Exception handling and Multi threaded programming.

4.1 Describe sources of errors.
4.2 Give advantages of Exception handling.
4.3 Types of exceptions
- Checked
- Unchecked

4.4 Apply following key words to handling exceptions through sample programs
- Try
- Catch
- Finally
- Throw
- Throws

4.5 Explain concept of Multi-catch statements with example.
4.6 Explain how to write nested try in exception handling with example.
4.7 Describe built in exceptions.
4.8 Describe multithreading.
4.9 Explain Thread life cycle and states
4.10 Explain how to Creating single thread with example program.
4.11 Explain how to Creating multi thread with example program.
4.12 Illustrate thread priorities in multiple threads with an example.
4.13 Describe the concept of synchronization with example program.

5.0 Applets, AWT, Event Handling.

5.1 Describe the basics of Applets – Life cycle of an applet.
5.2 Describe steps for design and execute sample applet program
5.3 Explain Graphics class methods
Update(), Paint(), Drawing Lines, Rectangle,circles, polygons
5.4 Working with Color Font classes.
5.5 Describe AWT classes
5.6 Explain how to design Frame window with example.
5.7 Describe Types of Events
5.8 List and explain sources of events.
5.9List and explain different event classes.
5.10List and explain event listener interfaces
5.11 Demonstrate event handling mechanism.
5.12 Demonstrate handling mouse events with sample program.
5.13 Demonstrate handling keyboard events with sample program.

5.14 Explain how to use AWT controls in applet programming.

a. Labels.
b. Buttons.
c. TextFields
d. Checkboxes.
e. Lists.
f. Choice
g. Scrollbars.

COURSE CONTENTS

1. Basics of java and overloading: object oriented programming-Importance of Java to Internet – Byte codes.Features of Java: OOPS concepts –Data types –type conversions – casting – Arrays. Usage of classes – objects – new – methods – constructors – method overloading, string classes – command line arguments-static members-this pointer

2. Concepts InheritanceOverridingInterfaces and Package:-Usages of Inheritance: inheritance super class, sub classes – Multi level inheritance – super keyword -overriding –Abstract classes-Interfaces-Packages.

3. Concepts of I/O Streams and Collections:I/O streams-Accessing data through console input and output-Collection Frame work- Collection Interfaces – Collection Classes-Iterator

4. Exception Handling and Multi threading: – Exception handling: Source of errors – error handling – Exception handling-Multi catch statements- Define thread – life cycle of thread - Multi threading –Synchronization- Inter thread communication – Dead locks – Thread properties.

5. Applets, AWT and Event Handling: Basics of Applets – life cycle of an applet-Working with Graphics-color-fonts-AWT classes-Event classes-Listener interfaces-keyboard and Mouse events-AWT controls-Buttons-TextFields-CheckBox-List

REFERENCE BOOKS

1. The complete reference Java -- Pattrick Naughten, Herbert Schildt TMH Company Limited, New Delhi.
2. Programming in JAVA -- P. Radhakrishna, University Press
3. Programming in Java -- Muthu - Thomson
4. Java Foundations of Programming – NIIT, PHI
5. Programming with Java -- Balagurusamy, TMH

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.3
Unit test-2	From 3.4 to 5.14

C-23 CBD-303 Computer Networks

Course code	Course Title	No. of Periods/ Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-303	Computer Networks	4	60	20	80

Time schedule:

S.No.	Chapter/Unit Title	No. of Periods	Weightage of marks	Short questions	Essay Questions	CO's Mapped
1.	Introduction to Networks	15(8,7)	21	2	1½	CO1,CO2
2.	LAN components, Devices, tools, and Network Topologies.	12(12)	26	2	2	CO3
3.	Network Addressing and sub-netting	10(3,5,2)	21	2	1½	CO3, CO4, CO6
4.	Networks protocols and management	14(4,5,5)	26	2	2	CO3, CO5,CO6
5.	Basic Network administration	9(9)	16	2	1	CO6
Total		60	110	10	8	

Course Objectives	i. To know the different types of networks ii. To know the Network components, devices and topologies. iii. To understand managing Network using IP addresses and protocols iv. To design and able to build network v. To familiarise network administration

	At the end of the course, the student shall able to		
Course Outcomes	CO1	CBD-303.1	Explain different types of networks, cables and connectors
	CO2	CBD-303.2	Explain ISO /OSI reference model and TCP/IP model
	CO3	CBD-303.3	Explain Network components, tools, devices and topologies

	CO4	CBD-303.4	Configure network using subnet technology using suitable IP addresses
	CO5	CBD-303.5	Describe different types of network protocols
	CO6	CBD-303.6	Apply the techniques for Troubleshooting in monitoring and administrating network

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-303.1	**1**	**3**						**3**		
CBD-303.2		**3**							**2**	
CBD-303.3				**3**	**3**		**2**	**3**	**2**	
CBD-303.4			**3**				**2**			**2**
CBD-303.5					**3**		**1**	**1**	**2**	
CBD-303.6	**2**				**3**	**2**	**1**		**1**	**2**
Average	**1.5**	**3**	**3**	**3**	**3**	**2**	**1.5**	**2.3**	**1.75**	**2**

3=strongly mapped, 2=moderately mapped, 1=slightly mapped

Learning Outcomes:

1.0 Introduction to Computer Networks.

1.1 Describe the Overview of Networking.
1.2 Discuss the Need and importance of Networking.
1.3 Classification and features of Networks–LAN,MAN,WAN
1.4 Importance of Wi-Fi, Bluetooth
1.5 List the Hardware and Software Components.
1.6 Various Network Communication Standards.
1.7 Explain the OSI Reference Model with its architecture and layer functions.
1.8 Explain the functions of each layer of TCP/IP Reference Model
1.9 Compare TCP/IP and OSI reference models.

2.0 Network components, devices, tools, and Network Topologies.

2.1 Discuss the need and importance of LAN Cables, Connectors, wireless network adapter
2.2 Explain about LAN Cables
  2.2.1 Coaxial Cables,
  2.2.2 Twisted-Pair Cables(Shielded, Unshielded)
  2.2.3 Optical Fiber Cables,
2.3 Explain about LAN Connectors.
  2.3.1 Registered Jack(RJ)-45
  2.3.2 Straight Tip (ST)
  2.3.3 Subscriber Connector (SC)
  2.3.4 Lucent Connector (LC)
2.4 Explain about LAN Devices
  2.4.1 Repeaters
  2.4.2 Hubs

2.4.3 Switches
2.4.4 Network Interface Cards(NICs)
2.4.5 Routers (CISCO, DAX, Etc.)
2.4.6 Modem (56KBPS Internal or External, ADSL Modems.)
2.4.7 Know about Gateways.

2.5 Explain about Wireless network adapter

2.6 List and Explain the functions of LAN Tools
2.6.1 Anti Magnetic mat
2.6.2 Anti Magnetic Gloves
2.6.3 Crimping Tool
2.6.4 Cable Tester
2.6.5 Cutter
2.6.6 Loop back plug
2.6.7 Toner probe
2.6.8 Punch down tool
2.6.9 Protocol analyzer
2.6.10 Multi meter

2.7 Explain about Topologies with their merits and de-merits
2.7.1 Bus
2.7.2 Ring
2.7.3 Star
2.7.4 Mesh
2.7.5 Hybrid Topologies

3.0 Network Addressing and sub-netting

3.1 Introduction to Network Addressing.
3.2 Explain TCP/IP Addressing Scheme.
3.3 List and describe the Components of IP Address.
3.4 List and explain IP Address Classes.
3.5 Define subnet and describe the necessity of sub-netting.
3.6 Illustrate sub-netting
3.7 Explain sub-netting with a simple example
3.8 List the Advantages and disadvantages of sub netting
3.9 Describe the Internet Protocol Addressing
3.9.1 IPv4
3.9.2 IPv6
3.10 Give the need for IPv6.
3.11 Explain about Classful addressing and classless addressing in IPv4.
3.12 Describe Internet protocol version-6 (IPv6) addressing.

4.0 Networks protocols and management

4.1 Describe need of protocols in computer networks
4.2 Explain the protocols
4.2.1 Hyper Text Transfer Protocol(HTTP)
4.2.2 File Transfer Protocol(FTP)
4.2.3 Simple Mail Transfer Protocol(SMTP)
4.2.4 Address Resolution Protocol(ARP)
4.2.5 Reverse Address Resolution Protocol(RARP)
4.2.6 Telnet
4.3 Describe Simple Network Management Protocol(SNMP)
4.4 Explain about working of SNMP.
4.5 Explain about DHCP, DNS
4.6 Explain the Overview of Network Management.
4.7 Explain Network Monitoring and Troubleshooting.
4.8 Explain about Remote Monitoring (RMON).

5.0 Basic Network administration

5.1 Explain about Network administration.
5.2 Describe the need of Network Administration.
5.3 Responsibilities of Network Administrator.
5.4 Discuss User & Group Managements.
5.5 Analyze the working of Device Manager
5.6 Analyze Verification & Managing Ports.
5.7 Practice Installing, Managing & Configuration of Printers,
5.8 Demonstrate Disk Management Tools &Tasks
5.9 Describe File Systems Management.
5.10 Demonstrate on NTFS (File and Folder)& Share Permissions.

COURSE CONTENTS:

1. **Introduction to Networks:** Need for network - Network classification - network standards - - Network Components - ISO reference model - TCP/IP model.
2. **Network components, devices, tools, and Network Topologies**: LAN Cables - connectors - tools - LAN devices - wireless network adapter - LAN tools - Network topologies
3. **Network Addressing and Sub netting:** Network addressing - IP address components – IP address classes - sub netting - internet protocols(IPv4,IPv6) addressing - need for IPv6 - classful and classless addressing in IPv4 - IPv6 addressing
4. **Network protocols and management**: need for protocols - different protocols - overview of network management - monitoring and troubleshooting network - remote monitoring
5. **Basic Network administration:** need for network administration –user &group management - working of device manager-verification &managing ports - installing, managing of printer configuration - disk management tools - file system management - NTFS - share permissions.

REFERENCE BOOKS

1.Data Communications and Networking, Fourth Edition by Behrouz

2. COMPUTER NETWORKS. SIXTH EDITION. Global Edition. **ANDREW S**. **TANENBAUM**.

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.4
Unit test-2	From 3.5 to 5.10

C-23 CBD-304 Data Structures Through C

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-304	Data Structures Through C	**5**	**75**	**20**	**80**

Time Schedule:

S.No.	Chapter/Unit Title	No.of Periods	Weightage of marks	Short questions	Essay Questions	CO's Mapped
1.	Introduction to Data structures Sequential Storage Representation	23	16	2	1	CO1
2.	Linked Storage Representation-Linked Lists	15	16	2	1	CO2
3.	Linear Data Structures-Stacks	12	26	2	2	CO3
4.	Linear Data Structures-Queues	10	26	2	2	CO4
5.	Non Linear Data Structures-Trees	15	26	2	2	CO5
	Total	75	110	10	8	

Course Objectives	At the end of the course students will be able to
	i)To know the various types of Data Structures ii)To familiarize with the representation of Data Structures iii)To use various Data structures in organizing data iv)To reinforce theoretical concepts by writing relevant programs

Course Out comes	CO1	CBD-304.1	Illustrate various techniques of sorting and searching
	CO2	CBD-304.2	Explain the operations on Various Linked Lists
	CO3	CBD-304.3	Apply the operations of Stack.

	CO4	CBD-304.4	Explain the operations of different types of Queue.
	CO5	CBD-304.5	Apply Binary tree traversal techniques.

CO-PO/PSO MATRIX

CO NO.	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-304.1	3	3	3	1	3	3	3	3	2	2
CBD-304.2	3	3	3	1	3	3	3	2	3	2
CBD-304.3	3	3	3	2	3	3	3	2	2	2
CBD-304.4	3	3	3	2	3	3	3	2	2	2
CBD-304.5	3	3	3	2	3	3	3	2	3	3
Average	3	3	3	2	3	3	3	2	2.5	3

3=Strongly mapped , 2=moderately mapped, 1=slightly mapped

LEARING OUTCOMES:

1. Introduction to Data Structures

1.1 Understand various types of Data Structures

1.1.1.Define Data Structure and classify them
1.1.2.Explain Linear Data Structures
1.1.3.Describe Non-Linear Data Structures
1.1.4.Explain Data Types and Abstract Data Types
1.1.5.Explain about Space and Time Complexities

1.2 **Sequential Storage Representation**

1.2.1 Various Sorting Techniques

1.2.1.1 Define Sorting
1.2.1.2 State the need of Sorting
1.2.1.3 List the methods of Sorting
1.2.1.4 Explain the following for Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort
a) Sorting technique,

b) Algorithm and complexity
c) Program

1.2.2 **Various Searching Techniques**

1.2.2.1 Define searching
1.2.2.2 State the need of searching
1.2.2.3 List two types of searching
1.2.2.4 Explain the following for Linear Search, Binary Search with Recursion and with-out Recursion..
a) Searching technique.
b) Algorithm and complexity
c) Program

2 Linked Storage Representation –Linked Lists

2.1 List the advantages & disadvantages of Linked Lists over Arrays
2.2 State the purpose of Dummy Header
2.3 Explain the following for Singly Linked List, Doubly Linked List
a) Structure
b) Creation
c) How to represent a node using 'C' Structure
d) Perform insertion, deletion, traverse and sort operations
e) Perform search and replace an element
f) C Program with all operations.
2.4 Define Singly circular list
2.4.1 Structure of Singly circular list
2.5 List the advantages of a Singly Circular Linked List over a Singly Linked List
2.6 Describe the changes require in a singly linked list program to make it the Singly Circular List.
2.7 Define Doubly circular list
2.7.1 Structurer of Doubly circular list
2.8 List the advantages of a Doubly Circular Linked List over a Doubly Linked List
2.9 Describe the changes require in a Doubly Linked List program to make it the Doubly Circular List.

3 Linear Data Structures-Stacks

3.1 Define Stack
3.2 Explain the push, pop and display operations of a Stack
3.3 Explain array implementation of a Stack with various operations.
3.4 Explain the program for Array implementation of a Stack with various operations.
3.5 Explain Linked List implementation of a Stack with various operations.
3.6 Explain the program for Linked List implementation of a Stack with various operations.
3.7 List the applications of Stacks
3.8 Convert Infix expression to Postfix expression
3.9 Explain the program for Conversion of Infix expression to Postfix expression
3.10 Evaluate Postfix expression
3.11 Explain the program for Evaluating Postfix expression

4 Linear Data Structures-Queues

4.1 Define Queue
4.2 Explain the insertion, deletion and display operations on Queues

4.3 Explain array implementation of a Queue with various operations.
4.4 Explain the program for Array implementation of a Queue with various operations.
4.5 Explain Linked List implementation of a Queue with various operations.
4.6 Explain the program for Linked List implementation of a Queue with various operations.
4.7 Know about Circular Queues
4.8 Explain array implementation of a Circular Queue with various operations
4.9 Explain the program for Array implementation of a Circular Queue with various operations
4.10 Explain Linked List implementation of a Circular Queue with various operations.
4.11 Explain the program for Linked List implementation of a Circular Queuewith various operations.
4.12 List the application of Queues
4.13 Know about Priority Queues

5 Non Linear Data Structures-Trees

5.1 Define a Tree
5.2 Explain the terminology related to Tree
5.2.1 Root, Edge, Parent, Child, Siblings, Leaf, Internal nodes, Degree, Level, Height, Depth, Path, Sub tree, Forest.
5.3 Define Binary Tree
5.4 Differences between General Tree and Binary Tree.
5.5 Conversion of General Trees to Binary Trees
5.6 Explain the linear representation and linked list representation of a Binary Tree
5.7 Define Binary Search Tree
5.8 Differences between Binary Search Tree and Binary Tree
5.9 Perform various traversals on Binary Search Trees
5.10 Construct a Binary Tree using In-order and Preorder Traversals
5.11 Construct a Binary Tree using In-order and Post-order Traversals
5.12 Know the importance of Binary Search Trees over General Trees
5.13 Perform insertion, deletion, search and various traversal operations on a Binary Search Tree.
5.14 Explain the program of Binary Search Tree with all operations.
5.15 List the Applications of trees

COURSE CONTENT

1. Introduction to Data Structures

Data structures – Linear &non linear, data types and abstract data types, algorithm analysis for time and space requirements.

Sequential Storage Representation – Sorting - Introduction to different sorting techniques –Bubble, Selection, Insertion, Quick &Merge. **Searching –** Introduction to different searching techniques – Linear and Binary.

2. Linear data structures-Linked Lists

Linked Lists – Types - Singly Linked Lists – Create, insert, delete, sort, search and replace an element in a linked list –- Doubly Linked Lists – Create, insert, delete, sort, search and replace an element in a linked list – Define terms Singly circular and doubly circular linked lists

3. Linear data structures-Stacks

Stacks- Implementation of stacks, application of stacks, converting infix to postfix expression and postfix expression evaluation.

4. Linear data structures-Queues

Queues–Implementation of queues- Application of queues- know about Circular queues, and Priority queue.

5. Non Linear data structures-Trees

Trees- Trees- Trees Terminology–Binary trees –Representation – Linear and Linked list representation-Binary Search Tree-various operations-Tree traversals-Tree Conversions& Applications

REFERENCE BOOKS

1. Data Structures: A Pseudocode Approach with C - Gilberg / Forouzan
2. Data Structures using 'C' - Tanenbaumlangsam and Augonstein (PHI).
3. Data structures through C - YashwanthKanetkar
4. An Introduction to data structures with applications - Tremblay & Sorenson

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 2.9
Unit test-2	From 3.1 to 5.15

C-23 CBD-305 CLOUD COMPUTING ARCHITECTURE AND DESIGN

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-305	CLOUD COMPUTING ARCHITECTURE AND DESIGN	4	60	20	80

Time Schedule:

S. No.	Chapter/Unit Title	No. of Periods	Weightage of marks	Short Questions	Essay Questions	CO's Mapped
1.	Basics of Cloud Computing	10	16	2	1	CO1
2.	Understand the concepts of Parallel and Distributed Computing	12	26	2	2	CO2
3.	Understand the concepts of Virtualization	15	26	2	2	CO3
4.	Cloud Computing Architecture and Services	13	26	2	2	CO4
5.	Cloud Deployment Models	10	16	2	1	CO5
Total		**60**	110	10	8	

Course Objectives	i) Understand the basics of Cloud Computing ii) Know the concepts of Parallel and Distributed Computing iii) To familiarize the virtualization Technologies like Xen , VM ware and Microsoft Hyper – V iv)To understand Cloud services and deployment models

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-305.1	3	1	1	1	1	1	1	3	2	1
CBD-305.2	3	1	1	1	1	1	1	3	2	1
CBD-305.3	3	2	3	3	1	2	2	3	2	1
CBD-305.4	3	3	2	2	1	2	2	3	2	1
CBD-305.5	3	2	2	2	1	2	2	3	2	1
Average	**3**	**2**	**2**	**2**	**1**	**1.5**	**1.5**	**3**	**2**	**1**

3=strongly mapped, 2=moderately mapped, 1=slightly mapped

LEARNING OUTCOMES:

On completion of the study of the subject, the student should be able to

1.0 Basics of Cloud Computing:

1.1 Define Cloud Computing

1.2 State the history of Cloud Computing

1.3 List the features of Cloud Computing

1.4 Define the following terms related to recent trends in Computing

1.4.1 Cluster Computing

1.4.2 Grid Computing

1.4.3 Distributed Computing

1.4.4 Utility Computing

1.5 State the basic principles of Cloud Computing

1.6 List the challenges of Cloud Computing

1.7 List the Cloud Service Providers

1.8 State the advantages and disadvantages of Cloud Computing

2.0 Understand the concepts of Parallel and Distributed Computing

2.1 Know the eras of Computing

2.2 Understand the concepts of Parallel Computing

2.2.1 Parallel Computing

2.2.2 Hardware architecture for parallel processing

2.2.3 Approaches to parallel processing

2.2.4 Levels of Parallelism

2.3 Understand the concepts of Distributed Computing

2.3.1 General Concepts and Definitions

2.3.2 Components of a Distributed System

2.3.3 Architectural Styles for Distributed Computing

2.3.3.1 Software architectural Styles

2.3.3.2 System Architectural Styles

2.3.4 Explain the models for Inter Process Communication

2.3.5 Know the technologies for Distributed Computing

2.3.5.1 Remote Procedure Call

1.3.5.2 Distributed Object Frame Work

2.3.5.3 Service Oriented Computing qp

3.0 Understand the concepts of Virtualization

3.1 Define the term Virtualization

3.2 State the different characteristics of Virtualization

3.3 Classify and explain Virtualization Techniques

3.3.1 Machine Reference Model

3.3.2 Hardware Level Virtualization

3.3.3 Hardware Virtualization Techniques

3.3.4 Operating System Level Virtualization

3.3.5 Programming Language Level Virtualization

3.3.6 Application Level Virtualization

3.4 Explain the role of virtualization in Cloud Computing

3.5 State the Pros and Cons of Virtualization

3.6 Know the Virtualization Technologies – Examples

3.6.1 Xen

3.6.2 VM ware

3.6.3 Microsoft Hyper – V

4.0 Cloud Computing Architecture and Services

- 4.1 Explain the working of Cloud Architecture
- 4.2 List the Services of Cloud Computing
- 4.3 Explain Infrastructure as a Service (IaaS),
  - 4.3.1 Describe the Infrastructure as a Service
  - 4.3.2 Characteristics of Infrastructure as a Service
- 4.4 Explain Platform as a Service (PaaS)
  - 4.4.1 Characteristics of Platform as a Service
  - 4.4.2 Describe Platform as a Service
- 4.5 Explain Software as a Service (SaaS)
  - 4.5.1 Characteristics of Software as a Service
  - 4.5.2 Describe Software as a Service
- 4.6 Differences between IaaS, PaaS and SaaS

5.0 Cloud Deployment Models

- 5.1 List the Types of cloud Models
- 5.2 State the Purpose of cloud Models
- 5.3 Public Clouds
  - 5.3.1 Define Public Clouds
  - 5.3.2 Explain Public Clouds
  - 5.3.3 Advantages and Disadvantages of Public Cloud
- 5.4 Private Clouds
  - 5.4.1 Define Private Clouds
  - 5.4.2 Explain Private Clouds
  - 5.4.3 Advantages and Disadvantages of Private Cloud
- 5.5 Hybrid Clouds
  - 5.5.1 Define Hybrid Clouds
  - 5.5.2 Explain Hybrid Clouds
  - 5.5.3 Advantages and Disadvantages of Hybrid Cloud
- 5.6 Community Clouds.
  - 5.6.1 Define Community Clouds
  - 5.6.2 Explain Community Clouds
  - 5.6.3 Advantages and Disadvantages of Community Cloud
- 5.7 Economics of Cloud

COURSE CONTENTS:

1. **Basics of Cloud Computing**
   Recent Trends in Computing, History of Cloud Computing, Features, Principles and Challenges of Cloud Computing, Cloud Service Providers Advantages and Disadvantages of Cloud Computing, Compare Cluster Computing, Grid Computing, Distributed Computing, Utility Computing and Cloud Computing
2. **Understand the concepts of Parallel and Distributed Computing**
   Eras of Computing, Concepts of Parallel Computing, Concepts of Distributed Computing, Parallel Vs Distributed Computing
3. **Understand the concepts of Virtualization**
   Introduction, Characteristics of Virtualized environments, Classification of Virtualization Techniques, Role of Virtualization in Cloud Computing, Pros and Cons of Virtualization Technologies – Examples (Xen, VM ware, Microsoft Hyper-V)
4. **Cloud Computing Architecture and Services**
   Cloud Architecture, Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), differentiate IaaS,PaaS and SaaS.

5. Cloud Deployment Models

Types of Clouds (Deployment models) – Public Clouds, Private Clouds, Hybrid Clouds and Community Clouds, Advantages and Disadvantages of Cloud Deployment Models ,Economics of Cloud.

REFERENCES

1. Cloud Computing : Principles and Paradigms – Rajkumar Buyya, James Broberg and Andrzej Goscinski
2. Mastering Cloud Computing – Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi
3. Cloud Security and Privacy – Tim Mather, Subra Kumaraswamy, Shahed Latif
4. First Steps in Cloud Computing – Navin Sabharwal, Ravi Shankar
5. www.tutorialspoint.com

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.3
Unit test-2	From 3.4 to 5.7

C-23 CBD-306 Java Programming Lab

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-306	**Java Programming Lab**	4	60	40	60

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Basics, overloading, inheritance, overriding	16	CO1,CO2
2.	Streams, Interfaces and Packages and Collections.	10	CO2,CO3
3.	Exceptions and Multi threaded programming.	14	CO3,CO4
4.	Applets and Event Handling	20	CO5
	Total Periods	60	

Course Objectives	i)Design object oriented programming paradigm ii)Able to developmulti tasking application with the knowledge of multi threading. iii) Familiarized to develop graphical user interface with event handling mechanism.

Course Outcomes	CO1	Perform object oriented programming model application design.
	CO2	Design optimized definition for an application with reusability features like inheritance and polymorphism Analyze modular design for real time applications by using packages concept in projects.
	CO3	Apply IO on data and use collections
	CO4	Apply multi threading concepts to implement multitasking and multi programming applications.
	CO5	Develop effective dynamic user interface for any front end applications using Applets and events.

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-306.1	2	1	3	2		2	1	2	3	3
CBD-306.2	1	3	3	3	1	3	2	2	3	3
CBD-306.3	1	2	3	2	2	3	1	2	3	3
CBD-306.4	1	1	3	2	2	3	2	2	3	3
CBD-306.5	3	3	3	3	2	3	2	2	3	3
Average	1.5	2.6	3	2.6	1.5	3	1.6	2	3	3

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

Learning Outcomes

1. Exercise programs on conditional statements and loop statements
2. Exercise programs on Strings.
3. Exercise program to create class and objects and adding methods.
4. Exercise programs using constructors and construction over loading.
5. Exercise programs on command line arguments.

i) Input as command line arguments and perform operation on that data.

ii) Input as command line arguments and update manipulated data in Files.

6. Exercise programs using concept of overloading methods.
7. Exercise programs on inheritance.
8. Write a program using the concept of method overriding.
9. Exercise on packages.

i) Creation of packages

ii) Design module to importing packages from other packages.

10. Exercise programs on interfaces.
11. Exercise programs on I/O Streams

i) Reading data through Keyboard

ii) Perform Reading and Writing operations on files using File Streams.

12. Exercise programs on Collections.

i) Write a java program to search a student mark percentage based on pin number using Array list.

ii) Write a java program to create linked list to perform delete, insert, and update data in linked list with any application.

13. Exercise on exception handling.

i) Programs on try, catch and finally.

ii) Programs on multiple catch statements

iii) Programs on nested try statements.

14. Exercise on multithreading

i) Programs on creation of single and multiple threads.

ii) Programs on adding priorities to multiple threads.

15. Exercise on applets

i) Programs on Graphics and colors.

ii) Simple animations using threads and graphics.

16. Exercise on AWT controls

i) Program to handle mouse events.

ii) Program to handle keyboard events.

iii) Programs to illustrate Text Fields and Button control.

iv) Programs to illustrate Check Box and List control.

v) Write an application program to illustrate multiple controls.

KEY COMPETENCIES

Exp. No.	Name of the experiment	Objectives	Key Competencies
1	Exercise programs on conditional statements and loop statements.	(a) Write program using if statement and switch (b) Write program using while, do and for constructs.	(a) Know the usage of IF and switch statements. (b) Compile the program and rectify the errors. (c) Observe the output.
2	Exercise programs on Strings.	(a) Write a programs to manipulate Strings (b) Write a programs to arrange array of strings in ascending order	(a) Create String objects (b) Use string class methods Observe the output.
3	Exercise program to create class and objects and adding methods.	(a) Write a program to create a class and create objects. (b) Write a program to create class adding methods and access class members.	(a) Create class. (b) Declare methods. (c) Create objects.

			(d) Write main method. (e) Access class members.
4	Exercise programs using constructors and construction over loading.	(a) Write a program using default constructor. (b) Write a program using parameterized constructor.	(a) Declare and define constructor. (b) Call default constructor. (c) Call parameterized constructor. (d) observe constructor overloading.
5	Exercise programs on command line arguments.	(a) Write a program to illustrate usage of command line arguments. (b) Write a program to read data as command line arguments and update it into Files.	(a) Use command line arguments. (b) Run the program. (c) Understand usage of Files. (c) Observe the output.
6	Exercise programs using concept of overloading methods.	(a) Write a program to illustrate method overloading. (b) Write a program to illustrate method overloading using constructors.	(a) Observe method overloading. (b) Overload constructor methods.
7	Exercise on inheritance.	(a)Write a program to illustrate single inheritance. (b)Write a program to illustrate multiple inheritance.	(a) Create base class. (b) Write base class constructor. (c) Create derived class. (d) Use extends keyword. (e) Use super keyword. (f) Write derived class constructor.
8	Write a program using the concept of method overriding.	Write a program using the concept of method overriding.	(a) Use method overriding. (b) Use this keyword. (c) use super keyword
9	Exercise on importing packages.	Write a program to create and importing package.	(a) Create package. (b) Use of access specifiers. (b) Use package. (c) Use import keyword.

10	Exercise on interfaces.	Write a program to illustrate multiple inheritance using interfaces.	(a) Define interface. (b) Use extends keyword. (c) Use implements keyword. (d) Access interface variables.
11	Exercise programs on I/O Streams	(a) Write a program to give values to variables interactively through the keyboard. (b) Write program to read and write primitive data types. (c) Write programs to handle Files.	(a) Use different data types. (b) Use readLine() method. (c) Use println() method. (d)use File Streams Observe the output.
12	Exercise programs on Collections.	(a) Write a java program to search a student mark percentage based on pin number using Array list. (b)Write a java program to create linked list to perform delete, insert, and update data in linked list with any application.	(a) Define collection classes (b) use ArrayList, LinkedList (c) apply List and Iterator Interface
13	Exercise on exception handling	(a) Write a program to illustrate exception handling. (b) Write a program to illustrate exception handling using multiple catch statements. (c) Write a program to illustrate exception handling using nested try.	(a) Use try – catch. (b) Use multiple catch blocks. (c) Use finally statement. (d) use Nested try
14	Exercise on multithreading	(a) Write a program to create single a thread by extending the thread class. (b) Write a program to create a single thread by implementing the runnable interface. (c) Write a program to create	(a) Use extends, new. (b) Use run() and start() methods. (c) Observe thread execution. (d) Use implements runnable interface. (e) Use setPriority() and getPriority()

		multiple threads. (d) Write a program to illustrate thread priorities.	methods. (f) use wait(),notify() methods
15	Exercise on applets.	Write a program to create simple applet to display different shapes with colors. Write an applet program to design simple animation.	(a) Use <applet>…</applet> tag. (b) Add applet to html file. (c) Run the applet. (d) use graphics methods (e) use threads and graphics.
16	Exercise on AWT controls	(a) Write an applet program to handle key events. (b) Write an applet program to handle mouse events. (c) Write an applet program to illustrate Text Field and button control. (d) Write an applet program to illustrate Check box and List control. (e)Write an applet program to illustrate multiple controls.	(a) Use keyboard event methods (b) Use mouse event methods (c) Use Text Field class methods (d) Use button class methods (e) Use Check box and List class methods

C-23 CBD-307 Computer Hardware & Networking Lab

Course Code	Course title	No of periods/week	Total no of periods	Marks for FA	Marks for SA
CBD-307	Computer Hardware & Networking Lab	04	60	40	60

S No	Chapter/ Unit Title	No. of Periods	COs Mapped
1.	Computer Hardware	30	CO1,CO2,CO3
2.	Computer Networking	15	CO3.CO4.CO5
3.	Network Maintenance through server	15	CO4,CO5,CO6
	Total	60	

COURSE OBJECTIVES	1. Identify all the components of mother board. 2. Modify CMOS settings as required 3. Troubleshoot desktop computer 4. Troubleshoot individual resources like keyboard, Monitor, Printers 5. Install drives, NIC cards, modems(internal, external) 6. Install network devices, design and develop network. 7. Understand ip address classes and sub netting 8. Prepare cross and straight Ethernet cables 9. Install and configure proxy server 10. Install any network operating system and Control/maintain the network and network resources using server administration and Troubleshoot the entire network

	At the end of the course the student will be able to		
Course Outcomes	CO1	CBD-307.1	Assemble the PC with suitable components.
	CO2	CBD-307.2	Troubleshoot desktop system and individual peripheral devices .
	CO3	CBD-307.3	Demonstrate configuring computer network with subnetting
	CO4	CBD-307.4	Perform user and group management techniques through Network Server
	CO5	CBD-307.5	Troubleshoot the computer network.
	CO6	CBD-307.6	Configure any network device.

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-307.1	**2**	**1**	**2**					**2**		
CBD-307.2	**3**	**3**	**1**	**3**				**2**		
CBD-307.3	**2**	**2**	**3**	**2**	**3**	**2**	**2**	**2**	**2**	**2**
CBD-307.4	**2**	**2**	**2**			**2**	**2**	**2**		**2**
CBD-307.5	**3**	**3**	**1**	**3**				**2**		
CBD-307.6	**2**	**2**	**3**	**2**	**3**	**2**	**2**	**2**		**2**
Average	**2.3**	**2.2**	**2**	**2.5**	**3**	**2**	**2**	**2**	**2**	**2**

3=Strongly mapped , 2=moderately mapped, 1=slightly mapped

Learning Outcomes:

Computer Hardware

1. Practicing motherboard components identification and disassembling and assembling
   a. Identify and note down mother board , Components and Chips
   b. Identify various Internal and External slots in the mother board and clean them with blower/ Brush.
   c. Practice Inserting and Removing RAM with care
   d. Measure the Output voltages of SMPS
2. Perform various operations and modifications required for CMOS setup.
3. Print the summary of your system Hardware and verify for correctness
4. Upgrading memory and verify the effect after upgrading.
5. Hard drive, optical drive installation.
6. How to recover lost data on hard drive.
7. Trouble shooting keyboard and monitor
   a. few keys do not work.
   b. keyboard does not work at all.
   c. key continuous to repeat after being released.
   d. key produces wrong character.
   e. Power light (led) does not go on, no picture.
   f. Power LED light is on no picture power up.
   g. Power on but monitor display wrong character.
   h. Monitor flickers has wary lines.
   i. Screen goes blank 30 seconds or minute after the keyboard is left untouched
8. Printer Problems
   a) Laser printer:
   a) Printer never leaves warm-up mode.
   b) Paper Jam message is displayed
   c) Printed messages are distorted
   d) RE-filling and replacing cartridge
   e) Replacing damaged drum with new one.

f) Perform head cleaning

b. DMP

II. Print head moves back and forth but nothing prints.

III. Print self test works but printing from a computer application does not work etc.,

9. Installation of Network card.
10. Dis-assembling and assembling of working desktop.

Computer Networking

11. Preparing the Ethernet cable for cross and direct connections using crimping tool and test using LAN tester.
12. Installation of a switch and connecting systems to a network switch.
13. Installation of a modem (internal, external or USB) and connecting to internet.
14. Using FTP for uploading and downloading files.
15. Installation and configuring the proxy server for internet access.
16. Setting of particular IP address to an existing terminal system
17. Installation of network operating system

Network Maintenance through server

18. Creating and managing user accounts through network server.
19. Configuration of DHCP and DNS
20. Exercise on File/Folder accessing rights for sharing
21. Exercise on remote desktop.
22. Exercise on setting up of VPN on network

The competencies and key competencies to be achieved by the student

S.No.	Name of the experiment	Objectives	Key Competencies
1	Exercise on Identification and familiarization of various components of computer system.	Identification and familiarization of various components of computer system.	❖ Identify and note down mother board , Components and Chips. ❖ Identify various Internal and External slots in the mother board and clean them with blower/ Brush. ❖ Practice Inserting and Removing RAM with care. ❖ Measure the Output voltages of SMPS.
2	Exercise on various operations and modifications required for CMOS setup.	Perform various operations and modifications required for CMOS setup.	❖ Identify location of CMOS battery on mother board. ❖ Know how to replace CMOS battery. ❖ Identify keyboard key for entering BIOS setup. ❖ Setup CMOS settings ❖ Check the status of CMOS settings after replacement.
3	Exercise on Print the summary of your system Hardware and verify for correctness	Print the summary of your system Hardware and verify for correctness	❖ Know how to open system summary window ❖ Check whether all the hardware peripherals are working properly or not. ❖ Know how to install device drivers ❖ Know how to enable and disable hardware peripherals.

			❖ Print the hardware summary page.
4	Exercise on Upgrading memory and verify the effect after upgrading.	Upgrading memory and verify the effect after upgrading.	❖ Know the location of RAM slots ❖ Know how to insert or replace RAM chips ❖ Check the system properties for confirming the RAM up gradation.
5	Exercise on Hard drive, optical drive installation.	Hard drive, optical drive installation.	Hard drive: ❖ Identify the Hard drive slot. ❖ Know how to remove power supply and SATA cables from Hard drive. ❖ Unscrew Hard drive from computer case ❖ Replace new Hard drive and fix it in computer case ❖ Know how to connect power supply cable and SATA cables to Hard drive ❖ Check for the working condition of new Hard Drive. Optical drive: ❖ Identify the Optical drive slot. ❖ Know how to remove power supply and SATA cables from Optical drive. ❖ Unscrew Optical drive from computer case ❖ Replace new Optical drive and fix it in computer case ❖ Know how to connect power supply cable and SATA cables to Optical drive ❖ Check for the working condition of Optical drive.
6	Exercise on recovery of lost data on hard drive.	How to recover lost data on hard drive.	❖ Verify the available recovery tools of Operating system. ❖ Know how to recover lost data on Hard drive using Restore point. ❖ Know how to recover lost data on Hard drive using Recovery Image.
7	Exercise on Trouble shooting keyboard and monitor.	Trouble shooting keyboard and monitor.	❖ few keys do not work. ❖ keyboard does not work at all. ❖ Key continuous to repeat after being released. ❖ key produces wrong character. ❖ Power light (led) does not go on, nopicture. ❖ Power LED light is on no picture power up. ❖ Power on but monitor display wrong character. ❖ Monitor flickers has wary lines. ❖ Screen goes blank 30 seconds or minute after the keyboard is left untouched
8	Exercise on Printer Problems	Printer Problems	Laser printer: ❖ Printer never leaves warm-up mode. ❖ Paper Jam message is displayed

			❖ Printed messages are distorted ❖ RE-filling and replacing cartridge ❖ Replacing damaged drum with new one. ❖ Perform head cleaning DMP ❖ Print head moves back and forth but nothing prints. ❖ Print self test works but printing from a computer application does not work etc.,
9	Exercise on Installation of Network card.	Installation of Network card.	❖ Identify the slot for placing NIC card ❖ Know how to place NIC card ❖ Install required NIC driver ❖ Check for working status of NIC card
10	Exercise on Dis-assembling and assembling of working desktop.	Dis-assembling and assembling of working desktop.	❖ Identify all the peripherals of Desktop computer. ❖ Check the working condition of system before dis-assembling it. ❖ Dis-assemble all the peripherals. ❖ Assemble all the peripherals. ❖ Check the working condition of system after assembling it.
11	Exercise on Preparing the Ethernet cable for cross and direct connections using crimping tool and test using LAN tester.	Preparing the Ethernet cable for cross and direct connections using crimping tool and test using cable tester.	❖ Know the color pattern of Ethernet cable for direct connection. ❖ Prepare UTP cable for direct connection using crimping tool. ❖ Check the working condition of cable using LAN tester. ❖ Know the color pattern of Ethernet cable for cross connection. ❖ Prepare UTP cable for cross connection using crimping tool. ❖ Check the working condition of cable using LAN tester.
12	Exercise on Installation of a switch and connecting systems to a network switch.	Installation of a switch and connecting systems to a network switch	❖ Know the purpose of switch ❖ Run Ethernet cables from switch to individual computers ❖ Connect Ethernet cables of computers to switch. ❖ Check the network status of the connection in computer system.
13	Exercise on Installation of a modem (internal, external or USB) and connecting to internet.	Installation of a modem (internal, external or USB) and connecting to internet.	Internal modem ❖ Identify PCI slot for placing Internal modem ❖ Connect internal modem ❖ Install required modem driver ❖ Check for the working condition External modem ❖ Connect External modem ❖ Install required modem driver ❖ Check for the working condition USB modem

			❖ Connect USB modem ❖ Install required modem driver Check for the working condition
14	Exercise on Using FTP for uploading and downloading files.	Using FTP for uploading and downloading files.	❖ Know about FTP protocol ❖ Know how to upload file using FTP ❖ Know how to download file using FTP
15	Exercise on Installation and configuring the proxy server for internet access	Installation and configuring the proxy server for internet access	❖ Know about proxy server. ❖ Know how to install proxy server. ❖ Know how to configure proxy server.
16	Exercise on Setting of particular IP address to an existing terminal system	Setting of particular IP address to an existing terminal system	❖ Know about IP addresses ❖ Know how to set IP addresses to the computer systems in a LAN
17	Exercise on Installation of network operating system	Installation of network operating system	❖ Know about Network operating systems. ❖ Know about different network operating systems. ❖ Install any Network operating systems ❖ Configure the system with the proper settings.
18	Exercise on Creating and managing user accounts through network server.	Creating and managing user accounts through network server.	❖ Know how to create user accounts ❖ Know how to modify user accounts ❖ Know how to delete user accounts
19	Exercise on Configuration of DHCP and DNS.	Configuration of DHCP and DNS.	❖ Know about static IP address, dynamic IP address ❖ Know about DHCP ❖ Configure the DHCP ❖ Know about DNS ❖ Configure the DNS
20	Exercise on File/Folder accessing rights for sharing	File/Folder accessing rights for sharing.	❖ Know the different accessing rights ❖ Know how to give access rights ❖ Know how to remove access rights ❖ Know how to share file/folders.
21	Exercise on remote desktop.	Exercise on remote desktop.	❖ Know about remote login ❖ Know how to login to the remote desktop
22	Exercise on setting up of VPN	Exercise on setting up of	❖ Know about VPN ❖ Know how to configure VPN service

	on network	VPN on network	

CBD-308 Data Structures Through C Lab

Course Code	Course Title	No. of periods/week	Total No. of periods	Marks for FA	Marks for SA
CBD-308	**Data Structures Through C Lab**	6	90	40	60

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Introduction to Data structures Sequential Storage Representation	24	CO1
2.	Linked Storage Representation-Linked Lists	18	CO2
3.	Linear Data Structures-Stacks	18	CO1,CO2,CO3
4.	Linear Data Structures-Queues	21	CO1,CO2,CO4
5.	Non Linear Data Structures-Trees	9	CO1,CO2,CO5
	Total Periods	90	

Course Objectives	At the end of the course students will be able to
	i)To know the various types of Data Structures ii)To familiarize with the representation of Data Structures iii)To use various Data structures in organizing data iv)To reinforce theoretical concepts by writing relevant programs

Course Outcomes	CO1	CBD-308.1	Execute C programs on sorting and searching techniques
	CO2	CBD-308.2	Develop C programs on the various Linked Lists operations.
	CO3	CBD-308.3	Design C programs on the operations of Stack data structure

	CO4	CBD-308.4	Execute C programs on the operations of Queue data structure
	CO5	CBD-308.5	Write C programs on the operations of Binary Trees

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-308.1	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**2**	**2**	**2**
CBD-308.2	**3**	**3**	**3**	**1**	**2**	**2**	**2**	**1**	**1**	**1**
CBD-308.3	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**3**	**3**	**3**
CBD-308.4	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**	**2**	**2**
CBD-308.5	**3**	**3**	**3**	**2**	**3**	**3**	**2**	**2**	**2**	**2**
Average	**3**	**3**	**3**	**1.8**	**2.8**	**2.6**	**2.4**	**2**	**2**	**2**

3=Strongly mapped , 2=moderately mapped, 1=slightly mapped

Learning out comes:

Write C Program to Implement

1. BUBBLE SORTING using Functions.
2. SELECTION SORTING using Functions.
3. INSERTION SORTING using Functions.
4. MERGE SORTING on two sorted list using Functions.
5. QUICK SORTING using Functions.
6. LINEAR SEARCHING using Functions.
7. BINARY SEARCHING with-out RECURSION.
8. BINARY SEARCHING with RECURSION.
9. SINGLY LINKED LIST with insert, delete, display, sort, find and replace operations.
10. DOUBLY LINKED LIST with insert, delete, display, sort, find and replace operations.

11. STACK with insertion, deletion and display operations using arrays.
12. STACK with insertion, deletion and display operations using linked lists.
13. Conversion of arithmetic expression to post-fix expression using STACKS.
14. Evaluation of post-fix expression using STACKS.
15. QUEUES with insertion, deletion and display operations using arrays.
16. QUEUES with insertion, deletion and display operations using linked lists.
17. CIRCULAR QUEUE with insertion, deletion and display operations using arrays.
18. CIRCULAR QUEUE with insertion, deletion and display operations using Linked List.
19. BINARY SEARCH TREE with insertion, deletion, various traversals and search operations.

Time Schedule:

Sno	Experiment Name	Allotted Periods
1	BUBBLE SORTING using Functions.	3
2	SELECTION SORTING using Functions.	3
3	INSERTION SORTING using Functions.	3
4	MERGE SORTING on two sorted list using Functions.	3
5	QUICK SORTING using Functions.	3
6	LINEAR SEARCHING using Functions.	3
7	BINARY SEARCHING with-out RECURSION.	3
8	BINARY SEARCHING with RECURSION.	3
9	SINGLY LINKED LIST with insert, delete, display, sort, find and replace operations.	9
10	DOUBLY LINKED LIST with insert, delete, display, sort, find and replace operations.	9
11	STACK with insertion, deletion and display operations using arrays.	3
12	STACK with insertion, deletion and display operations using linked lists.	6
13	Conversion of arithmetic expression to post-fix expression using STACKS.	6
14	Evaluation of post-fix expression using STACKS.	3
15	QUEUES with insertion, deletion and display operations using arrays.	3
16	QUEUES with insertion, deletion and display operations using linked lists.	6
17	CIRCULAR QUEUE with insertion, deletion and display operations using arrays.	6

18	CIRCULAR QUEUE with insertion, deletion and display operations using Linked List.	6
19	BINARY SEARCH TREE with insertion, deletion, various traversals and search operations.	9

DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES			
Sl.No	Name of the Experiment	Objectives	Key Competencies
1	Exercise on bubble sort	Write a C program for i. Implementing Bubble sort ii. Printing the list after every pass iii. Printing the list after Bubble sort is performed	❖ Correct syntactical errors ❖ Debug logical errors ❖ Observe whether Bubble sort algorithm is properly implemented ❖ Check whether the sorted list is generated after the Bubble sort is performed for the given unordered list ❖ Check the efficiency of the program if the given list is almost sorted
2	Exercise on Selection sort	Write a C program for i. Implementing selection sort ii. Printing the list after every pass iii. Printing the list after selection sort is performed	❖ Correct syntactical errors ❖ Debug logical errors ❖ Observe whether selection sort algorithm is properly implemented ❖ Check whether the sorted list is generated after the selection sort is performed for the given unordered list
3	Exercise on insertion sort	Write a C program for i. Implementing insertion sort ii. Printing the list after every pass iii. Printing the list after insertion sort is performed	❖ Correct syntactical errors ❖ Debug logical errors ❖ Observe whether insertion sort algorithm is properly implemented ❖ Check whether the sorted list is generated after the insertion sort is performed for the given unordered list
4	Implement a program for merge sort on two sorted lists of elements	Write a C program for i. Implementing merge sort ii. Printing the list after every pass iii. Printing the list after merge sort is performed	❖ Correct syntactical errors ❖ Debug logical errors ❖ Check whether two separate sorted lists are properly stored in separate arrays ❖ Observe whether Merge sort algorithm is properly implemented ❖ Check whether the sorted list is generated after the Merge sort is

DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES			
Sl.No	Name of the Experiment	Objectives	Key Competencies
			performed for the given two separate lists
5	Exercise on Quick sort	Write a C program for i. Implementing Quick sort ii. Printing the list after every pass iii. Printing the list after Quick sort is performed	❖ Correct syntactical errors ❖ Debug logical errors ❖ Observe whether Quick sort algorithm is properly implemented ❖ Check whether the sorted list is generated after the Quick sort is performed for the given unordered list ❖ Check the efficiency of the program if the given list is almost sorted
6	Exercises on linear search	Write a C program for i. Implementing Linear Search ii. Print the proper result for successful and unsuccessful search	❖ Correct syntactical errors ❖ Debug logical errors ❖ Check whether Linear Search algorithm is properly implemented ❖ Observe the result for the search element is present in the list ❖ Observe the result for the search element is not present in the list
7	Exercise on binary search with-out Recursion	Write a C program for i. Implementing Binary Search ii. Print the proper result for successful and unsuccessful Binary search	❖ Correct syntactical errors ❖ Debug logical errors ❖ Check whether Binary Search algorithm is properly implemented ❖ Observe the result for the search element is present in the list ❖ Observe the result for the search element is not present in the list
8	Exercise on binary search with Recursion	Write a C program for I. Implementing Binary Search II. Print the proper result for successful and unsuccessful Binary search	❖ Correct syntactical errors ❖ Debug logical errors ❖ Check whether Binary Search algorithm is properly implemented ❖ Observe the Base Condition ❖ Observe the intermediate results in stack ❖ Observe the result for the search element is present in the list ❖ Observe the result for the search element is not present in the list
9	Exercises on creation, insertion,	Write a C program for i. Creation of linked list	❖ Rectify syntactical errors ❖ Debug logical errors ❖ Study node structure

DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES			
Sl.No	Name of the Experiment	Objectives	Key Competencies
	deletion, display, sorting, find and replace of elements in a singly linked lists	ii. Inserting an element in Linked list iii. Check for deletion of a node if no element is present and print error message iv. Delete an element from the Linked list v. Display all the elements from the linked list vi. Sorting of elements vii. Find and Replace of element	❖ Validate whether the memory allocation is done for the node ❖ Confirm whether the addition of node is done at the end ❖ Correct if deletion of an element in an empty list ❖ Confirm whether deletion of required node is done ❖ Observe whether all the elements of the linked list are displayed in proper order ❖ Observe whether all the elements of the linked list are sorted in proper order ❖ Observe whether find and replace of element in the linked list
10	Exercises on creation, insertion, deletion, display, sorting, find and replace of elements in a Double linked lists	Write a C program for iii. Creation of linked list ix. Inserting an element in Linked list x. Check for deletion of a node if no element is present and print error message xi. Delete an element from the Linked list xii. Display all the elements from the linked list iii. Sorting of elements iv. Find and Replace of element	❖ Rectify syntactical errors ❖ Debug logical errors ❖ Study node structure ❖ Validate whether the memory allocation is done for the node ❖ Confirm whether the addition of node is done at the end ❖ Correct if deletion of an element in an empty list ❖ Confirm whether deletion of required node is done ❖ Observe whether all the elements of the linked list are displayed in proper order ❖ Observe whether all the elements of the linked list are sorted in proper order ❖ Observe whether find and replace of element in the linked list
11	Write a program to Implement a stack using Arrays	Write a C program for i. Creation of Stack consisting of elements using arrays ii. Insertion of new element is done by push() function call iii. Deletion of last element is done by pop() function call iv. Print error message for 'empty stack' if no elements are present for pop() function call v. Print error message for 'stack full'	❖ Correct syntactical errors ❖ Debug logical errors ❖ Observe declaration of stack using arrays ❖ Validate whether a new element is inserted at the top by push() function call ❖ Check whether only the top element is deleted by pop() function call ❖ Verify for empty stack condition in pop()

DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES			
Sl.No	Name of the Experiment	Objectives	Key Competencies
		if number of elements exceed size of Stack array	❖ Verify for stack full condition in push()
12	Write a program to Implement a stack using Linked List	Write a C program for i. Creation of Stack consisting of elements using Linked List ii. Insertion of new element is done by push() function call iii. Deletion of last element is done by pop() function call iv. Print error message for 'empty stack' if no elements are present for pop() function call	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study node structure ❖ Validate whether the memory allocation is done for the node ❖ Observe declaration of stack using Linked List ❖ Validate whether a new element is inserted at the top by push() function call ❖ Check whether only the top element is deleted by pop() function call ❖ Verify for empty stack condition in pop()
13	Write a program for conversion of given infix arithmetic expression into postfix expression	Write a C program for I. Conversion of infix expression into postfix expression using stacks concept II. Printing the postfix expression	❖ Correct syntactical errors ❖ Debug logical errors ❖ Observe declaration of stack using arrays ❖ Check whether the final expression is postfix expression or not.
14	Write a program for Evaluation of post-fix expression using STACKS.	Write a C program for i. Evaluation of post-fix expression using STACKS ii. Printing the evaluated result	❖ Correct syntactical errors ❖ Debug logical errors ❖ Observe declaration of stack using arrays ❖ Check whether the result is correctly evaluated or not.
15	Write a program to implement a queue using arrays	Write a C program for i. Creation of Queue consisting of elements using arrays ii. Insertion of new element is done by add_Queue() iii. Print error message for 'empty queue' if no elements are present for deletion of an empty queue. iv. Print error message for 'queue full' if number of elements exceed size of Queue array upon insertion of new element. v. Deletion of first element is done by delete_Queue()	❖ Correct syntactical errors ❖ Debug logical errors ❖ Observe declaration of Queue using arrays ❖ Validate whether a new element is inserted at the end of the array by add_Queue() ❖ Verify for empty Queue condition for deletion of an element ❖ Verify for Queue full condition upon insertion of a new element ❖ Check whether only the first element is deleted by delete_Queue()

DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES			
Sl.No	Name of the Experiment	Objectives	Key Competencies
16	Write a program to implement a queue using linkedlist	Write a C program for i. Creation of Queue consisting of elements using Linked List ii. Insertion of new element is done by add_Queue() iii. Print error message for 'empty queue' if no elements are present for deletion of an empty queue. iv. Deletion of first element is done by delete_Queue()	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study node structure ❖ Validate whether the memory allocation is done for the node ❖ Validate whether a new element is inserted at the end of the Linked List by add_Queue() ❖ Verify for empty Queue condition for deletion of an element ❖ Check whether only the first element is deleted by delete_Queue()
17	Write a program to implement a circular queue using arrays	Write a C program for vi. Creation of circular Queue consisting of elements using arrays vii. Insertion of new element is done by add_Queue() iii. Print error message for 'empty queue' if no elements are present for deletion of an empty queue. ix. Print error message for 'queue full' if number of elements exceed size of Queue array upon insertion of new element. x. Deletion of first element is done by delete_Queue() at the front end	❖ Correct syntactical errors ❖ Debug logical errors ❖ Observe declaration of circular Queue using arrays ❖ Validate whether a new element is inserted at the rear end of the array by add_Queue() ❖ Verify for empty Queue condition for deletion of an element ❖ Verify for Queue full condition upon insertion of a new element ❖ Check whether only the first element is deleted by delete_Queue() at the front end
18	Writea program to implement a circular queue using LInkedLists	Write a C program for xi. Creation of circular Queue consisting of elements using Linked List xii. Insertion of new element is done by add_Queue() iii. Print error message for 'empty queue' if no elements are present for deletion of an empty queue. iv. Deletion of first element is done by delete_Queue() at the front end	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study node structure ❖ Validate whether the memory allocation is done for the node ❖ Observe declaration of circular Queue using Linked List ❖ Validate whether a new element is inserted at the rear end of the Linked List by add_Queue() ❖ Verify for empty Queue condition for deletion of an element ❖ Check whether only the first element is deleted by delete_Queue() at the front end

DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES			
Sl.No	Name of the Experiment	Objectives	Key Competencies
19	Write a C program to BINARY SEARCH TREE with insertion, deletion, various traversals and search operations.	rite a C program for i. Creation of Binary Trees ii. Insertion of a node iii. Deletion of a node iv. Perform In-order Traversal of the binary tree v. Perform Pre-order Traversal of the binary tree vi. Perform Post-order Traversal of the binary tree	❖ Correct syntactical errors ❖ Debug logical errors ❖ Observe proper definition of elements in a Binary Search Tree ❖ Check whether the node is properly inserted in the Binary Tree ❖ Check whether the node is properly deleted in the Binary Tree ❖ Observe the root node after deleting root node element ❖ Validate whether the Tree in-order traversal is properly done ❖ Validate whether the Tree pre-order traversal is properly done ❖ Validate whether the Tree post-order traversal is properly done

C-23 CBD-309 CLOUD COMPUTING ARCHITECTURE AND DESIGN LAB

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD- 309	CLOUD COMPUTING ARCHITECTURE AND DESIGN LAB	3	45	40	60

S.No.	Chapter/Unit Title	No. of Periods	CO's Mapped
1.	Virtual Box/VMware	20	CO1, CO2
2.	Xen Server & Xen Center	15	CO3, CO4
3.	Google App Engine	10	CO5
Total Periods		45	

CO-PO/PSO Matrix:

Course Outcomes	Upon completion of the course the student shall be able to		
	CO1	CBD-309.1	Install and configure VMWARE
	CO2	CBD-309.2	Create and manage virtual machine on VMWARE
	CO3	CBD-309.3	Install and configure XENSERVER & XENCENTER
	CO4	CBD-309.4	Create and manage virtual machine on XENSERVER & XENCENTER
	CO5	CBD-309.5	Install and configure Google App Engine for designing web applications

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-309.1	**3**	**2**	**1**	**3**	**1**	**2**	**2**	**3**	**1**	**1**
CBD-309.2	**3**	**2**	**3**	**1**	**1**	**2**	**2**	**3**	**3**	**1**
CBD-309.3	**3**	**2**	**1**	**3**	**1**	**2**	**2**	**3**	**1**	**1**
CBD-309.4	**3**	**2**	**3**	**1**	**1**	**2**	**2**	**3**	**3**	**1**
CBD-309.5	**3**	**2**	**3**	**3**	**1**	**2**	**2**	**3**	**3**	**1**
Average	**3**	**2**	**2**	**2**	**1**	**2**	**2**	**3**	**2**	**1**

3=strongly mapped, 2=moderately mapped, 1=slightly mapped

LEARNING OUTCOMES

1) Exercise on the Installation of Virtual Box/VMware Workstation with different flavours of Linux on the top of Windows 7 or 8.

1) Exercise on the Installation of Virtual Box/VMware Workstation with different flavours of windows OS on the top of Windows 7 or 8.

2) Exercise on the Installation of a C compiler in the virtual machine created using virtual box and executes Simple Programs.

4) Exercise on the Installation of Google App Engine.

5) Exercise on creating a hello world app and other simple web Applications using python/java.

6) Exercise to launch the web applications using the GAE launcher.

7) Exercise on the Installation and Configuration of Xen Server

8) Exercise on the Installation and Configuration of Xen Center

9) Exercise on Virtual Machine (Linux) –on Xen server

10) Exercise on Virtual Machine (windows) –on Xen Server

11) Exercise to Implement a procedure to transfer the files from one virtual machine to another virtual machine.

KEY COMPETENCIES :

Exp. No.	Name of the experiment	Objectives	Key Competencies
1	Exercise on Installation of VirtualBox/VMware Workstation with different flavours of Linux on top of windows OS.	Creating virtual machine (Linux) by using VMWARE/ Virtual box on top of windows OS.	1) Identify and download proper version of VirtualBox/VMware. 2) Install VirtualBox/VMware on host. 3) Identify and download proper iso file for Linux. 4) Create a virtual machine with Linux iso file 5) Configure the virtual machine with linux. 6) Troubleshoot installation problems.
2	Exercise on Installation of VirtualBox/VMware Workstation with different flavours of windows OS on top of windows OS.	Creating virtual machine (windows) by using VMWARE/ Virtual box on top of windows OS.	1) Identify and download proper version of Virtual Box/VMware. 2) Install Virtual Box/VMware on host 3)Identify and download proper iso file for Windows. 4)Create a virtual machine with windows iso file 5) Configure the virtual machine with windows. 6) Troubleshoot installation problems
3	Exercise on Installation of a C compiler in the virtual machine created using virtual box and execute Simple Programs	Usage of C Compiler on virtual machine to run simple programs.	1) Identify and download proper version of C Compiler. 2) Use VirtualBox/VMware to install C compiler on virtual OS. 3) Write and execute simple C programs on virtual OS. 4) Troubleshoot installation problems
4	Exercise on Installation of Google App Engine.	Installation and configuration of Google App Engine	1) Identify and download proper version of Google App Engine. 2) Install and Configure the Google App Engine on host. 3) Troubleshoot installation problems

Exp. No.	Name of the experiment	Objectives	Key Competencies
5	Exercise on Creating hello world app and other simple web applications using python/java.	Designing simple web applications using Google App Engine	1) Develop hello world app using python/java on Google app Engine. 2) Develop Simple web app using python/java on Google app Engine.
6	Exercise on Use GAE launcher to launch the web applications	Launching simple web applications using Google App Engine.	1)Developing and launching Simple web app using python/java on Google app Engine
7	Exercise on Xen Server – Installation and Configuration	Installation and configuration of Xen Server.	1) Identify and download proper version of Xen Server. 2) Installation and configuration of Xen Server on host. 3) Troubleshoot installation problems
8	Exercise on Xen Center – Installation and Configuration	Installation and configuration of Xen Center	1) Identify and download proper version of Xen Center. 2) Installation and configuration of Xen Center on host. 3) Trouble shoot installation problems
9	Exercise on Virtual Machine (Linux) – Creating and Managing on Xen server	Creating virtual machine (Linux) by using Xen server.	1) Identify and download proper iso file for Linux. 2) Create a virtual machine with Linux iso file 3) Configure the virtual machine with linux. 4) Trouble shoot installation problems.
10	Exercise on Virtual Machine (Windows) – Creating and Managing on Xen Server	Creating virtual machine (windows) by using Xen server.	1) Identify and download proper iso file for windows. 2) Create a virtual machine with windows iso file 3) Configure the virtual machine with windows. 4) Trouble shoot installation problems.
11	Exercise on Find a procedure to transfer the files from one virtual machine to another virtual machine	Implement a procedure to transfer the files from one virtual machine to another virtual machine	1) Using both host and virtual OS environments. 2) Basic file handling skills with multiple operating systems. 3) Move file from one OS on host to another OS on virtual machine and vice- versa.

IV SEMESTER

CURRICULUM-2023

(IV Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods P	Scheme Of Examinations			
		Theory	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
CBD-401	Data warehousing & Data Mining	4	-	60	3	20	80	100
CBD-402	Web Technologies	5	-	75	3	20	80	100
CBD-403	Operating Systems & Computer Organization	4	-	60	3	20	80	100
CBD-404	Python Programming	5	-	75	3	20	80	100
CBD-405	DBMS	5	-	75	3	20	80	100
PRACTICAL SUBJECTS								
CBD-406	Web Technologies Lab	-	6	90	3	40	60	100
CBD-407	Python Programming Lab	-	4	60	3	40	60	100
CBD-408	Communication Skills	-	3	45	3	40	60	100
CBD-409	DBMS Lab	-	3	45	3	40	60	100
	ACTIVITIES		3	45				
	Total	23	19	630	-	260	640	900

CBD-401&408 common with all branches
CBD-402,404,406,407 common with DAIME, DCCNE
CBD-402,406 common with DCME

C-23 CBD-401 Data Warehousing and Data Mining

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-401	Data Warehousing and Data Mining	4	60	20	80

Time schedule:

S.No.	Chapter/Unit Title	No. of Periods	Weightage of marks	Short questions	Essay questions	CO's Mapped
1.	**Data Warehouse Basic concepts**	10	16	2	1	CO1
2.	**Data Warehouse Modelling, Design and Usage**	10	21	2	1½	CO2
3.	**Introduction to Data Mining**	15	26	2	2	CO3
4.	**Understanding Data and Data Pre-processing**	15	26	2	2	CO4
5.	**Data Mining Techniques**	10	21	2	1½	CO5
Total		60	110	10	8	

Course Objectives	i) To know the basics of Data Warehouse ii) To Understand various concepts of Data Warehouse Modelling and Design. iii) To know the basics of Data Mining iv) To understand basic statistical description of data and Pre-processing methods v) To familiarize with various Data Mining Techniques

	At the end of the course the student will be able to:		
Course Outcomes	CO1	CBD -401.1	Explain the basic concepts of Data Warehouse
	CO2	CBD -401.2	Describe Data Warehouse Modelling
	CO3	CBD -401.3	Explain the basic concepts of Data Mining
	CO4	CBD -401.4	Analyse and use of appropriate data pre-processing methods
	CO5	CBD -401.5	Analyse various Data measuring methods and describe the importance of various techniques of data mining

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD -401.1	**3**	**1**	**1**	**1**	**1**	**1**	**1**	**3**	**1**	**1**
CBD -401.2	**3**	**2**	**3**	**1**	**1**	**1**	**1**	**3**	**1**	**1**
CBD -401.3	**3**	**1**	**1**	**1**	**1**	**1**	**1**	**3**	**2**	**1**
CBD -401.4	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**

CBD -401.5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**
Average	**3**	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**2**	**1**

3=Strongly mapped, 2=moderately mapped, 1=slightly mapped

Learning Outcomes:

1.0 Data Warehouse Basic concepts
1.1 Define Data Warehouse
1.2 Distinguish Operational Database Systems and Data Warehouses
1.3 Understand Multi-tiered Data Warehouse Architecture
1.4 Understand Data Warehouse Models
1.5 To know Data Warehouse Operations
1.6 Understand Metadata Repository
2.0 Data Warehouse Modelling, Design and Usage
2.1 Data warehouse Modelling: Data cube and OLAP
2.1.1 Understand Multi-dimensional Data Model
2.1.2 Explain data schemas for multi-dimensional data models – Stars, Snowflakes and Fact Constellations
2.1.3 To know the role of concept hierarchies
2.1.4 To know data measures
2.1.5 To understand various typical OLAP operations
2.2 Data warehouse Design and Usage
2.2.1 To know the business analysis framework for Data warehouse design
2.2.2 To Explain the Data warehouse design process
2.2.3 To understand data warehouse usage for Information Processing
2.2.4 To know usage of data warehouse from OLAP to Multidimensional data mining
3.0 Introduction to Data Mining
3.1 Define Data Mining
3.2 To know various kinds of data that can be mined
3.2.1 Database data
3.2.2 Data warehouses
3.2.3 Transactional Data
3.2.4 Other kinds of data
3.3 To understand various kinds of patterns that can be mined
3.3.1 Class/Concept Description
3.3.2 Frequent patterns, Associations, Correlations
3.3.3 Classification
3.3.4 Clustering
3.4 To know various technologies used in data mining
3.4.1 Database Systems
3.4.2 Data warehouse
3.4.3 Pattern Recognition
3.4.4 Machine Learning
3.4.5 Statistics
3.4.6 Visualization
3.5 To know various application areas of data mining
3.5.1 Business Intelligence
3.5.2 Web search Engines
4.0 Understanding Data and Data Pre-processing
4.1 To know about Data Objects and Nominal, Binary, Ordinal, interval scaled, Ratio scaled Attribute Types
4.2 To illustrate the various statistical description of data
4.2.1 Measuring the central tendency: Mean, Median, Mode

4.2.2 Measuring dispersion of data: Range, Quartiles, Variance, Standard Deviation, Inter-quartile Range

4.2.3 Five-Number summary, Box plots and Outliers

4.3 To know about various data visualization techniques

4.3.1 Pixel oriented visualization

4.3.2 Geometric Projection Visualization

4.3.3 Icon-Based visualization

4.3.4 Hierarchical visualization

4.5 Data Pre-processing

4.5.1 Understanding the necessity of data pre-processing

4.5.2 List major tasks in data pre-processing

4.5.3 Illustrate the process of Data cleaning, Integration, Reduction, Transformation and Discretization

5.0 Data Measures & Mining Techniques

5.1 To understand data similarity and dissimilarity measures

5.1.1 Data matrix vs Dissimilarity matrix

5.1.2 Proximity Measures for Nominal Attributes

5.1.3 Proximity Measures for Binary Attributes

5.1.4 Dissimilarity of numeric data: Minkowski Distance

5.1.5 Proximity Measures for ordinal Attributes

5.1.6 Dissimilarity for attributes of mixed types

5.1.7 Cosine Similarity

5.2 List various Data Mining techniques with their purpose.

COURSE CONTENT:

UNIT I

Data Warehouse Basic concepts: What is a Data Warehouse – Differences between operational database systems and Data Warehouses– Multi-tiered Architecture of Data Warehouse – Data Warehouse models – Extraction, Transformation and Loading – Metadata repository.

UNIT II

Data warehouse Modelling: Data cube and OLAP – Data cube: A Multidimensional Data model – Schemas for multidimensional data models – Dimensions: The role of concept hierarchies – Measures: Their categorization and computation – Typical OLAP operations.

Data warehouse Design and Usage: A Business analysis framework for data warehouse design-Data warehouse Design Process-Data warehouse usage for information processing-From online analytical processing to multidimensional data mining.

UNIT III

Introduction to Data Mining: Introduction-What is Data Mining-kinds of data that can be mined-kinds of patterns that can be mined- Technologies used in Data Mining-kinds of applications targeted-Major issues in Data Mining.

UNIT IV

Understanding Data:

Data objects and Attribute types, Basic statistical descriptions of data, Data visualization, **Data pre-processing:** An overview – Data cleaning – Data Integration – Data Reduction – Data Transformation and Data Discretization.

UNIT V

Data Measuring metrics: Measuring data similarity and dissimilarity measures**.**

Data Mining Techniques :State the importance of Mining Frequent Patterns, Associations, Correlations: Basic Concepts – Frequent Item-set mining methods – Pattern Evaluation Methods.

Text Books:

1. Data Mining-Concepts and Techniques- Jiawei Han, Micheline Kamber,Jian Pei, Morgan Kaufmann Publishers, Elsevier, 3rd Edition.

2. Pang-Ning Tan, Michael Steinbach, Vipin Kumar: Introduction to Data Mining, Addison Wesley, 2005.

3. G. K. Gupta: Introduction to Data Mining with Case Studies, 3rd Edition, PHI, New Delhi, 2009.

Reference Books:

1) Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.

2) Data Ware Housing Fundamentals, Pualraj Ponnaiah, Wiley Student Edition.

3) The Data Ware House Life Cycle Toolkit- Ralph Kimball, Wiley Student Edition.

4) Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University.

5)Data Mining and Data Warehousing, Bharat Bhushan Agarwal, SumitPrakahsTayal, University Science Press, First Edition 2009, New Delhi.

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.4
Unit test-2	From 3.5 to 5.5

C-23 CBD-402 WEB TECHNOLOGIES

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-402	**Web Technologies**	5	75	20	80

Time schedule:

S.No.	Chapter/Unit Title	No.of Periods	Weightage of marks	Short questions	Essay questions	CO's Mapped
1.	Principles of Web Designing and HTML Introduction.	11	21	2	1½	CO1
2.	Understand various HTML tags and usage of style sheets.	14	21	2	1½	CO1,CO2
3.	Understand XML and Client side scripting using Java Script.	18	26	2	2	CO2
4.	JQuery	10	13	1	1	CO3
5.	Web servers and Server side scripting using PHP	22	29	3	2	CO4
Total Periods		75	110	10	8	

Course Objectives	i)Understand the basic elements of web page ii) Know the working with HTML, CSS iii) To familiarize the various Technologies like Java Script, JQuery, PHP. iv)To understand Database connectivity Using PHP

Course Outcomes	CO1	Implement interactive web page(s) using HTML and CSS
	CO2	Know how to format and validate Web page elementsusing JavaScript and describe data in a web page using XML.
	CO3	To know the Usage of JQuery
	CO4	Build Dynamic web site using server side PHP Programming and database connectivity using PHP.

LEARNING OUTCOMES:

1. Principles of Web Designing and HTML Introduction.

   1.1 Understand the principles of Web Designing
   - 1.1.1 Basic web Terminology.
   - 1.1.2 Describe Anatomy of web page.
   - 1.1.3 Understand different Web page elements.
   - 1.1.4 Navigate through web pages
   - 1.1.5 Narrate steps in building web site
   - 1.1.6 Narrate steps in launching
   - 1.1.7 Narrate maintaining web site.

   1.2 HTML Introduction
   - 1.2.1 Introduction and Overview of HTML
   - 1.2.2 Discuss the rules for designing a HTML document.
   - 1.2.3 Explain the structure of HTML document.
   - 1.2.4 Define HTML element and Attribute.
   - 1.2.5 Study the basic tags in HTML <html>, <head>, <title>, <body>.
   - 1.2.6 Study the header tags <h1> to <h6>
   - 1.2.7 Discuss the Physical formatting tags <b>, <i>, <u>, <strike>, <sub>, <sup>, big>, <small>, <tt>
   - 1.2.8 Discuss the Logical formatting tags <q>, , <cite>, <<ins>, <del>,
   - 1.2.9 Discuss the <marquee> with attributes.
   - 1.2.10 List Character entities.
   - 1.2.11 Explain the List tags like <ul>, <ol>, <li>, <dl>, <menu> with attributes.

   1.3 Describe the setting of tables.
   - 1.3.1 Describe the tags <table>, <tr>, <td>, <th>,<tbody>, <thead>, <tfoot>

2. Understand various HTML tags and usage of style sheets.

   2.1 Explain the link and imaging tags <a>, <img> with attributes.

   2.2 Explain<object> tag with attributes.

   2.2.1 Explain the tags, <form>, <input>, <button>, <label>, <select>, <options>, <textarea>, <legend> with attributes.

   2.3 Explain the tags, <frame>, <frameset>, <noframe>, <iframe> with attributes.

   2.4 Illustrate about cascading style sheets
   - 2.4.1 Understandthe level of styles inline, internal and embedded style sheets.
   - 2.4.2 Explain ID and Class selectors in CSS
   - 2.4.3 Explain about Color and background properties
   - 2.4.4 Explain about Box properties like Border, position, margin, padding of elements.

3. Understand XML and Java Script.

   3.1 Understand XML
   - 3.1.1 Describe how to organize data in the form of XML.
   - 3.1.2 Explain the rules for designing XML document.
   - 3.1.3 Understand the significance of Namespace.
   - 3.1.4 List the various applications of XML.

   3.2 Types of scripting-JavaScript
   - 3.2.1 Differentiate between Client-side and Server-side scripting.
   - 3.2.2 List Client side and server side scripting languages.
   - 3.2.3 Describe the features of Java Script.
   - 3.2.4 Placing JavaScript code in HTML.

3.2.5Understand functions
3.2.5.1 Know how to define and call a function.
3.2.5.2 Know how to pass parameters.
3.2.5.3 Understand the purpose of GetElementBId method
3.2.5.4 Describe the global functions provided by JavaScript.
3.2.6Form Handling in Java Script

3.2.7Illustrate Arrays
3.2.7.1 Understand single and multi dimensional arrays.
3.2.7.2 Design small programs using arrays.
3.2.8Understand about various Objects provided by JavaScript
3.2.8.1 Math object
3.2.8.2 String object
3.2.8.3 Date object
3.2.8.4 Boolean and Number object
3.2.9Describe events in java script.

4. JQuery
4.1Define JQuery
4.2List the features of JQuery
4.3List JQuery plugins
4.4Explain the steps for to includeJQueryin Web Pages
4.5Explain JQuery Syntax with example program
4.6Describe the jQuery Selectors-Accessing HTML elements by using
4.7Element Selectors
4.8ID, Class Selectors
4.9Explain the JQuery Document Ready Event
4.10Describe the JQuery Event handling methods(Mouse Events, Keyboard Events,Form Events, Docment/Window events)
4.11Explain effects of JQuery(likehide, show, fadeIn, fadeout, fadeToggle,fadeTo, slideDown, SlideUp, SlideToggle)
4.12Explain Functions in JQuery like text(),html(), val(), attr(),css().

5 Web servers and Server side scripting using PHP.
5.1 Web servers:

5.1.1 Understand the architecture of a Web server.
5.1.2 List the various web servers.
5.1.3 Illustrate the various HTTP request types and their difference.
5.1.4 Compare the properties of IIS, and Apache.
5.2 Understand theFundamentals of PHP
5.2.1 Explain how to combine HTML and PHP.
5.2.2 Explain how to access HTML, PHP documents from web servers.
5.3 Listvarious Data types and explain them with examples.
5.3.1 Explain how to declare Variables and Constants.
5.4 List and explain string manipulation functions.
5.5 Understand Arrays
5.5.1 Explaintypes of arrays.
5.5.2 Design small programs using arrays.
5.6 Explain form handling in PHP
5.6.1 Access elements of form using $_GET,$_POST
5.7 Know how to accessMysql Database
5.7.1 List and explain mysql database functions in PHP.

5.7.2 Explain the steps of connecting to a Database.
5.7.3 Know about retrieving data from a table.
5.7.4 Know about inserting data into a table.
5.7.5 Know about updating the data in a table.
5.7.6 Know about deleting data from a table.
5.7.7 Design some simple programs to insert, delete, update and retrieve data from database.

5.8 Cookies
5.8.1 Define Cookie.
5.8.2 Know how to create and delete a cookie.
5.8.3 Know the purpose of cookie.

5.9 Sessions
5.9.1 Define Session
5.9.2 Understand how to create a session.
5.9.3 Know how to destroy a session.
5.9.4 Know the purpose of session.
5.9.5 Differentiate Sessions and Cookies.

5.10 Passing data from one web page to other webpage using query string.

COs-POs Mapping Strength:

Course Code CBD-402	Course Title: Web Technologies Number of course outcomes:04				No. of periods:75
Pos	**Mapped with CO No.**	**CO Periods Addressing PO in column1**		**Level (1,2,3)**	**Remarks**
		No	%		
PO1	CO1	25	30	2	>40% Level3 Highly addressed
PO2	CO2,CO3,CO4	60	70	3	
PO3	CO1,CO2,CO3,CO4	60	70	3	
PO4					25% to 40% Level 2 Moderately Addressed
PO5	C01,CO2,CO3,CO4	50	60	3	
PO6					
PO7	CO3	60	70	3	5% to 25% Level1 Low addressed <5% Not addressed

COURSE CONTENTS

1. Principles of Web Designing and HTML Introduction

Principles of Web Designing:
Anatomy of Web page, Format, Elements, Navigation, Building, Launching and maintaining web site

HTML:

Introduction to HTML, Format of web page, Tags and attributes, Formatting text, Adding images, Positioning. Lists, Colours, Tables.

2. HTML & CSS

Connecting to hyperlinks and Imaging, Forms, Frames,IFrame

CSS : Introduction, Inline styles, Embedded style sheets, Conflicting styles, Linking external

Style sheets, Positioning elements, Backgrounds, Element dimensions

3. XML & JavaScript

XML: Introduction, Structuring Data, XML Namespaces, Applications of XML

JAVA SCRIPT

Introduction to Scripting, Client-Side versus Server-Side Scripting, JavaScript features,

Functions – Function definitions, Use of GetElementById, GetElementByName,Global functions, Form handling.

Arrays – Declaring and allocating arrays, References and reference parameters, passing arrays to functions, sorting and Searching arrays, Multiple-Subscripted arrays

Objects – **Math** object, **String** object, **Date** object, **Boolean** and **Number** object.

4. **JQuery**

JQuery

Introduction to Jquery, Features of JQuery, Plugin used in JQuery, steps for to include JQuery in Web Page, JQuery Syntax, jQuery Selectors- Element, Selectors, ID, Class, Document Ready Event, JQuery Event handling methods, effects of JQuery, Functions in JQuery

5. Web servers and Server side scripting using PHP.

Web servers:

Introduction, HTTP Request Types, System Architecture, Client-Side versus Server-Side Scripting, Accessing Web Servers-IIS, Apache, Requesting HTML, PHP documents.

PHP

Fundamentals of PHP, Data types, String functions, Arrays, form handling, Databases, Cookies, Sessions, Passing data from one web page to other web page.

REFERENCE BOOKS

1) Principles of Web Design, Sklar, TMH
2) HTML complete reference, Powell, TMH
3) Basics of Web Site Design, NIIT – PHI
4) WWW Design with HTML, Xavier (TMH)
5) Internet & World Wide Web,Dietel and Dietel, Pearson education Asia.
6) Complete Reference PHP, Steven Holzer-McGraw Hill
7) JQueryCookbook,O'Reilly Media
8) www.w3schools.com
9) www.php.net

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.2.4
Unit test-2	From 3.2.5 to 5.5

C-23 CBD-403 Operating Systems & Computer Organization

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-403	**Operating Systems & Computer Organization**	**4**	**60**	**20**	**80**

Time Schedule:

S.No.	Chapter/Unit Title	No.of Periods	Weightage of marks	Short Questions	Essay Questions	CO's Mapped
1.	Introduction to operat system & Process Management	10	26	2	2	CO1,CO3
2.	Memory management & Disk scheduling	15	26	2	2	CO1,CO2
3.	Information representation & CPU Organization	12	26	2	2	CO1,CO2,CO3
4.	Memory Organization	13	16	2	1	CO2,CO4
5.	I/O Organization	10	16	2	1	CO3,CO4,CO5
Total		60	110	10	8	

Course Objectives	i) To acquire the basic knowledge of operating systems & process management ii) To prepare students to know about memory management & disk scheduling iii) To know about Processor organization, information Representation iv) To understand the memory organization v) To understand i/o organization in an effective way

	At the end of the course the student able to learn following:		
	CO1	CBD-403.1	Describes operating systems & process management

Course Outcomes	CO2	CBD-403.2	Explain memory management & disk scheduling
	CO3	CBD-403.3	Explain the Basic computer organization techniques and information representation
	CO4	CBD-403.4	Explain Memory organization
	CO5	CBD-403.5	Describe the peripheral organization.

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-403.1	3	2	2		1		2	2	1	3
CBD-403.2	2	2	2	1	1		2	2	1	2
CBD-403.3	2	1			1	1	2	3	1	1
CBD-403.4	2	1	1		1	1	2	3	2	1
CBD-403.5	2		2		1	1	2	3	1	1
Average	**2.2**	**1.5**	**1.75**	**1**	**1**	**1**	**2**	**2.6**	**1.2**	**1.6**

3=Strongly mapped , 2=moderately mapped, 1=slightly mapped

Learning Outcomes:

1.0 Introduction to operating system & Process management

1.1 Introduction to operating systems

- 1.1.1 Define an operating system
- 1.1.2 State the need of operating system
- 1.1.3 Discuss various types of operating systems
- 1.1.4 Explain the concepts of multiprogramming & timesharing
- 1.1.5 Describe distributed , real time systems ,multiprocessor systems
- 1.1.6 Discuss operating system services

1.2 Process management

- 1.2.1 Define process
- 1.2.2 Explain process state diagram
- 1.2.3 Describe scheduling queues and schedulers
- 1.2.4 Describe CPU scheduling & scheduling criteria
- 1.2.5 Explain various scheduling algorithms
  - 1.2.5.1 FCFS
  - 1.2.5.2 SJF
  - 1.2.5.3 Round Robin
  - 1.2.5.4 Priority

2.0 Memory management & Disk scheduling

2.1 Memory management

2.1.1 Describe briefly on swapping
2.1.2 Explain single partition allocation
2.1.3 Explain multiple partition allocation
2.1.4 Define fragmentation
2.1.5 Explain paging concept
2.1.6 Explain segmentation
2.1.7 Define and explain virtual memory techniques
2.1.8 Define demand paging.
2.1.9 Describe page replacement
2.1.10 Discuss on page replacement algorithms
2.1.10.1FIFO
2.1.10.2LRU
2.1.10.3Optimal

2.2 Disk scheduling

2.2.1 List and define various scheduling parameters like Capacity,Latency time,Seek time,Transfer rate,Access time,Reliability and average transfer time
2.2.2 Disk scheduling algorithms
2.2.2.1 FIFO
2.2.2.2 SSTF
2.2.2.3 SCAN

3.0 **CPU Organization &Information representation and Arithmetic Operation**

3.1 CPU Organization

3.1.1 Draw the functional block diagram of Digital computer and explain the function of each unit.
3.1.2 Define Register
3.1.3 State the purpose of
3.1.3.1 Accumulator
3.1.3.2 Program counter
3.1.3.3 Instruction Register
3.1.3.4 Memory Buffer Register
3.1.3.5 Memory Address Register
3.1.4 Draw the block diagram of simple accumulator based CPU.
3.1.5 Explain the function of each unit
3.1.6 Define the terms micro operation, macro operation,
3.1.7 Define instruction cycle, fetch cycle and execution cycle.
3.1.8 What is stored program concept
3.1.9 Describe the sequential execution of a program stored in memory by the CPU

3.2 **Information representation and Arithmetic Operation**

3.2.1 Explain the basic types of information representation in a computer.
3.2.2 Define floating point representation and fixed point representation of numbers.
3.2.3 Illustrate the floating point and fixed point representations with example.
3.2.4 Distinguish between Fixed point and Floating point representations.
3.2.5 What is Instruction format
3.2.6 Define Opcode , Operand and address.

3.2.7 Explain different types of instructions with examples
3.2.7.1 Zero address instructions
3.2.7.2 One address instructions
3.2.7.3 Two address instructions
3.2.7.4 Three address instructions

3.3 List and explain various addressing modes.

4.0 Memory Organization

4.1 Distinguish between main and auxiliary memory.

4.2 State the need for memory hierarchy in a computer.

4.3 Explain memory hierarchy in a computer in detail

4.4 State the significance of various memory device characteristics: access time, access rate, alterability, permanence of storage, cycle time.

4.5 Discuss Associative Memory

4.6 Explain the principle of virtual memory organization in a computer system

4.7 Explain virtual address and physical address organization.

4.8 State the principle of locality of reference

4.9 Explain Cache memory organization.

4.10 Analyze the importance of the principle of memory interleaving in a computer.

5.0 I/O Organization

5.1 List the any five peripheral devices that can be connected to a computer.

5.2 Define Interface.

5.3 Explain the need for an interface.

5.4 List modes of date transfer.

5.5 Explain synchronous and asynchronous data transfer.

5.6 Compare synchronous and asynchronous data transfer.

5.7 Know various data transfer techniques
5.7.1 Hand shaking procedure of data transfer.
5.7.2 Programmed I/O method of data transfer.
5.7.3 Iinterrupted initiated I/O.
5.7.4 DMA controlled transfer.

5.8 Explain priority interrupt, polling, and daisy chaining priority.

5.9 Write about bus system

5.10 List various bus systems.

5.11 Differentiate between i/o bus and memory bus

COURSE CONTENTS:

1. Introduction to Operating systems & process management:

Operating System-Types of operating systems-Multi programming and Time sharing-Distributed and Real time systems-operating system services

2. Memory management & Disk scheduling: Process-Process state Diagram-Scheduling concepts-schedulers-CPU scheduling and scheduling criteria-Scheduling algorithms

3. Processor Organization - functional block diagram of Digital computer -Simple accumulator based CPU and function of each unit.-Stored program concept

Information representation and Arithmetic Operation- Basic types of information representation - floating point representation and fixed point representation of numbers, Operand, Opcode and

address - zero address, one address, two address and three address instructions - different addressing modes.

4. Organization of Computer Memory system - Main and auxiliary memory -Need for memory hierarchy in a computer -Significance of various memory devices characteristics: access time, access rate, alterability, permanence of storage, cycle time - Associative Memory-Virtual memory organization in a computer system - Virtual address and physical address organization. -Principle and advantage of cache memory organization- Principle of memory interleaving in a computer

5. Input and output organization - Peripheral devices -Need for an Interface-Three modes of date transfer - Synchronous and asynchronous data transfer -Hand shaking procedure of data transfer - Programmed I/O method of data Transfer-Interrupted initiated I/O-DMA controlled transfer-Priority interrupt, polling, and daisy chaining priority-Bus systems

REFERENCE BOOKS

1. Operating systems	- -	B. Galvin, Greg Gagne & Abraham Silberschatz
2. Computer System Architecture	- -	Morris Mano.

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 2.2
Unit test-2	From 3.1 to 5.11

C-23 CBD-404 **Python Programming**

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-404	**Python Programming**	5	75	20	80

Time Schedule:

S.No.	Chapter/Unit Title	No.of Periods	Weightage of marks	Short questions	Essay questions	CO's Mapped
1.	Introduction	10	26	2	2	CO1
2.	Control Flow and Loops	15	13	1	1	CO2
3.	Functions and Arrays	15	26	2	2	CO3
4.	Data Structures	15	26	2	2	CO4
5.	Object Oriented Programming in Python and File Handling and Exception Handling	20	19	3	1	CO5
Total		75	110	10	8	

Course Objectives	i)To know the fundamentals Python programming ii)To understand fundamental syntactic information about 'Python' iii) To develop various python programs

Course Outcomes	CO1	CBD-404.1	Explain Basic constructs like operators, expressions and components of python programming as well as Editing and Debugging
	CO2	CBD-404.2	Write Python programs using Control statements, Loops
	CO3	CBD-404.3	Write python programs using Functions and arrays
	CO4	CBD-404.4	Develop Python programs using Data structures
	CO5	CBD-404.5	Develop Python application programs using OOP Concept, FILES, Exceptions

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-404.1	3	1	2	1	1	1		2	1	
CBD-404.2	3	2	2	1	1	1	1	2	2	2
CBD-404.3	3	2	2	1	1	1		2	2	2
CBD-404.4	3	1	2	1	1	1	1	2	2	2
CBD-404.5	3	1	2	1	2	3	2	2	2	2
Average	3	1.75	2	1	1.2	1.8	1.3	2	1.8	1.8

3=strongly mapped, 2=moderately mapped, 1=slightly mapped

LEARNING OUTCOMES:

1.0 Introduction

1.1. History of Python.
1.2. List Python features
1.3. Explain Applications of Python
1.4. Describe Python Integrated Development and Learning Environment (IDLE)
1.5. Give the process of Running Python Scripts.
1.6. Explain Identifiers, Keywords, Indentation, Variables
1.7. Explain various datatypes (Int, float, Boolean, string, and list)
1.8. Explain declaration, initialization of variables.
1.9. Explain Input and Output statements.
1.10. Explain formatted input output.
1.11. State the usage of comments
1.12. Explain various Operators.
1.13. Explain Boolean values.
1.14. Explain Operator precedence rules.
1.15. State the purpose of modules.
1.16. Define functions.
1.17. List types of functions.(Built-in, User defined)
1.18. Explain Built-in Functions.
1.19. Give the Steps in Develop a simple python program and execution.

2.0 Control Flow and Loops

2.1. Explain various Control Flow constructs.
  2.1.1.If
  2.1.2.If-Else
  2.1.3.if-elif-else
2.2. Explain various Loop Statements.
  2.2.1.for Loop
  2.2.2.while loop
  2.2.3.break
  2.2.4.continue
  2.2.5.pass

3.0 Functions and Arrays

3.1. Introduction
3.2. Function Arguments: Default arguments, Variable Length arguments
3.3. Anonymous Functions
3.4. Return Statement
3.5. Scope of variables: Local Variables and Global Variables
3.6. Explain creation of modules.
3.7. Explain importing of modules.

3.8. Python Variable: Namespace and scoping
3.9. Python Packages
3.10. Explain Strings: String slices, immutability
3.11. Explain String functions and methods.
3.12. Explain about String module.
3.13. Explain about Python Arrays.
3.14. Explain accessing of elements in an Array.
3.15. Explain Array methods.

4.0 Data Structures

4.1. Explain Python Lists.
4.2. Describe Basic List Operations.
4.3. Explain List Slices.
4.4. Explain List methods.
4.5. Explain List loop
4.6. Explain mutability.
4.7. Explain aliasing.
4.8. Explain Cloning lists.
4.9. Explain List parameters.
4.10. Explain List comprehension.
4.11. Tuples.
    4.11.1. Explain Tuple assignment.
    4.11.2. Explain Tuple as return value.
    4.11.3. Explain Tuple Comprehension
4.12. Dictionaries
    4.12.1. Explain creation of dictionary/assignment.
    4.12.2. Explain Operations and methods.
    4.12.3. Explain Dictionary Comprehension.
4.13. Explain Sets.

5.0 Object Oriented Programming in Python and File Handling and Exception Handling

5.1. Creating Classes
5.2. Creating Objects
5.3. Method Overloading and Overriding
5.4. Data Hiding
5.5. Data Abstraction
5.6. Opening files in different modes
5.7. Processing files
5.8. Closing a file
5.9. Exception Handling

COURSE CONTENT

UNIT – I:

Introduction: Introduction to Python and installation, data types: Int, float, Boolean, string, and list; variables, Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Boolean values, expressions, statements, precedence of operators, comments; modules, functions--- function and its use, flow of execution, parameters and arguments.

UNIT – II:

Control Flow and Loops: Control Flow- if, if-elif-else, for, while, break, continue, pass

UNIT – III:

Functions and Arrays - Defining Functions, Calling Functions, Passing Arguments, Keyword

Arguments,Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables, Modules: Creating modules, import statement, from Import statement, name spacing, Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages - Strings: string slices, immutability, string functions and methods, string module; Python arrays, Access the Elements of an Array, array methods.

UNIT – IV:

Data Structures : Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters, list comprehension; Tuples: tuple assignment, tuple as return value, tuple comprehension; Dictionaries: operations and methods, comprehension-sets.

UNIT – V:

Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding,

File Handling: Open Files, File Processing and Closing a File

Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions

REFERENCE BOOKS

1. Python Programing by K. Nageswara Rao, Shaikh Akbar - Scitech Publications (India) Pvt. Ltd.
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
3. Learning Python, Mark Lutz, Orielly
4. Think Python, Allen Downey, Green Tea Press
5. Core Python Programming, W.Chun, Pearson.
6. Introduction to Python, Kenneth A. Lambert, Cengage

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.7
Unit test-2	From 3.8 to 5.9

C23 **CBD-405 DBMS**

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-405	**DBMS**	5	75	20	80

Time Schedule:

S.No.	Chapter/Unit Title	No.of Periods	Weightage of marks	Short questions	Essay questions	CO's Mapped
1.	Concepts of DBMS & RDBMS	18	29	3	2	CO1
2.	Concepts of SQL	22	26	2	2	CO2
3.	Basics of PL/ SQL	15	26	2	2	CO3
4.	Advance PL/SQL	10	16	2	1	CO4
5.	Concepts of NoSQL&MongoDB.	10	13	1	1	CO5
Total		75	110	10	8	

Course Objectives	i)To know the fundamentals of DBMS ii)To familiarizeinsert, retrieve, update, delete data in database iii)To familiarize programming skills for insert, retrieve, update, delete data in database

Course Out comes	CO1	CBD-405.1	Describe fundamentals, types and Overall structure of DBMS
	CO2	CBD-405.2	Apply SQL commands to create, retrieve, update, delete data from the Relational data bases.
	CO3	CBD-405.3	Describe PL/SQL programming constructs, control statements and sub programs.
	CO4	CBD-405.4	Apply cursors, triggers and Exception handling concepts
	CO5	CBD-405.5	Use NOSQL database concepts and MongoDB data base concepts in designing database Schema.

CO-PO/PSO MATRIX

CO NO.	**PO 1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO 3**
CBD-405.1	**3**	**2**	**2**	**2**	**2**	**3**	**2**	**2**	**3**	**1**
CBD-405.2	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**1**	**2**
CBD-405.3	**3**	**2**	**2**	**2**	**1**	**3**	**2**	**2**	**3**	**1**

CBD-405.4	**1**	**3**	**3**	**2**	**2**	**3**	**3**		**3**	**3**
CBD-405.5	**3**	**1**	**3**	**1**	**3**	**3**	**2**	**2**	**2**	**3**
Average	**2.4**	**2.2**	**2.6**	**2**	**2.2**	**3**	**2.8**	**2**	**2**	**2**

3=strongly mapped, 2=moderately mapped, 1=slightly mapped

LEARNING OUTCOMES:

1.0 Concepts of DBMS &RDBMS

1.1 Define Database Management System(DBMS)
1.2 List the advantages of DBMS
1.3 Explain Database Abstraction, Data Independence
1.4 Define Instances and Schemas
1.5 Explain Data Models.
1.6 Define Database languages DDL, DML, TCL
1.7 Explain Database Administrator, Users and Database System Architecture with diagram.
1.8 Define Entity, Entity sets, Relationship, Relationship sets, Super Key , Candidate Key and Primary Key, Foreign Key
1.9 Explain Mapping Cardinalities.
1.10 List the symbols used in ER model.
1.11 Know The Entity-Relationship Model.
1.12 Reduce the ER-diagrams to tables
1.13 Explain Generalization, Specialization &Aggregation.
1.14 Explain Functional Dependencies, Normalizations– 1 NF, 2 NF and 3NF

2.0 Concepts ofSQL

2.1 Explain SQL and benefits of SQL.
2.2 Describe about Embedded SQL and Lexical conventions
2.3 Describe Naming of the Objects and parts and how to refer them.
2.4 Explain literals &different data types like character, number, long, date, raw and long raw etc.
2.5 Illustrate the comments within SQL Statement
2.6 Explain SQL Operators
2.7 Describe Data Definition Language commands CREATE, ALTER and DROP.
2.8 Explain integrity constraints through creating a table and altering table.
2.9 Describe Data Manipulation Language commands INSERT, UPDATE and DELETE
2.10 Explain SELECT statement with WHERE, ORDER BY, GROUP BY and HAVING clauses with examples
2.11 List and explain single row(Number, character, date and conversion) functions
2.12 List and Explain group functions
2.13 Explain Transaction Control Commands COMMIT, SAVEPOINT, ROLLBACK, GRANT, and REVOKE.
2.14 Explain Sub Queries with examples
2.15 Explain Joins (Equi Join, Non-Equi Joins, Inner Join, Outer Join, cross join and Self join) with syntax and examples.

3.0 PL/SQL

3.1 Explain PL/SQL Block structure.
3.2 List the features of PL/SQL
3.3 Explain the data types of PL/SQL
3.4 Declaration of variables

3.5 Explain PL/SQL tables and user defined records.
3.6 Explain Input/Output statements
3.7 Explain decision making statements and illustrate
3.8 Explain looping statements and illustrate
3.9 Define procedure and function
3.10 Describe the advantages of subprograms.
3.11 Explain handling procedures and functions with example programs.
3.12 Explain the parameter modes in PL/SQL with examples (in , out and in out)

4.0 Advanced PL/SQL

4.1 Define cursor.
4.2 Classify cursors
4.3 Explain implicit cursor with example
4.4 Explain explicit cursors with example
4.5 Define trigger
4.6 List Advantages of triggers
4.7 Explain database triggers.

5.0 Concepts of NoSQL&MongoDB.

5.1 No SQL
- 5.1.1 List features of NOSQL
- 5.1.2 Compare RDBMS and NoSQL
- 5.1.3 List the Advantages and Disadvantages of NoSQL
- 5.1.4 Know about the ACID and BASE system.
- 5.1.5 Compare ACID and BASE properties
- 5.1.6 NoSQL
  - 5.1.6.1 Key-value stores,
  - 5.1.6.2 Column-oriented,
  - 5.1.6.3 Graph oriented Databases
  - 5.1.6.4 Document oriented Databases.

5.2 MongoDB
- 5.2.1 What is mongoDB.
- 5.2.2 List the advantages of MongoDB
- 5.2.3 Explain the Creation, Dropping, Creation of Collection
- 5.2.4 Dropping of Collection of Database in MongoDB
- 5.2.5 Explain the Data types of MongoDB.
- 5.2.6 Explain Inserting Document, Query Document, Update Document, Deleting Document &Sorting Document.

COURSE CONTENT

1. Concepts of DBMS & RDBMS

Define DBMS –Purpose of DBMS - Data Abstraction – Data Models – Instances and Schemas – Data Independence – Data Definition Language - Data Manipulation Language – Database Administrator - Database Users – Database system Structure.

Entities – Relationships and Relationship sets – Mapping constraints – Entity – Relationship Diagram – Super key , Candidate key and Primary key - Reducing E- R Diagrams to tables – Generalization and Specialization – Aggregation – Functional Dependencies - Normal forms 1NF , 2 NF , 3 NF

2. Concepts of SQL

Benefits of SQL – Embedded SQL – Lexical conventions – Naming objects and parts – Referring objects and parts – Literals – Text –Integer – Number – Data types – Character data types – Number data type – Long data type –Raw and Long Raw data types –Pseudo columns – comments within SQL statements – comments on schema objects.

Operators – Unary and Binary operators – Precedence- Arithmetic operators – character operators – comparison operators – logical operators- set operators – other operators –DDL Commands – Integrity Constraints – DML Commands - functions – single row functions – numeric functions – character functions – date functions – conversion functions – other functions- Group functions. Transaction control commands-Sub queries - Joins.

3. Basics of PL/SQL

Main features – architecture – advantage of PL/SQL – fundamentals – character set – Lexical units – Data types – data type conversion – Declaration -scope and visibility – assignments – expressions and comparisons – PL/SQL tables – user defined records.

Conditional control- IF statement – sequential control- GOTO and NULL statements. SQL support – national language support – Remote Access

Advantages of subprograms – procedures – Functions RETURN statement – forward declarations – actual versus formal parameters – positional and named notation - parameter modes

4. Advanced PL/SQL

Cursors – Implicit cursor – Explicit cursor – Triggers – Advantages - creating trigger – raising trigger -

5. NoSQL& Basics of MongoDB

Classification of Databases : RDBMS, OLAP, NoSQL.-Introduction to NoSQL- need for NoSQL – Comparison of RDBMS and NoSQL- Advantages and Disadvantages of NoSQL - BASE system – ACID System – Comparison of ACID and BASE properties – Classification of NoSQL as Key-value stores, Column-oriented, Graph and Document oriented Databases

Introduction to MongoDB - advantages of MongoDB - applications of MongoDB - Installation of MongoDB - Creation of Database - Dropping of Database - Creation of Collection - Dropping of Collection - Data types of MongoDB - different Commands of MongoDB - Inserting Document - Query Document - Updating Document – Deleting Documents - Sorting Documents

REFERENCE BOOKS

1. Database System Concepts --- Silber schatz, Henry F. Korth, S. Sudarshan
2. Oracle Database 11g :The Complete Reference - Kevin Loney
3. Understanding ORACLE -- James T. Peary & Joseph G. Laseer.
4. RDBMS with ORACLE -- Rolland.
5. ORACLE series books of ORACLE Press – TMH.
6. Starting out with Oracle – Covering Databases -- John Day &CraigVan
7. PL/SQL, Developer Tools & DBA -- Slyke, Dreamtech
8. www.nosql-database.org
9. www.mongodb.org

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.5
Unit test-2	From 3.6 to 5.2.6

C-23 CBD- 406 Web Technologies Lab

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD- 406	Web Technologies Lab	6	90	40	60

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Excercies on HTML, CSS&XML	30	CO1
2.	Excercises on Java Script, JQuery	30	CO2,CO3
3.	Excercises on PHP web applications and Database Applications	30	CO3,CO4
	Total Periods	90	

Course Objectives	i)Understand the principles of creating an effective web page ii) To Know the working with HTML, CSS iii) To acquire knowledge and skills for creation of web site considering both client and server side iv) To familiarize the various Technologies like Java Script, JQuery, PHP. V)To understand Database connectivity Using PHP

Course Outcomes	CO1	CM-406.1	Implement interactive web page(s) using HTML, CSS and JavaScript.
	CO2	CM-406.2	To know the Usage of JQuery
	CO3	CM-406.3	Build Dynamic web site using server side PHP Programming
	CO4	CM-406.4	To know database connectivity using PHP.
	CO5	CM-406.5	Develop real world application with different web designing tools.

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-406.1	**2**	**2**	**3**	**2**		**2**	**1**	**2**	**3**	**2**
CBD-406.2	**1**	**3**	**3**	**3**	**1**	**3**	**1**	**3**	**3**	**3**
CM\BD-406.3		**2**	**3**	**2**	**1**	**3**	**1**	**2**	**3**	**3**
CBD-406.4	**1**	**1**	**3**	**2**	**2**	**3**	**2**	**2**	**3**	**3**
CBD-406.5	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**
Average	**1.5**	**2.6**	**3**	**2.6**	**1.5**	**3**	**1.5**	**2**	**3**	**1.5**

3=strongly mapped, 2=moderately mapped, 1=slightly mapped

LEARNING OUTCOMES

HTML, CSS and XML:

1. Exercise on basic HTML tags.
2. Design a HTML page using suitable table tags and attributes.
3. Design a HTML page with a form containing various controls.
4. Design a HTML page on iframes.
5. Exercise on style.
6. Exercise on designing a XML document.

JavaScript, AJAX & JQuery:

7. Exercise on JavaScript functions.
8. Exercise on JavaScript arrays.
9. Write a program on mouse events using JQuery.
10. Design a webpage to apply the Effects of JQuery to HTML elements.
11. Exercise on changing background color using css() function in JQuery.
12. Write a JavaScript program using ResponsiveSlides Jquery plugin(download from responsiveslides.com)

PHP:

13. Install the following on local machine:
    - Apache Web server
    - MySQL
    - PHP and configure it to work with Apache Web server and MySQL.
14. Exercise on PHP arrays.
15. Design a form and access the elements of form using PHP.
16. Write PHP program to perform various operations on a database table using functions.
17. Write a PHP program to set a cookie.

KEY COMPETENCIES:

Exp. No.	**Name of the experiment**	**Objectives**	**Key Competencies**
1	Exercise on basic HTML tags	Create the HTML page with a title, heading, formatting and list tags in the body.	1) Identify the editor required forwriting HTML 2) Add the tags with relevantcontent 3) Save thefile 4) Open the file in abrowser 5) Test theresults
2	Design a HTML page using suitable table tags and attributes	Create the HTML page with a table and that table should have a header, body and footer.	1) Identify the tags for creating thetable 2) Add header, body and footer to the table. 3) Put some content in each section of table 4) Save thefile 5) Open the file in abrowser 6) Test theresults
3	Design a HTML page with a form containing various controls	Create the HTML page with a form and add some controls like textbox, label to the form.	1) Identify the tags to add a form and controls 2) Add the form and put some controls in it. 3) Save the file 4) Open the file in a browser 5) Test the results
4	Design a HTML page on frames	Create the HTML page with multiple iframes so that content in each frame will have different format and colors.	1) Identify the tags for creating multiple frames 2) Add some content to the frames and use different formats, colors for each frame. 3) Save the file 4) Open the file in a browser 5) Test the results
5	Design a style sheet to set the background color, position and dimensions of a HTML element	Create a style sheet which contains selectors to set the background color, position and dimensions of a HTML element.	6) Identify the editor required for creating CSS 7) Add selectors to set the background color, position and dimensions of an element. 8) Save the CSS file 9) Link the CSS file to a valid HTML page. 10) Save the HTML page 11) Open the HTML page in a browser 12) Test the results
6	Exercise on designing a XML document	Create a XML Document on Student data	1) Identify the editor required for creating XML 2) Add required elements for student data 3) Save the XML file as .xml extension 4) Open the XML document in browser 5)Test the results.

Exp. No.	**Name of the experiment**	**Objectives**	**Key Competencies**
7	Exercise on JavaScript functions	Write a JavaScript program using function which performs sum of two numbers and function should call when button is clicked.	1) Create a HTML file 2) Write a JavaScript function which adds two numbers. 3) Add HTML button tag and assign a function to onclick attribute. 4) Save the HTML file. 5) Open the HTML page in a browser 6) Test the results Resolve the errors if any through debugging
8	Exercise on JavaScript arrays	Write JavaScript code to implement sorting like reading an array of ‗n' numbers and sorting them in ascending order.	1) Create a HTML file 2) Add elements to read array and to sort. 3) Write the logic for sorting using iterative and conditional statements. 4) Save the HTML file. 5) Open the HTML page in a browser 6) Test the results Resolve the errors if any through debugging
9	Write a program on mouse events using JQuery	Write a JavaScript program using JQuery which displays different messages for mouse events like mouse enter, mouse leave, click, dbl click	1) Create a HTML file 2) Add a div tag with some content and border. 3) Write a JQuery functions which displays different messages when mouse enters in div tag, mouse leaves div tag and clicks on div tag. 4) Save the HTML file. 5) Open the HTML page in a browser 6) Test the results by moving moues over the div tag. 7) Resolve the errors if any through debugging
10	Design a webpage to apply the Effects of JQuery	Write a JavaScript program using JQuery which performs effects like hide, show, slideupfadeIn,fadeout,slideDown, SlideUp	1) Create a HTML file 2) Add a div tag with some content and border. 3) Add some buttons 4) Write a JQuery functions which performs some effect when click on respective button. 5) Save the HTML file. 6) Open the HTML page in a browser 7) Test the results by click on the button. Resolve the errors if any through debugging

Exp. No.	Name of the experiment	Objectives	Key Competencies
11	Exercise on changing background color using CSS properties in JQuery	Write a JavaScript program using JQuery which changes css properties like color, background-color, border etc.	1) Create a HTML file 2) Add a div tag with some content 3) Add some buttons 4) Write a JQuery functions which changes css properties like color, border when click on respective button. 5) Save the HTML file. 6) Open the HTML page in a browser 7) Test the results by click on the button. Resolve the errors if any through debugging
12	Write a JavaScript program using ResponsiveSlidesJquery plugin(download from responsiveslides.com)	Write a JavaScript program using JQuery which displays datepicker.	1) Create a HTML file 2) Add JQuery script tag. 3) Add slider plugin, which can be downloaded from http://responsiveslides.com 4) Add plugins file 5) Add images 6) Write JQuery code for display slideshow of images 7) Save the HTML file. 8) Open the HTML page in a browser 9) Test the results by click on the button. Resolve the errors if any through debugging
13	Install the following on local machine: • Apache Web server • MySQL • PHP and configure it to work with Apache Web server and MySQL.	Install a web server which supports PHP	1) Identify version compatible to system 2) Download the software 3) Install the server software 4) Configure the server 5) Write simple PHP program 6) Test the result
14	Exercise on PHP arrays	Write PHP program to implement searching like reading an array of 'n' numbers and finding smallest among them.	1) Create a PHP file. 2) Add elements to read array and to find the smallest number. 3) Write the logic for sorting using iterative and conditional statements. 4) Save and Run the page. Test the result

Exp. No.	**Name of the experiment**	**Objectives**	**Key Competencies**
15	Design a form and access the elements of form using PHP	Write a php program which displays sum of two numbers submitted by the form	1) Create a HTML file 2) Add form with two textboxes for enter two numbers 3) Write a php program, which adds two numbers submitted by form and display the sum. 4) Place the files in server 5) Open the HTML file in browser 6) Test the results
16	Write PHP code to perform various operations on a database table using functions.	Write PHP code to perform retrieval, insertion, modification and deletion of data in a database table using functions	1) Understand the process of connecting to database and execute commands. 2) Create a PHP file. 3) Add required elements to the page. 4) Write the logic to retrieve, insert, update and delete data in the table using functions. 5) Save and Run the page. 6) Test the result
17	Write a PHP program to set a cookie.	Write PHP code to create a cookie and put some information in it.	1) Understand the significance of cookies. 2) Create a PHP file. 3) Write the logic to create and seta cookie 4) Save and Run the page. 5) Test the result.

C-23 CBD-407 Python Programming Lab

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-407	Python Programming Lab	4	60	40	60

COURSE OBJECTIVES	Upon completion of the course the student shall able to learn 1. Basics of Python programming 2. Decision Making and Functions in Python 3. Object Oriented Programming using Python.

Course Outcomes	At the end of the course the student will be able to:		
	CO 1	CBD-407.1	Execute Simple python programs
	CO 2	CBD-407.2	Execute Python programs using expressions, operators
	CO 3	CBD-407.3	Demonstrate Python programs using Lists
	CO 4	CBD-407.4	Execute python programming using Functions, packages
	CO 5	CBD-407.5	Develop the Python programs using OOP Concepts and exceptions
	CO 6	CBD-407.6	Demonstrate Debugging of Python Programs

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-407.1	2	2	2	1	2			3		2
CBD-407.2	2	3	2					2		2
CBD-407.3	3	3	2	3		2	2	2		
CBD-407.4	2	2	2		2	3	1	2	3	
CBD-407.5	3	3	2		2	2	2	2	2	
CBD-407.6	2	1		3			3	1		
Average	**2.3**	**2.3**	**2**	**2.3**	**2**	**2.3**	**2**	**2**	**2.5**	**2**

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

LEARNING OUTCOMES:

1. Write and execute simple python Program.
2. Write /execute simple 'Python' program: Develop minimum 2 programs using different data types (numbers, string, tuple, list, and dictionary).
3. Write /execute simple 'Python' program: Develop minimum 2 programs using Arithmetic Operators, exhibiting data type conversion.
4. (i)Write simple programs to convert U.S. dollars to Indian rupees.

   (ii) Write simple programs to convert bits to Megabytes, Gigabytes and Terabytes.
5. Write simple programs to calculate the area and perimeter of the square, and the volume & perimeter of the cone.
6. Write program to: (i) determine whether a given number is odd or even. (ii) Find the greatest of the three numbers using conditional operators.
7. Write a program to: i) Find factorial of a given number. ii) Generate multiplication table up to 10 for numbers 1 to 5
8. Write a program to: Create a list, add element to list, delete element from the lists.
9. Write a program to: Sort the list, reverse the list and counting elements in a list.
10. Write a program to: Create dictionary, add element to dictionary, delete element from the dictionary.
11. Write a program to: To calculate average, mean, median, and standard deviation of numbers in a list.
12. Write a program to: To print Factors of a given Number.
13. File Input/output: Write a program to: i) To create simple file and write "Hello World" in it. ii) To open a file in write mode and append Hello world at the end of a file.
14. Write a program to :i) To open a file in read mode and write its contents to another file but replace every occurrence of character 'h' ii) To open a file in read mode and print the number of occurrences of a character 'a'.
15. Write a Program to: Add two complex number using classes and objects.
16. Write a Program to: Subtract two complex number using classes and objects.
17. Write a Program to: Create a package and accessing a package.

TIME SCHEDULE

Sl. No.	Major Topic	Periods	CO'S mapped
1.	Write and execute simple python Program.	3(2,1)	CO1, CO6
2.	Write /execute simple 'Python' program: Develop minimum 2 programs using different data types (numbers, string, tuple, list, dictionary).	4(2,1,1)	CO1, CO2, CO6
3.	Write /execute simple 'Python' program: Develop minimum 2 programs using Arithmetic Operators, exhibiting data type conversion.	4(2,1,1)	CO1, CO2, CO6
4.	(i)Write simple programs to convert U.S. dollars to Indian rupees. (ii) Write simple programs to convert bits to Megabytes, Gigabytes and	3(1,1,1)	CO1, CO2, CO6
5.	Write simple programs to calculate the area and perimeter of the square, and the volume & perimeter of the cone.	3(1,1,1)	CO1, CO2, CO6
6.	Write program to: (i) Determine whether a given number is odd or even. (ii) Find the greatest of the three numbers using conditional operators.	3(1,1,1)	CO1, CO2, CO6
7..	Write a program to: i) Find factorial of a given number. ii) Generate multiplication table up to 10 for numbers 1 to 5.	4(2,1,1)	CO1, CO2, CO6
8.	Write a program to: To print Factors of a given Number.	3(2,1)	CO4, CO6
9.	Write a program to: Create a list, add element to list, delete element from the lists.	3(1,1,1)	CO1, CO3, CO6
10.	Write a program to: Sort the list, reverse the list and counting elements in a list.	3(1,1,1)	CO2, CO3, CO6
11.	Write a program to: Create dictionary, add element to dictionary, delete element from the dictionary.	4(2,1,1)	CO2, CO3, CO6
12.	Write a program to: To calculate average, mean, median, and standard deviation of numbers in a list.	3(1,1,1)	CO2, CO3, CO6
13.	File Input/output: Write a program to: i) To create simple file and write "Hello World" in it. ii) To open a file in write mode and append Hello world at the end of a file.	4(2,2)	CO1, CO6
14.	Write a program to :i) To open a file in read mode and write its contents to another file but replace every occurrence of character 'h' ii) To open a file in read mode and print the number of occurrences of a character 'a'.	4(2,2)	CO1, CO6
15.	Write a Program to: Add two complex number using classes and objects.	4(2,2)	CO5, CO6

16.	Write a Program to: Subtract two complex number using classes and objects	4(2,2)	CO5, CO6
17.	Write a Program to: Create a package and accessing a package.	4(2,2)	CO5, CO6
Total		**60**	

KEY COMPETENCIES:

Sl.No	Name of the Experiment	Objectives	Key Competencies
1.	Write and execute simple python Program.	Write a simple python program to print Hello World! and debug and execute	1. Know the usage of Python IDLE 2. Edit and save the program 3. Check for the syntax errors and clear the errors 4. Run the program and check for the output.
2.	Write /execute simple 'Python' program: Develop minimum 2 programs using different data types (numbers, string, tuple, list, dictionary).	Write a Python program to identify different data types.	1. Identify different data types 2. Write basic python program using datatypes 3. Evaluate arithmetic expression 4. Run the program 5. Rectify the syntactical errors 6. Execute the program 7. Check the output for its correctness
3.	Write /execute simple 'Python' program: Develop minimum 2 programs using Arithmetic Operators, exhibiting data typeconversion.	Write a Python program to identify arithmetic operators and data type conversion	1. Identify different arithmetic operators 2. Build arithmetic expressions 3. Identify the priorities of operators 4. Evaluate arithmetic expression 5. Run the program 6. Rectify the syntactical errors 7. Execute the program Check the output for its correctness

4.	(i)Write simple programs to convert U.S. dollars to Indianrupees. (ii) Write simple programs to convert bits to Megabytes, Gigabytes and Terabytes.	Write a Python program to identify arithmetic operators and data type conversion	1. Identify different arithmetic operators 2. Build arithmetic expressions 3. Identify the priorities of operators 4. Evaluate arithmetic expression 5. Run the program 6. Rectify the syntactical errors 7. Execute the program Check the output for its correctness
5.	Write simple programs to calculate the area and perimeter of thesquare, and the volume & perimeter of the cone.	Write a Python program to identify arithmetic operators and data type conversion	1. Identify different arithmetic operators 2. Build arithmetic expressions 3. Identify the priorities of operators 4. Evaluate arithmetic expression 5. Run the program 6. Rectify the syntactical errors 7. Execute the program Check the output for its correctness
6.	Write program to: (i) Determine whether a given number is odd or even. (ii) Find the greatest of the three numbers using conditional operators.	Write a Python program to identify conditional statements in Python.	1. Build a relational expression 2. Use the if statement for decision making 3. Rectify the syntax errors 4. Check the output for correctness
7.	Write a program to : i) Find factorial of a given number. ii) Generate multiplication table up to 10 for numbers 1 to 5.	Write a Python program to identify loops statements in Python.	1. Build the termination condition for looping 2. Use while statement with correct syntax 3. Check whether correct number of iterations are performed by the while loop 4. Rectify the syntax errors 5. Debug logical errors
8.	Write a program to : To print Factors of a given Number.	Write a Python program to identify loops statements in Python.	1. Build the termination condition for looping 2. Use while statement with correct syntax 3. Check whether correct number of iterations are performed by the while loop 4. Rectify the syntax errors Debug logical errors

9.	Write a programs to: Create a list, add element to list, delete element from the lists.	Write a Python program to identify various lists and list manipulation methods in Python.	1. Create a one list with correct syntax 2. Create a list 3. Read elements from list 4. Add elements to list 5. Delete elements 6. Rectify the syntax errors 7. Debug logical errors 8. Check for the correctness of output for the given input
10.	Write a programs to: Sort the list, reverse the list and counting elements in a list.	Write a Python program to identify various lists and list manipulation methods in Python.	1. Create a one list with correct syntax 2. Create a list 3. Read elements from list 4. Add elements to list 5. Delete elements 6. Rectify the syntax errors 7. Debug logical errors 8. Check for the correctness of output for the given input
11.	Write a programs to: Create dictionary, add element to dictionary, delete element from the dictionary.	Write a Python program to identify various dictionary and dictionary manipulation methods in Python.	1. Create a one dictionary with correct syntax 2. Create a dictionary 3. Read elements from list 4. Add elements to dictionary 5. Delete elements from dictionary 6. Rectify the syntax errors 7. Debug logical errors 8. Check for the correctness of output for the given input
12.	Write a program to: To calculate average, mean, median, and standard deviation of numbers in a list.	Write a Python program to identify various statistical functions.	1.Create a list 2. add elements to list 3. perform statistical functions on that list
13.	File Input/output: Write a program to : i) To create simple file and write “Hello World” in it. ii) To open a file in write mode and append Hello world at the end of a file.	Write a Python program to identify the steps to create a file and append to file.	1. Create a Python file 2. Add contents to file

14.	Write a program to :i) To open a file in read mode and write its contents to another file but replace every occurrence of character 'h' ii) To open a file in read mode and print the number of occurrences of a character 'a'.	Write a Python program to identify the steps to open a file in read/write mode.	1. Open a Python file in write mode 2. Add contents to the file 3. Open a Python file in Read mode 4. Print the file
15.	Write a Program to: Add two complex number using classes and objects.	Write a Python program to identify the steps to create class and create an object in Python.	1. Create a class using Python 2. Create an object in Python 3. Debug the python program 4. Check the correctness
16	Write a Program to: Subtract two complex number using classes and objects	Write a Python program to identify the steps to create class and create an object in Python.	1. Create a class using Python 2. Create an object in Python 3. Debug the python program Check the correctness
17.	Write a Program to: Create a package and accessing a package.	Write a Python program to practice in creating packages and accessing packages	1. Create a package using Python 2. Access the package in Python 3. Debug the python program Check the correctness

C23 CBD-408: English Communication Skills (Lab Practice)

Course Title : English Communication Skills	**Course code: C23-Common- 408 (Common to all Branches)**
Year/ Semester : IV Semester	**Number of Periods : 45 (3 periods per week)**
Type of Course : Practical	**Max Marks : 100 (Internal 40 + External 60)**

Course Objectives:	- to communicate effectively in diverse academic, professional and everyday situations
	- exhibit appropriate body language and etiquette at workplace
	- be employable through preparing appropriate job applications and attend interviews confidently with all necessary skills

CO No.	
CO1	Listen and comprehend the listening inputs related to different genres effectively
CO2	Communicate effectively in interpersonal interactions, interviews, group discussions and presentations
CO3	Acquire employability skills: job hunting, resume writing, attending interviews
CO4	Practise appropriate body language and professional etiquette

Course Delivery: Text book: **"English Communication Skills"** by State Board of Technical Education and Training, AP

Sl No	**Unit**	**Teaching Hours**
1	Listening Skills	6
2	Workplace Etiquette	3
3	Introducing Oneself	3
4	Short presentation (JAM)	6
5	Group Discussion	6
6	Resume Writing and Cover Letter	3
7	Interview Skills	9
8	Presentation Skills	9
Total		*45*

Course Content:

UNIT I:Listening Skills **6 periods**

Pre – While- Post-listening activities- Listening to audio content (dialogues/ speech/ narrations) - answering the questions and fill in the blanks- vocabulary

UNIT 2: Workplace Etiquette **3 periods**

Basics of Etiquette- politeness/ courtesy, good manners- features of work place etiquette- adaptability, positive attitude, body language.

UNIT 3: Introducing Oneself **3 periods**

Speak about oneself - introduce oneself to a gathering/ formal & informal situations- Know about others- filling in the grid- introducing oneself in interviews

UNIT 4: Short Presentation **6 periods**

Dos and Don'ts in short presentation- speak for a minute without repetition, deviation & hesitation - the techniques to speak fluently – defining and describing objects, people, phenomena, events.- speaking on randomly chosen topics.

UNIT 5: Group Discussion **6 periods**

Fundamentals of Group Discussion- Dos and Don'ts- filling the Grid- possible list of topics- practice sessions- sample videos-Group activity

UNIT 6: Resume Writing and Cover Letter **3 periods**

Pre activity: answer the questions- jotting down biographical information- sample resumes- tips, Dos and Don'ts- model resumes- practice exercises on Resume writing

UNIT 7: Interview Skills **9 periods**

Pre –while-post activities: - things to do at three stages – respond to notifications- know the information about the organisation-practice FAQs - preparation of good/ suitable C V, Body language, tips for success in interviews, model / mock interviews.

UNIT 8: Presentation Skills **9 periods**

Preparatory work: observe pictures and answer questions- different kinds of presentations- PPTs, Flash cards, Posters, Charts. - tips to prepare aids, slide show, model PPTs, - checklist on pre, while and post presentations.

Mapping Course Outcomes with Programme Outcomes:

PO	**1**	**2**	**3**	**4**	**5**	**6**	**7**
CO	**POs 1 to 5 are applications of Engineering Principles, can't be directly mapped to English Communication Skills**					**1,2,3,4**	**1,2,3,4**

Unit wise Mapping of CO –PO

CO	**Course Outcome**	**COs / Unit Mapped**	**POs** mapping	**Cognitive levels as per Bloom's Taxonomy R/U/A/An (Remembering / Understanding / Applying/ Analyising)**
CO 1	Listen and comprehend listening inputs related to different genres effectively	Unit 1	6,7	R/U/A

CO2	Communicate effectively in interpersonal interactions, interviews, group discussions and presentations	Units 3,4,5,7,8	6,7	R/U/A/An
CO3	Acquire employability skills: job hunting, resume writing, attending interviews	Units 6,7	6,7	R/U/A/An
CO4	Practise appropriate body language and professional etiquette	Units 2, 3, 4,5,7,8	6,7	R/U/A

C-23 CBD-409 DBMS Lab

Course Code	Course Title	No. of periods/week	Total No. of periods	Marks for FA	Marks for SA
CBD-409	**DBMS Lab**	3	45	40	60

Sno	**UNIT TITLE**	**NO. OF PERIODS**	**COS**
1	Concepts of DBMS & RDBMS	**8**	**CO1**
2	Concepts of SQL	**14**	**CO2**
3	Basics of PL/ SQL	**9**	**CO3**
4	Advance PL/SQL	**6**	**CO4**
5	Concepts of NoSQL & MongoDB.	**8**	**CO5**
		45	

COURSE OBJECTIVES	**Upon completion of the course the student shall able to learn** 1. Insert, update, delete and select data into/from Relation Database 2. Develop PL/SQL programs 3. Insert, update, delete and select data from MongoDB

Course Outcomes	CO1	CBD-409.1	Develop SQL Queries to Create, modify and drop tables and Queries to Insert, update, delete data from tables.
	CO2	CBD-409.2	Execute SQL Queries to display data on different conditions from different tables
	CO3	CBD-409.3	Execute PL/SQL Programs
	CO4	CBD-409.4	Demonstrate the usage of cursors and triggers
	CO5	CBD-409.5	Execute commands to Insert, update, delete and select data in NOSQL and Mongo DB databases

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-409.1	2		3			2	3	3	2	
CBD-409.2	2	2	1			2			2	
CBD-409.3	2		1					2		2
CBD-409.4	2	2	3	3	3	3		2	2	2
CBD-409.5	2	3				3	3			
Average	2	2.3	2	3	3	2.6	3	2.3	2	2

3=Strongly mapped , 2=moderately mapped, 1=slightly mapped

LEARNING OUTCOMES

1 Know installation of Oracle
2 Exercise on creating tables.
3 Exercise on inserting records
4 Exercise on updating records
5 Exercise on modifying the structure of the table
6 Exercise on Select command
7 Exercise on querying the table using clauses like WHERE, ORDER BY, IN, AND, OR,NOT, IS NULL
8 Exercise on GROUP BY, HAVING
9 Exercise on Number functions, character functions, conversion functions and date functions, group functions
10 Exercise on set operators
11 Exercise on sub queries
12 Exercise on Joins
13 Exercise on various date and number format models
14 Exercise on creating tables with integrity constraints
15 Write programs using PL/SQL control statements
16 Exercise on Procedures
17 Exercise on Functions
18 Exercise on Cursors
19 Exercise on Triggers
20 Exercise on Installation of MongoDB
21 Exercise on Creation and Dropping of Database
22 Exercise on Creation and Dropping of Collections.
23 Exercise on Commands of MongoDB- Insert , update , find, delete and sorting of Documents.

Time Schedule:

Sl.No	Name of the Experiment	Periods
1	Know installation of Oracle	1
2	Exercise on creating tables.	1
3	Exercise on inserting records	2
4	Exercise on updating records	2
5	Exercise on modifying the structure of the table	1
6	Exercise on SELECT command	2
7	Exercise on querying the table using clauses like WHERE, ORDER, IN,AND, OR,NOT, IS NULL	3
8	Exercise on GROUP BY, HAVING	2
9	Exercise on Number functions, character functions, conversion functions and date functions, group functions	3
10	Exercise on SET operators	2
11	Exercise on sub queries	3
12	Exercise on Joins	3
13	Exercise on various date and number format models	1
14	Exercise on creating tables with integrity constraints	2
15	Write programs using PL/SQL control statements	6
16	Exercise on Procedures	2
17	Exercise on Functions	1
18	Exercise on Cursors	2
19	Exercise on Triggers	2
20	Exercise on Installation of MongoDB	1
21	Exercise on Creation and Dropping of Database	1
22	Exercise on Creation and Dropping of Collections	1
23	Exercises on commands of MongoDB	1
	Total	45

KEY COMPETENCIES

Sl.No	Name of the Experiment	Objectives	Key Competencies
1	Know installation of Oracle	Perform the following: i. To identify the version of Oracle being installed ii. To understand the RAM and HDD requirements for Oracle installation iii. To comprehend the installation steps correctly iv. Setting up of Oracle Administrative Password v. Configuring the Oracle database after post-installation steps of Oracle viz configuring administrative rights for performing vi. To login to Oracle as administrator account and Oracle user account	❖ Observe Oracle version being installed ❖ Observe the RAM & HDD requirements ❖ Rectify for any Oracle installation errors ❖ Able to login as Administrator and as Oracle user account
2	Exercise on creating tables.	Perform the following: i. To login with Oracle user account ii. To give correct syntax for table creation iii. To give correct data type for the required fields with appropriate size iv. To display the structure of the table	❖ Correct Table creation syntax errors ❖ Correct the wrong data types and inappropriate sizes for the respective fields ❖ Check for displaying the structure of the table
3	Exercise on inserting records	Perform the following: i. Check for the required table present already ii. To insert the records correctly iii. To display the records correctly	❖ Correct syntax errors for Insertion of record ❖ Check for insertion of proper values for the required fields ❖ Verify the correct values pertaining to the record are inserted in the required table ❖ Check for displaying of the records correctly

Sl.No	Name of the Experiment	Objectives	Key Competencies
4	Exercise on updating records	Perform the following: i. Check for the required table present already ii. To update the records correctly iii. To display the updated records	❖ Correct syntax errors for updation of record ❖ Check for updation of proper values for the required fields ❖ Check for displaying of the updated records correctly
5	Exercise on modifying the structure of the table	Perform the following i. To identify the required table present in the system already ii. To add new column iii. To display the records correctly	❖ Correct syntax errors in modifying the structure of the table ❖ Check whether required field is newly added to the existing table ❖ Check for displaying of the modified table correctly
6	Exercise on SELECT command	Perform the following i. To identify the required table present already ii. To display the records in the required table	❖ Check for syntax error in usage of Select command ❖ Check whether Select command is given correctly to display all the records
7	Exercise on querying the table using clauses like WHERE, ORDER, IN,AND, OR,NOT, IS NULL	Perform the following: i. To use the Select command ii. To use the clauses WHERE, ORDER, IN,AND, OR, NOT, IS NULL along with Select command on the given records in the table	❖ Check for syntax error in usage of Select command with appropriate clauses ❖ Check whether Select command along with appropriate clause is given correctly for the required condition ❖ Check the usage of clauses WHERE, ORDER, IN,AND, OR, NOT along with Select command appropriately
8	Exercise on GROUP BY, HAVING	Perform the following: i. To use the Select command To use the clauses GROUP BY, HAVING along with Select command on the given records in the table	❖ Check for syntax error in the usage GROUP BY, HAVING ❖ Check for usage of GROUP BY, HAVING ❖ Verify output values based on certain condition on few records

Sl.No	Name of the Experiment	Objectives	Key Competencies
9	Exercise on Number functions, character functions, conversion functions and date functions, group functions	Perform the following i. To use functions ii. To use set command along with WHERE condition, GROUP BY, HAVING	❖ Check for syntax error of various functions ❖ Check for usage of various functions ❖ Verify output values based on certain condition on few records
10	Exercise on SET operators	Perform the following iii. To use set command iv. To use set command along with WHERE condition	❖ Check for syntax error in the usage of SET command ❖ Check for usage of SET command for updating values based on certain condition on few records
11	Exercise on sub queries	Perform the following i. To use Select command ii. To use appropriate Operators IN	❖ Check for the syntax error in usage of sub queries ❖ Check for the correctness of the usage of appropriate operators used
12	Exercise on Joins	Perform the following i. To create two tables ii. To use the common field if two tables aroused iii. To know different types of Join	❖ Check for the correctness of the syntax used for joining ❖ Check if the join is created between two tables ❖ Check if self join is created
13	Exercise on various date and number format models	Perform the following: i. To use date formats correctly ii. To use number formats correctly	❖ Check for the syntax of the date formats ❖ Check for the syntax of the number formats
14	Exercise on creating tables with integrity constraints	Perform the following i. Create Primary key ii. Create Foreign key or referential integrity constraint iii. Create NOT NULL constraint iv. Create UNIQUE Key constraint v. Create CHECK constraint	❖ Check for the syntax errors in usage of all types of Integrity constraints ❖ Check whether different types of Integrity constraints are used
15	Write programs using PL/SQL control statements	Perform the following i. To use IF .. ELSE statements ii. To use iterative statements – Simple loop, While Loop, For Loop	❖ Check for the syntax of IF.. ELSE statements ❖ Check for the syntax of all iterative statements

Sl.No	Name of the Experiment	Objectives	Key Competencies
16	Exercise on Procedures	Perform the following i. To know the concept of stored procedures ii. To declare procedures iii. The type of parameters IN,IN OUT,OUT iv. To call procedures from other procedures	❖ Check for proper declaration of procedures ❖ Check for syntax of parameters and its type ❖ Check for proper calling of procedures
17	Exercise on Functions	Perform the following i. To know the concept of stored functions ii. To declare function with return data iii. To call functions from other functions	❖ Check for proper declaration of function ❖ Check for syntax of parameters and its data type ❖ Check for proper return data type from the functions ❖ Check for variable assignment to get the returned value from the function
18	Exercise on Cursors	Perform the following i. To know the concept cursors ii. To know the fetch data from database	❖ Check for the syntax of cursor ❖ Check for open cursor, fetch data, close cursor ❖ Check for the result
19	Exercise on Triggers	Perform the following i. To know the concept of triggers ii. Validation before and after insert, before and after update and , before and after delete data	❖ Check for the syntax of trigger ❖ Write a trigger which raises before insert data ❖ Raise trigger ❖ Repeat the procedure for remaining ❖ Check for the result
20	Exercise on Installation of MongoDB	Perform the following i. To download and install MongoDB	❖ Observe MongoDB version being installed ❖ Observe the RAM & HDD requirements ❖ Rectify for any MongoDB installation errors Able to login as Administrator

Sl.No	Name of the Experiment	Objectives	Key Competencies
21	Exercise on Creation and Dropping of Database	Perform the following i. Create the Database ii. Drop the Database	❖ Know the use of create Database() and drop Database() ❖ Correct Database creation syntax errors ❖ Check for displaying the database name
22	Exercise on Creation and Dropping of Collections	Perform the following i. Create the Collection ii. Drop the Collection	❖ Know the use of create Collection() and drop() ❖ Correct Database creation syntax errors ❖ Check for collection name ❖ Check for the collection dropped
23	Exercises on commands of MongoDB	Execute the following commands of MongoDB i. Insert the Document ii. update the Document iii. find the Document iv. Delete the Document v. sort the Documents	❖ Know the syntax of insert(), update(), find(), remove(), sort() functions. ❖ Correct syntax errors. ❖ Check out for different input values.

V SEMESTER

DIPLOMA IN CLOUD COMPUTING & BIG DATA ENGINEERING
SCHEME OF INSTRUCTIONS AND EXAMINATION

CURRICULUM-2023

(V Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Semester	Scheme Of Examinations			
		Theory	Pract--icals		Duration (hrs)	Sessio-nal Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
CBD-501	Industrial Management and Entrepreneurship	5		75	3	20	80	100
CBD-502	Advanced Cloud Computing	4		60	3	20	80	100
CBD-503	Software Engineering	5	-	75	3	20	80	100
CBD-504	Internet Of Things	4	-	60	3	20	80	100
CBD-505	Big Data Analytics	5		75	3	20	80	100
PRACTICAL SUBJECTS								
CBD-506	Cloud Computing Lab		4	60	3	40	60	100
CBD-507	Big Data Analytics Lab		6	90	3	40	60	100
CBD-508	Life Skills		3	45	3	40	60	100
CBD-509	Project work		3	45	3	40	60	100
	Activities		3	45				
	Total	23	19	630		260	640	900

- **CBD-501 IS COMMON WITH CM-501**
- **CBD-504 IS COMMON WITH CM-504**

C-23 CBD-501 Industrial Management and Entrepreneurship

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-501	Industrial Management and Entrepreneurship	5	75	20	80

TIME SCHEDULE

Sl. No.	Chapter/ Unit Title	Periods	Weightage of Marks	Short questions	Essay questions	CO's Mapped
1.	Principles of Management.	10	16	2	1	C01
2	Organization Structure & Organizational Behaviour.	18	26	2	2	CO2
3.	Production Management.	17	26	2	2	CO3
4.	Engineering Ethics & Safety and Labour Codes.	20	26	2	2	CO4
5.	Entrepreneurship & Start-ups.	10	16	2	1	CO5
Total		**75**	**110**	**10**	**8**	

Course Objectives and Course Outcomes

COURSEOBJECTIVES		Upon completion of the course the student shall be able to (i) Familiarize the concepts of management, and organization structures. (ii) Exposure to organizational behavioural concepts, basics of production management in industries. (iii) Exposure to Engineering Ethics, Industrial Safety, Labour codes and entrepreneurial start-ups programmes.	
COURSE OUTCOMES	CO1	CBD-501.1	Understand the principles of management as applied to industry.
	C02	CBD-501.2	Explain types of the industrial organization structures and the behaviour of an individual in an organization, motivational and leadership styles.
	C03	CBD-501.3	Explain the different aspects of production management.
	CO4	CBD-501.4	Explain Engineering Ethics, Industrial Safety and industrial

			Labour Codes.
	CO5	CBD-501.5	Explain Entrepreneurial development programmes and Start-ups.

CO and PO Mapping

	PO 1	PO 2	PO3	PO4	PO5	PO 6	PO7	PSO 1	PSO 2	PSO 3
CO1	1							1		
CO2		1								2
CO3	3								2	2
CO4						3		1	2	
CO5							2	1	2	

3: High, 2: Moderate, 1: Low Note:

The gaps in CO and PO mapping will be achieved by one or more appropriate activities from the following:
(i) Assignments (ii) Tutorials (iii) Seminars (iv) Guest Lectures (v) Group Discussions
(vi) Quiz (vii) Industry Visits (viii) Tech-Fest (ix) Mini Projects (x) Library Visits.

Learning Outcomes

Understand the principles of management as applied to industry.

1.0 Principles of Management
- **1.1** Define industry, commerce (Trade) and business.
- **1.2** Know the need for management.
- **1.3** Understand functions of Management.
- **1.4** List the principle of scientific management by F.W.Taylor
- **1.5** List the principle of modern management by Henry Foyal.
- **1.6** Differentiate management, administration and organization
- **1.7** Differentiate Lower, Middle and Top level management
- **1.8** Explain the importance of Managerial skills (Technical, Human, Conceptual)
- **1.9** Know the objectives of Management Information Systems.
- **1.10** Know the Characteristics of Management Information Systems.

2.0 Organization Structure & Organizational Behavior
- **2.1** Define organization structure.
- **2.2** Explain line, staff and line & staff organization structures with advantages, disadvantages and applications.
- **2.3** List various Motivation theories.
- **2.4** Explain Maslow's Hierarchy of needs.
- **2.5** Explain Different leadership styles.
- **2.6** Explain Trait theory of leadership
- **2.7** Explain Behavioral theory of Leadership.
- **2.8** Explain the Responsibility of human resource management.
- **2.9** Understand the process of recruitment, selection and training
- **2.10** State the Objectives of Job Analysis.

3.0 Production Management

3.1 Define Production, Planning and Control.
3.2 Explain Briefly Mass production, Batch production and Job order production.
3.3 Define the terms Routing, Scheduling and Dispatching.
3.4 List applications of network diagrams in production planning and control.
3.5 Draw PERT and CPM Network Diagrams – Simple Problems.
3.6 Know the functions of Materials Management.
3.7 Explain ABC analysis of Inventory.
3.8 Explain concept of Economic ordering quantity.
3.9 Explain meaning of Supply chain management.
3.10 Write processes of Supply Chain Management
3.11 List the Functions of Purchase Department.
3.12 Write functions of Stores Department.

4.0 Engineering Ethics & Safety and Labour Codes

4.1 Definition of Engineering Ethics.
4.2 Understand Core qualities of Professional Engineers.
4.3 Explain Different types of Ethics in Engineering.
4.4 State the meaning of Intellectual Property Rights
4.5 List common types of Intellectual Property Rights.
4.6 List Activities of Corporate Social Responsibility (CSR).
4.7 State the need of Human values in engineering fields.
4.8 Comprehend the importance of safety at Workplace.
4.9 ListDifferent hazards in the industry.
4.10 State the causes of accidents costs of accidents and their prevention.
4.11 List Salient features of Code on Wages, 2019.
4.12 List Salient features of Industrial Relations Code, 2020,
4.13 List Salient features of Code on Social Security, 2020
4.14 List Salient features of Occupational Safety, Health and Working Conditions Code, 2020.

5. Entrepreneurship & Start-ups

5.1 Define the word Entrepreneur and Entrepreneurship.
5.2 Explain various self - employment schemes
5.3 List the Financial assistance programmes provided by the Governments.
5.4 Explain the concept of TQM and ISO 9000 series and BIS 14000 Series.
5.5 List the Advantages and Drawbacks of ISO 9000 series of standards.
5.6 Explain the Concept of Incubation center's.
5.7 Explain Startup and its stages.
5.8 Explain Break Even Analysis to make or buy the products.
5.9 State the Importance of Branding.
5.10 State the significance of Business name, logo and tag line.
5.11 Explain the Concepts of Digital Marketing.
5.12 Know the Role of E-commerce and Social Media.
5.13

Course Content

1.0 Principles of Management

Introduction: Industry, Commerce and Trade; Definition of management; Functions of management; Principles of Scientific Management: F.W. Taylor - Principles of Modern Management: Henry Fayol; Administration organization and management; Levels of management - Managerial skills - Management Information Systems: Objectives and Characteristics.

2.0 Organization Structure & Organizational Behaviour

Organization Types: Line, Staff and Line & Staff Organizations – Maslow's motivational theory; Leadership Styles – Trait theory of leadership – Behavioural theory of Leadership.

Job Analysis - Responsibility of human resource management - Selection procedure – Training of Workers: Apprentice Training – On job training.

3. Production Management.

Production, Planning and Control – Types of Production - Routing, Scheduling and Dispatching - PERT and CPM Network Diagrams – Applications - –Calculate Project Duration and identify the critical path of the Project – Simple Problems; Functions of Materials Management - ABC analysis of Inventory. - Economic ordering quantity- Meaning of Supply Chain Management – Processes of Supply Chain Management - Functions of Purchase Department - Purchasing Procedure -Functions of Stores Department – Bin Card.

4. Engineering Ethics &Safety and Labour Codes

Engineering Ethics: Definition – Classification of Engineering Ethics - Personal and Business ethics –Value based ethics - Environmental ethics – Meaning of Intellectual Property Rights – Common types of Intellectual Property Rights - Activities of Corporate Social Responsibility (CSR).

Human values : Morals – Values –Character- Caring –Courage - Cooperation – Commitments – Empathy – Honesty- Integrity - Respect for others – Sharing–Service learning.

Industrial Safety: The importance of safety at Workplace -Hazard and accident - Different hazards in the industry -The causes of accidents and prevention of accidents - Direct and indirect cost of accidents.

Industrial Labour Codes: Meaning of Employer and Employee - Objectives of Industrial Labour Codes – Salient features of Code on Wages, 2019 - Salient features of Industrial Relations Code, 2020 - Salient features of Code on Social Security, 2020 - Salient features of Occupational Safety, Health and Working Conditions Code, 2020.

5. Entrepreneurship & Start-ups

Entrepreneur - Entrepreneurship - Role of Entrepreneur - Qualities of an entrepreneur- Requirements of an entrepreneur - Expectations of Entrepreneurship - Self-employment schemes - Institutional support - Concept of TQM –Pillars of TQM- Importance of ISO 9000 certification - Concepts of ISO 9000 Series and BIS 14000 Series- Advantages and Drawbacks of ISO 9000 series of standards - List the beneficiaries of ISO 9000.

Financial assistance programmes - Concept of Incubation center's – Start-up and its stages –– Make or Buy Decision – Break Even Analysis - Branding – Business name, logo and tag line – Concepts of Digital Marketing - Role of E-commerce and Social Media.

REFERENCEBOOKS

1. Industrial Engineering and Management -by O.PKhanna
2. Production Management-by Buffa.
3. Engineering Economics and Management Science-by Banga& Sharma.
4. Personnel Management by Flippo.
5. Production and Operations Management–S.N.Chary
6. Converging Technologies for Smart Environments and Integrated Ecosystems IERC Book Open Access 2013 pages-54-76.

Table specifying the scope of syllabus to be covered for Unit Test-I & Unit Test-II
CBD-501 :: Industrial Management & Entrepreneurship

Unit Test	Learning Outcomes to be covered
Unit Test – I	From 1.1 to 3.12
Unit Test – II	From 4.1 to 5.12

C-23 **CBD-502 ADVANCED CLOUD COMPUITNG**

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-502	**ADVANCED CLOUD COMPUITNG**	4	60	20	80

Time Schedule:

S. No.	Chapter/Unit Title	No. of Periods	Weightage of marks	Short questions	Essay questions	CO's Mapped
1.	**AWS Cloud Networks**.	10	16	2	1	CO1
2.	**Google Cloud Platform and Microsoft Azure**	18	36	2	3	CO2
3.	**Cloud Security**.	10	16	2	1	CO3
4.	**Green Cloud Computing**	12	26	2	2	CO4
5.	**Cloud Applications**	10	16	2	1	CO5
	Total	**60**	110	10	8	

Course Objectives	i)Understand the **AWS Cloud Networks** ii) To familiarize the various Technologies like AWS, GAE, MICROSOFT AZURE. iii)To understand Green Cloud Computing. iv) Know the cloud security and applications

Course Outcomes	Upon completion of the course the student shall be able to		
	CO1	CBD-502.1	Analyse the AWS Cloud Networks.
	CO2	CBD-502.2	Describe Google Cloud Platform and Microsoft Azure
	CO3	CBD-502.3	Explain Cloud Security.
	CO4	CBD-502.4	Analyse the Green Cloud Computing
	CO5	CBD-502.5	Summarize the Cloud Applications

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-502.1	3	3	3	3	2	3	2	3	2	1
CBD-502.2	3	3	2	3	2	3	2	3	2	1
CBD-502.3	3	2	2	1	2	2	2	3	1	1
CBD-502.4	3	3	3	3	2	3	2	3	2	1
CBD-502.5	3	2	1	1	2	2	2	3	1	1
Average	**3**	**3**	**2**	**2**	**2**	**2.6**	**2**	**3**	**1.5**	**1**

3=strongly mapped, 2=moderately mapped, 1=slightly mapped

LEARNING OUTCOMES:

On completion of the study of the subject, the student should be able to

1.0 AWS Cloud Networks

1.1 Introduction to AWS
1.2 Know the History of AWS
1.3 State the Features of AWS
1.4 List different AWS services
1.5 Explain AWS services
    1.5.1 Compute services
    1.5.2 Storage services
    1.5.3 Network services
1.6 List the Advantages and disadvantages of AWS
1.7 List the Applications of AWS

2.0 Google Cloud Platform and Microsoft Azure

2.1 Google Cloud Plat form

2.1.1 Know the concept of Google cloud platform
2.1.2 List the Key Features of Google Cloud Platform
2.1.3 Describe the working of Google cloud platform
2.1.4 List the Google cloud platform services
2.1.5 Explain the Google cloud platform services
    2.1.5.1 Compute services
    2.1.5.2 Storage services
    2.1.5.3 Network services
2.1.6 Write the Advantages of Google cloud platform

2.2 Microsoft Azure

2.2.1 Know the concept of Microsoft Azure in cloud computing?
2.2.2 List the different services of Microsoft Azure
2.2.3 Explain the Working of Microsoft Azure
2.3 Differentiate between AWS, Microsoft azure and Google cloud platform

3.0. Cloud Security

3.1 Define Security, Privacy and Trust
3.2 Explain Infrastructure Security
    3.2.1. Network Level Security
    3.2.2 Host Level Security
    3.2.3 Application Level Security
3.3 Explain Data Security
    3.3.1 Aspects of Data Security
    3.3.2 Data Security Mitigation

4.0 Green Cloud Computing

4.1 Define Green cloud computing
4.2 Define Cloud Simulator

4.3 List the Features of CloudSim
4.4 List the advantages and Disadvantages of Green cloud
4.5 Draw and Explain the CloudSim Architecture
4.6 Explain the installation procedure of cloudSim using Net beans IDE
4.7 Understanding the Working platform for CloudSim

5.0 Cloud Applications

5.1 List different Applications of cloud Computing
5.2 Explain Scientific Applications
- 5.2.1 Health Care
- 5.2.2 Biology
- 5.2.3 Geo-Science – Satellite Image Processing

5.3 Explain Business and Consumer Applications
- 5.3.1 Social Networking
- 5.3.2 Media Applications
- 5.3.3 Multiplayer Online Gaming
- 5.3.4 CRM and ERP

COURSE CONTENTS:

1. AWS Cloud Networks

Introduction to AWS, History of AWS, Features of AWS, , AWS services, Advantages and disadvantages of AWS and Applications of AWS

2. Google Cloud Platform and Microsoft Azure

Google cloud platform: Concept of Google cloud platform, working of Google cloud platform, Features of Google Cloud Platform, Google cloud platform services and Advantages of Google cloud platform,

Microsoft Azure : concept of Microsoft Azure , services of Microsoft Azure, Working of Microsoft Azure, Differentiate between AWS, Microsoft azure and Google cloud platform

3. Cloud Security

Cloud Security, Privacy and Trust, Infrastructure Security - Network Level Security, Host Level Security, Application Level Security, Data Security- Aspects of data security ,Security Mitigation.

4. Green Cloud Computing

Green cloud computing –Definition, Introduction to cloud Simulator, Features of CloudSim, Advantages and Disadvantages of Green cloud, CloudSim Architecture, Installation procedure of cloudSim using net beans IDE and Working platform for CloudSim.

5. Cloud Applications

Applications of cloud Computing-Scientific Applications - Health Care, Biology, Geo-Science – Satellite Image Processing, Business and Consumer Applications- Social Networking, Media Applications, Multiplayer Online Gaming, CRM and ERP.

REFERENCES:

1. Cloud Computing : Principles and Paradigms – Rajkumar Buyya, James Broberg and Andrzej Goscinski
2. Mastering Cloud Computing – Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi
3. Cloud Security and Privacy – Tim Mather, Subra Kumaraswamy, Shahed Latif

4. First Steps in Cloud Computing – Navin Sabharwal, Ravi Shankar
5. www.tutorialspoint.com
6. www.cloudsimtutorials.online
7. AWS-lab-practice-guide-by-www.server-computer
8. https://www.javatpoint.com/cloud-computing-tutorial

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 2.3
Unit test-2	From 3.1 to 5.3

C-23 CBD-503 Software Engineering

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-503	Software Engineering	5	75	20	80

Time Schedule:

S.No.	Chapter/Unit Title	No.of Periods	Weightage of marks	Short questions	Essay questions	CO's Mapped
1.	Basics of Software Engineering Designs & Life Cycle Models	10	16	2	.1	C01
2.	Software Project Management	18	16	2	1	CO2
3.	Requirement Analysis & Specifications	10	13	1	1	C03
4.	Software Design, Coding	22	39	3	3	CO4
5.	Software testing, Debugging, Reliability, Quality Management & Maintenance	15	26	2	2	CO5
	Total	75	110	10	8	

Course Objectives	i)To know the fundamentals of software engineering & life cycle modes ii)To familiarize project managements iii)To design software projects with the help of software engineering principles and UML models

Course Outcomes	At the end of the course the student able to learn following:		
	CO1	CBD-503.1	Explain Software life cycle models and basics of software engineering.
	CO2	CBD-503.2	Describe Software Project Management
	CO3	CBD-503.3	Prepare SRS document
	CO4	CBD-503.4	Apply Design ,coding techniques.
	CO5	CBD-503.5	Apply Testing Techniqes ,Quality and reliability metrics

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-503.1	3	2	3	2	2	1	1	2	2	2

CBD-503.2	3	3	3	3	1	3	2	2	2	3
CBD-503.3	3	3	1		3		1	2	2	3
CBD-503.4	3	3	3	3	2	2	2	2	3	3
CBD-503.5	3	2	3	3	2	2	3	2	2	3
Average	3	2.6	2.6	2.6	2.75	2	1.8	2	2.2	2.8

3=strongly mapped, 2=moderately mapped, 1=slightly mapped

Learning Outcomes:

1.0 Basics of Software Engineering Designs & Life Cycle Models

1.1 Know the Evolution and Impact of the Software Engineering

1.1.1 Evolution of an Art to an Engineering Discipline

1.1.2 A Solution to the Software Crisis?

1.2 Know the difference between Programs and Software Products

1.3 Understand the evolution of Software Engineering Design

1.3.1 Early Computer Programming

1.3.2 High Level Language Programming

1.3.3 Control Flow-Based Design

1.3.4 Data Structure-Oriented Design

1.3.5 Data Flow-Oriented Design

1.3.6 Object Oriented Design

1.3.7 Other Developments

1.4 Explain the Software Life Cycle Models

1.4.1 Classical Waterfall Model

1.4.2 Iterative Water fall Model

1.4.3 Prototyping Model

1.4.4 Evolutionary Model

1.4.5 Spiral Model

1.4.6 **AGILE Model**

1.4.7 Comparison of Different Life Cycle Models

2.0 Software Project Management

2.1 Software Project Manager

2.1.1 Job Responsibilities of a Software Project Manager

2.1.2 Skills Necessary for Software Project Management

2.2 Know about Software Project Planning

2.3 The SPMP Document

2.4 Metrics for Project Size Estimation

2.4.1 Lines of Code

2.4.2 Function Point Metric

2.5 Project Estimation Techniques

2.5.1 Empirical Estimation Technique

2.5.2 Heuristic Technique

2.6 Staffing Level Estimations

- **2.6.1** Nordens Work
- 2.6.2 Putnam's Work

2.7 Scheduling

- **2.7.1** Work Break Down Structure
- **2.7.2** Activity Networks
- 2.7.3 Gantt Charts
- **2.7.4** PERT Charts

2.8 Learn how to do Staffing

2.9 Who is a Good Software Engineer?

2.10 Risk Management

- **2.10.1** Risk Identification
- **2.10.2** Risk Assessment
- **2.10.3** Risk Containment

3.0 Requirement Analysis & Specifications

3.1 Requirements Gathering and Analysis

3.2 Software Requirement Specifications

- **3.2.1** List Contents of the SRS Document
- **3.2.2** Explain Functional Requirements
- **3.2.3** Describe Procedure to identify the Functional Requirements

3.3 How to Document the Functional Requirements

3.4 Explain requirements Traceability

3.5 List Characteristics of a Good SRS Document

3.6 Give Examples of Bad SRS Document

3.7 Explain Organization of the SRS Document

4.0 Software Design, Coding

4.1 What is a good Software Design?

4.2 Define and Classify Cohesion and Coupling

- 4.2.1 Classification of Cohesiveness
- 4.2.2 Classification of Coupling

4.3 Approaches of Software Design

- 4.3.1 Function-Oriented Design
- 4.3.2 Object-Oriented Design
- 4.3.3 Function-Oriented vs Object-Oriented Design

4.4 User Interface Design

- 4.4.1 List the Characteristics of a good User Interface
- 4.4.2 Understand the Basic Concepts
  - 4.4.2.1 User Guidance and Online Help
  - 4.4.2.2 Mode Based vs Modeless Interface
  - 4.4.2.3 Graphical User Interface (GUI) vs Text-Based User Interface
- 4.4.3 Types of User Interface
  - 4.4.3.1 Command Language Based Interface
  - 4.4.3.2 Menu Based Interface
  - 4.4.3.3 Direct Manipulation Interfaces
- 4.4.4 Component Based GUI Development Window System and Types of Widgets.

4.5 Unified Modeling Language

4.5.1 List the goals of UML
4.5.2 Role of UML in Object oriented Design
4.5.3 List and explain Building blocks of UML
4.5.4 List different symbols used in UML notation
4.5.5 Classify and list standard UML diagrams
4.5.6 Know the purpose of Class diagram and draw simple class diagrams
4.5.7 Use case diagram
4.5.7.1 Define the term Use case
4.5.7.2 Know the purposes of Use case diagram
4.5.7.3 Learn to draw the Use case diagram
4.5.8 Interaction diagram
4.5.8.1 State the purpose of Interaction diagram
4.5.8.2 Interaction diagrams
4.5.8.3 List interaction diagrams(sequence & collaboration)
4.5.8.4 learn to draw the Interaction diagrams

4.6 Understand the concept of Software Coding
4.6.1 Coding Standards and Guidelines - Code Review - Code Walk- Throughs - Code Inspection
4.6.2 Clean Room Testing - Software Documentation- Software Testing

5.0 **Testing, Debugging, Reliability, Quality Management & Maintenance**

5.1 Understand Testing
5.1.1 What is Testing?
5.1.2 Differentiate Verification and Validation
5.1.3 List 3Designs of Test Cases
5.1.4 Compare Testing in the Large vs Testing in the Small
5.1.5 Explain Unit Testing
5.1.6 Explain Black box Testing and White Box Testing.
5.1.7 Explain Open source software testing tools : Selenium,Bugzilla

5.2 Debugging
5.2.1 Explain Debugging Approaches.
5.2.2 List the Debugging Guidelines.

5.3 Explain Program Analysis Tools (Static Analysis Tools& Dynamic Analysis)
5.4 List and Explain Integration Testing
5.5 Explain System Testing
5.6 Explain Performance Testing.
5.7 Understand the concept of Software Reliability
5.7.1 Differentiate Hardware Reliability and Software Reliability
5.7.2 List the different Reliability Metrics
5.7.3 Understand the Reliability Growth Modeling
5.8 State the importance of Statistical Testing
5.9 Explain Software Quality Management systems
5.10 Define SEI Capability Maturity Model

COURSE CONTENT

1. Introduction to Software Engineering- Life Cycle Models.

2. Software Project Management- Responsibilities of a Software Project

Manager- Project planning – Metrics-Project Estimation Techniques- Staffing Level Estimation - Scheduling – Risk Management

3. Requirement Analysis and Specification: Requirement Gathering and Analysis - SRS document

4. Software Design , Coding : Good software design, Cohesion and Coupling, Software Design Approaches, User interface Design, Software Coding and

Goals of UML - Role of UML in Object oriented Design - Building blocks of UML : Things, Relationships, and Diagrams - Symbols used in UML notation - Classify and list standard UML diagrams - Class diagram, purposes of class diagram, draw the class diagram - Use case diagram, define the term Use case, purposes of Use case diagram, draw the Use case diagram - Interaction diagram, purposes of Interaction diagram, the types of interaction diagrams : Sequence diagram and Collaboration diagram, draw the Interaction diagrams.

5. Software Testing, Debugging ,Reliability, Quality Management and maintenance – Testing, Debugging software Reliability- Statistical Testing, Software Quality, Software Quality Management System, SEI capability Maturity Model

REFERENCE BOOKS

1. Fundamentals of Software Engineering – Rajib Mall (PHI)Second Edition.
2. Software Engineering - Jawadekar (TMH)
3. Software Engineering Concepts - Fairley (TMH)
4. Pankaj Jalote international approach to software engineering ":2nd edition Narosal publishing house 1997
4. http://www.tutorialspoint.com/uml/
6.The Unified Modelling Language User guide…Grady Booch

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.6
Unit test-2	From 4.1 to 5.7

C-23 CBD-504 Internet of Things

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-504	**Internet of Things**	4	60	20	80

Time Schedule:

S.No.	Chapter/Unit Title	No.of Periods	Weightage of marks	Short questions	Essay questions	CO's Mapped
1.	Introduction of IOT	10	16	2	1	CO1
2.	Data Protocols	14	16	2	1	CO2
3.	Communication Technologies	14	13	1	1	CO3
4.	Wireless Sensor Networks	14	39	3	3	CO4
5.	Role Of IOT	8	26	2	2	CO5
	Total Periods	60	110	10	8	

Course Objectives	i)To assess the vision of IoT. ii)To classify Real World IoT applications in various Domains. iii)To understand design methodology for IoT platforms.

Course Outcomes	At the end of course student able to learn the following :		
	CBD-504.1	CO1	Understand the basic concepts like usage of sensors ,components and frequently used technologies of IoT from a global context
	CBD-504.2	CO2	Illustrate the application of Data protocols of IoT
	CBD-504.3	CO3	Understand various communication technologies of IOT
	CBD-504.4	CO4	Illustrate the use of sensor networks in applications of various domains
	CBD-504.5	CO5	Illustrate applications of IOT

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-504.1	3	1	1	2	2		3	2	2	2
CBD-504.2	2	1	3	2	2	1	3	2	3	3
CBD-504.3	3	1	1	2	2		3	2	3	3
CBD-504.4	3	3	3	3	3	3	3	2	3	3
CBD-504.5	3	3	3	3	3	3	3	2	3	3
Average	2.8	1.6	1.8	2.2	2.5	2.3	3	2.2	2.6	2.8

3=strongly mapped, 2=moderately mapped, 1=slightly mapped

Learning Outcomes:

1: Introduction of IOT

1.1. INTRODUCTION:
- 1.1.1. Define IOT
- 1.1.2. List Features
- 1.1.3. Evolution of Connected Devices
- 1.1.4. List Advantages
- 1.1.5. List Disadvantages
- 1.1.6. List the components of IoT
- 1.1.7. List Applications IOT
- 1.1.8. List various connecting technologies
- 1.1.9. Sensors
  - 1.1.9.1. Need of sensor
  - 1.1.9.2. Features of Sensors
  - 1.1.9.3. Classify Sensors based on output, on data types
- 1.1.10. Define actuator
- 1.1.11. List types of Actuators
- 1.1.12. Explain IoT Solutions Architecture
- 1.1.13. List IOT challenges
- 1.1.14. Explain IoT Ecosystem

1.2 Various Connectivity Technologies in IOT:
- 1.2.1 6LoWPANs Technologies
  - 1.2.1.1 Features
  - 1.2.1.2 Applications
  - 1.2.1.3 Advantages
  - 1.2.1.4 Addressing
  - 1.2.1.5 List and explain different packet formats
  - 1.2.1.6 Explain 6LoWPAN protocol stack architecture
- 1.2.2 Describe Routing protocols(RPL,CORPL,LOADng)
- 1.2.3 RFID Technologies
  - 1.2.3.1 What is RFID
  - 1.2.3.2 List features
  - 1.2.3.3 Applications
  - 1.2.3.4 Advantages
  - 1.2.3.5 Explain Working principle
  - 1.2.3.6 Applications

2. DATA PROTOCOLS

2.1. Message Queue Telemetry Transport(MQTT)
- 2.1.1. Define MQTT
- 2.1.2. List features of MQTT
- 2.1.3. Explain MQTT
- 2.1.4. List components
- 2.1.5. List Methods
- 2.1.6. List Applications
- 2.1.7. Define Secure MQTT
- 2.1.8. Explain Secure MQTT

2.2. Constrained Application Protocol (CoAP)

2.2.1.Define CoAP
2.2.2.List features
2.2.3.Explain CoAP
2.2.4.List CoAP message types
2.2.5.Explain CoAP message types
2.2.6.Differentiate between COAP and MQTT

2.3. Extensible Messaging and Presence Protocol(XMPP)
2.3.1. List Features of XMPP
2.3.2.History of XMPP
2.3.3.Explain XMPP
2.3.4.Describe core XMPP Technologies
2.3.5.List applications of XMPP

2.4. Advanced Message Queuing Protocol (AMQP)
2.4.1.List Features of AMQP
2.4.2.Explain AMQP in detail
2.4.3.List applications of XMPP

3. Communication Technologies

3.1. IEEE 802.15.4
3.1.1.List features of IEEE 802.15.4
3.1.2.Why 802.15.4 is preferred in IoT communication?
3.1.3.Explain IEEE 802.15.4
3.1.4.List IEEE 802.15.4 Variants
3.1.5.List and explain IEEE 802.15.4 Types

3.2. ZIGBEE
3.2.1.What is ZIGBEE
3.2.2.List features
3.2.3.List components
3.2.4.List different topologies
3.2.5.List types
3.2.6.List Applications
3.2.7.Explain different topologies of ZIGBEE
3.2.8.Explain ZIGBEE types

3.3. Near field communication(NFC)
3.3.1.What is NFC
3.3.2.List types
3.3.3.List applications
3.3.4.Explain working principle
3.3.5.Describe modes of operation of NFC

3.4. Bluetooth
3.4.1.What is the purpose of Bluetooth
3.4.2.List features
3.4.3.List functions
3.4.4.List applications
3.4.5.Explain Bluetooth technology in detail
3.4.6.Describe Pico Net

4.0 Wireless Sensor Networks(WSN)

4. Wireless Sensor Networks

4.1. State the importance of Wireless Sensor Network
4.2. List Applications
4.3. List characteristics of Sensor Networks
4.4. What are the Requirements of WSN
4.5. List and explain WSN Network Topologies

4.6. Sensor networks
- 4.6.1. List and types of sensor networks
- 4.6.2. Single Source Single Object Detection
- 4.6.3. Single Source Multiple Object Detection
- 4.6.4. Multiple Source Single Object Detection
- 4.6.5. Multiple Source Multiple Object Detection

4.7. Describe Challenges in Wireless Sensor Networks
4.8. Define Node in WSN
4.9. Explain node Behaviour in WSNs
4.10. List and explain Security Services in WSN
4.11. Explain Information theoretic self-management in WSN
4.12. Applications of WSN
4.13. State importance of Wireless Multimedia Sensor Networks
4.14. Explain Wireless Multimedia Sensor Networks(WMSN)
4.15. State importance of Stationary Wireless Sensor Networks
4.16. Explain Stationary Wireless Sensor Networks
4.17. State importance of Mobile Wireless Sensor Networks
4.18. Explain Mobile Wireless Sensor Networks
4.19. What is Machine to Machine Communications(M 2 M)
4.20. Lists applications and features of M2M
4.21. List and explain M2M sensor nodes

5. ROLE OF IOT

5.1. Explain Role of IOT in automation of the following applications
- 5.1.1. State the importance of automation in IOT.
- 5.1.2. List automation applications of IOT
- 5.1.3. List advantages of IOT in automation
- 5.1.4. List disadvantages of IOT in automation
- 5.1.5. What Is The Impact Of Iot On Industrial Automation?
- 5.1.6. List Types Of Industrial Automation
- 5.1.7. APPLICATIONS OF IOT
  - 5.1.7.1. Health care
  - 5.1.7.2. Smart Home
  - 5.1.7.3. Smart Cities
  - 5.1.7.4. Smart class rooms
  - 5.1.7.5. Smart Energy
  - 5.1.7.6. Smart Transportation and Mobility
  - 5.1.7.7. Smart Factory

COURSE CONTENT

<u>UNIT1 Introduction</u> of IOT

INTRODUCTION to IOT – Definition – Applications – Technologies – Sensor features –Types – Actuator list – Components – Challenges
Connectivity technologies - 6LoWPAN –Features – Addressing –Routing
RFID – features – working principle – Applications

UNIT2: DATA PROTOCOLS
MQTT – Definition – features – components – applications – MQTT – SMQTT
CoAP- Definition – message types
XMPP – features – core technologies – applications
AMQP- Features-applications

UNIT3 : Communication Technologies
IEEE 802.15.4 – features – variants – types
ZIGBEE – features – components – technologies – types – applications
NFC – types –modes – applications
Bluetooth - purpose – features - Technologies- applications

UNIT4: Wireless Sensor Networks

Wireless Sensor Networks- Applications -Types-Challenges-node Behaviour-Information theoretic self-management-Applications-WMSN-.
Stationary Wireless Sensor Networks-Mobile Wireless Sensor Networks-M 2 M-applications - features-sensor nodes-

UNIT5: ROLE OF IOT
Role of IOT in automation of applications - Health care -Smart Home-Smart Cities

REFERENCE BOOKS
1) https://onlinecourses-archive.nptel.ac.in/

2) Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach", Orient Blackswan Pvt., Ltd., New Delhi, 2015.
3) Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice", A John Wiley and Sons, Ltd., Publication, 2010.
4)Jeeva Jose, "Internet of Things", (ISBN: 978-93-86173-591) KBP House,1st edition,2018.
5) Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

6) Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally

7) Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr.OvidiuVermesan, Dr. Peter Friess, River Publishers

8) Internet of Things (A Hands-on-Approach) , Vijay Madisetti , ArshdeepBahga

9) 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley

10) Building the internet of things with ipv6 and mipv6, The Evolving World of M2M Communications, Daniel Minoli John Wiley & Sons

11) Recent research/white papers

Table specifying the scope of syllabus to be covered for unit tests

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.2
Unit test-2	From 3.3 to 5.13

C-23 CBD-505 BIG DATA ANALYTICS

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-505	**BIG DATA ANALYTICS**	5	75	20	80

Time Schedule:

S. No.	Chapter/Unit Title	No. of Periods	Weightage of marks	Short questions	Essay questions	CO's Mapped
1.	Hadoop and Hadoop Distributed File Systems	20	26	2	2	CO1
2.	MapReduce	15	26	2	2	CO2
3.	HBase and Pig	15	26	2	2	CO3
4.	Hive	13	16	2	1	CO4
5.	Spark	12	16	2	1	CO5
	Total	**75**	110	10	8	

Course Objectives	i)	To know the basic concepts and importance of Big Data
	ii)	To familiarize with the installation of Hadoop and design concepts of HDFS
	iii)	To provide good insight for developing a MapReduce applications
	iv)	To explore the concepts of HBase, Hive , Pig and Spark

Course Outcomes	Upon completion of the course the student shall be able to		
	CO1	CBD-505.1	Explain the working of Hadoop Framework and Hadoop Distributed File Systems
	CO2	CBD-505.2	Illustrate job execution in Hadoop Environment using MapReduce
	CO3	CBD-505.3	Develop Bigdata solutions using Hadoop ecosystem
	CO4	CBD-505.4	Analyse structured data by Hive and Hive query language
	CO5	CBD-505.5	Illustrate the Processing of Big data with advanced architecture like Spark

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-505.1	2	1	2	3	1	2	2	2	3	1
CBD-505.2	2	3	3	3	2	3	3	3	3	3
CBD-505.3	2	2	2	3	2	3	2	2	3	2
CBD-505.4	1	2	2	3	2	3	2	2	3	2
CBD-505.5	2	3	3	3	2	3	3	3	3	3
Average	**1.8**	**2.2**	**2.4**	**3**	**1.8**	**2.8**	**2.4**	**2.4**	**3**	**2.2**

3=strongly mapped, 2=moderately mapped, 1=slightly mapped

LEARNING OUTCOMES:

1. **HADOOP AND HADOOP DISTRIBUTED FILE SYSTEMS**
   - 1.1 **Introduction to Hadoop**
     - 1.1.1 Explain the Modules of Hadoop

1.1.2 Draw and explain Hadoop Architecture
1.1.3 Explain the design of Hadoop Distributed File System
1.1.4 Define various terms related to HDFS NameNode, DataNode, Job Tracker, Task Tracker, Map Reduce Layer
1.1.5 List the Advantages of Hadoop

1.2 Hadoop Installation

1.2.1 Explain the process of Hadoop Installation

1.3 HDFS

1.3.1 Know the usage of HDFS
1.3.2 Explain the HDFS Concepts
1.3.3 How to Start HDFS
1.3.4 Discuss various HDFS Basic File Operations
1.3.5 List and explain HDFS Other commands

1.4 HDFS Features and Goals

1.4.1 Discuss the Features of HDFS.
1.4.2 List the Goals of HDFS.

1.5 YARN

1.5.1 Define YARN.
1.5.2 List the Components of YARN.
1.5.3 Discuss the Benefits of YARN.

2. MAPREDUCE

2.1 Introduction to MapReduce

2.1.1 Define MapReduce
2.1.2 Explain the Steps involved in Map Reduce
2.1.3 Discuss the Usage of MapReduce

2.2 Data Flow in MapReduce

2.2.1 Explain the Anatomy of a MapReduce
2.2.2 Discuss various terms of MapReduce : Job Run, Failures, Shuffle and sort,Task execution

2.3 MapReduce API

2.3.1 Explain Various classes of MapReduce :Mapper Class, Reducer Class, Job Class

2.4 **MapReduce Word Count paradigm**

2.4.1 Illustrate the concept of MapReduce with program on Word count, char count

2.5 **MapReduce Types and formats**

Explain MapReduce Types, Input formats, Output formats

3. HBase and Pig

3.1 Introduction to HBase

3.1.1 Define HBase
3.1.2 Discuss the Features of HBase.
3.1.3 Explain the terms related to HBase: Read,Write,MemStore

3.2 Installation of HBase

3.2.1 Know the procedure for installation of HBase and configuring HBase in Standalone Mode

3.3 Difference between RDBMS and HBase
3.4 Discuss HBase Commands
3.5 Write an procedure to import data of a file in HBase table
3.6 Apache Pig

3.6.1 Know the Features of Apache Pig
3.6.2 Differentiate Apache MapReduce and PIG
3.6.3 Know the Advantages of Apache Pig

3.7 Installation of Apache Pig

3.7.1 Explain the Steps to install Apache Pig

3.8 Describe Pig Run Modes:Local Mode,MapReduce Mode, Ways to execute Pig program

3.9 Explain the Concepts of Pig Latin, Statements, Conventions,and Data Types.

3.10 Illustrate the concept of Using Pig to find the most occurred start letter

3.11 Explain Pig user defined functions

4. **Hive**
   - **4.1 Introduction to Hive**
     - **4.1.1** Discuss the Features of Hive
     - **4.1.2** Limitations of Hive
     - **4.1.3** Distinguish between Hive and Pig
   - **4.2** Explain the Architecture of Hive
   - **4.3** Explain the procedure for Installation of Apache Hive
   - **4.4** Explain various data types of HIVE
     - **4.4.1** Integer Types
     - **4.4.2** Decimal Type
     - **4.4.3** Date/Time Types
     - **4.4.4** String Types
     - **4.4.5** Complex Type
   - **4.5 Write the procedure for Creating Database in Hive and do the DDL operations**
     - **4.5.1** Create Table
     - **4.5.2** Load Data
     - **4.5.3** Drop Table
     - **4.5.4** Alter Table
   - **4.6 State the importance of HiveQL**
     - **4.6.1** Introduction to HiveQL
     - **4.6.2** State the importance of HiveQL
     - **4.6.3** List various Operators with their usage

5. **Spark**
   - **5.1 Introduction to Spark**
     - 5.1.1 Discuss the features of Apache Spark
     - 5.1.2 Uses of Spark
   - 5.2 Explain the procedure of Spark Installation
   - 5.3 Draw and Explain the Spark Architecture
   - 5.4 List and Explain the Components of spark
   - 5.5 Explain Resilient Distributed Dataset
   - 5.6 Discuss various RDD Operations map(), filter(), mapPartitions(), union(), reduce(), collect(),
     count (), take()

COURSE CONTENTS

1. **HADOOP AND HADOOP DISTRIBUTED FILE SYSTEMS**
   Modules of Hadoop,**Hadoop Installation, Hadoop Installation**
   HDFS: HDFS Concepts, Starting HDFS,Basic File Operations,Other commands, HDFS Features and Goals
   YARN

2. **MAPREDUCE**
   Steps in Map Reduce, Data Flow in MapReduce, Anatomy of a MapReduceJob Run, Failures, Shuffle and sort, Task execution

MapReduce API: MapReduce Mapper Class, MapReduce Reducer Class, MapReduce Job Class
MapReduce Word Count Paradigm, Map Reduce Types and formats

3. **HBase and Pig**
   HBase Read, HBase Write, HBase MemStore, Installation of HBase, Configuring HBase in Standalone Mode, Difference between RDBMS and HBase, HBase Commands, Example to import data of a file in HBase table
   Apache Pig: Differences between Apache MapReduce and PIG, Advantages of Apache Pig Installation of Apache Pig, Steps to install Apache Pig, Apache Pig Run Modes,
   Concepts of Pig Latin, Pig user defined functions

4. **Hive**
   Features of Hive, Limitations of Hive, Differences between Hive and Pig, Hive Architecture, Installation of Apache Hive, Hive Data Types,
   Creating Database: Create Table, Load Data, Drop Table, Alter Table
   HiveQL

5. **Spark**
   Uses of Spark, Spark Installation, Spark Architecture, Components of spark, Resilient Distributed Dataset

Text Books

1. Tom White, "Hadoop the Definitive Guide"4th Edition, O'reily media, 2015
2. Bart Baesens, Analytics in a Big Data world: The Essential Guide to Data Science and its Applications, Wiley publications, 2014.

REFERENCE BOOKS

1. Pro Apache Hadoop Paper back – September 10, 2014 by Jason venner, Sameer wadkar, Madhu siddalingaiah.
2. Hadoop Beginners guide paper back – February 22, 2013 by Garry turkington
3. www.javatpoint.com
4. www.tutorialspoint.com

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD- 506	**ADVANCED CLOUD COMPUTING LAB**	4	60	40	60

Course Objectives	i) Understand the public cloud infrastructure and services. ii) Use AWS for compute, storage, network, database iii) Understand the concepts auto scaling and Monitoring. iv) Understand the usage of CloudSim to model the cloud computing environment

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped

1.	AWS concepts – compute	09	CO1
2	AWS concepts –storage	09	CO2
3	AWS concepts –network	12	CO3
4	AWS concepts-database	06	CO4
5	AWS concepts - auto scaling and Monitoring	12	CO5
6	CloudSim Simulator	12	CO6
Total Periods		60	

LEARNING OUTCOMES

Implement the following on AWS

1) Create and secure user accounts.
2) Create Linux Instance
3) Create Amazon Machine Image (AMI)
4) Create EC2 windows instance
5) Assign Elastic IP Addresses to Instance (Static IP Address)
6) Launch RDS Instance
7) Access MySQL Instance Using Workbench
8) Create AWS S3 Bucket – (Object Storage)
9) AWS S3 Lifecycle Management
10) S3 Bucket Replication to Cross-Region
11) S3 Bucket Policies to control Access
12) Create VPC – Virtual Private Cloud (isolated Network)
13) Create subnets
14) Create Internet gateway and attach to VPC
15) Create Virtual Private Gateway and Attach to VPC
16) Create route tables and attach to subnets
17) Create AWS Elastic Load Balancer (ELB)

Implement the following using CloudSim Simulator

18) Install CloudSim software by using Netbeans IDE
19) Model the cloud computing environment using CloudSim
20) Create a Dataset with Cloud Sim

KEY COMPETENCIES

Exp. No.	Name of the experiment	Objectives	Key Competencies
1	Exercise to create and secure user accounts	create and secure user accounts on AWS	13) Opening account on AWS console. 14) Login into AWS Console. 15) User account creation with suitable security credentials.
2	Exercise to Create Linux Instance	Create Linux Instance on AWS	7) Creating Linux instance 8) Configuring Linux instance as required.
3	Exercise toCreate Amazon Machine Image (AMI)	Create Amazon Machine Image (AMI) on AWS	1) Creating Amazon Machine Image (AMI) 2) Configuring Amazon Machine Image (AMI as required.
4	Exercise to Create EC2 windows instance	Create EC2 windows instance on AWS	1) Creating EC2 Windows instance 2) Configuring EC2 Windows instance as required
5	Exercise to Assign Elastic IP Addresses to Instance (Static IP Address)	Assigning Elastic IP Addresses to Instance (Static IP Address) on AWS.	1)Planning network infrastructure. 2)Assigning suitable Static IP address.
6	Exercise on Launching RDS Instance	Launching RDS Instance on AWS	1) creating RDS instance 2) Launching RDS instance 3) Using RDS instance
7	Exercise to Access MySQL Instance Using Workbench	Accessing MySQL Instance Using Workbench	7) Download suitable version of MYSQL workbench. 8) Installing MYSQL workbench. 9) Configuring MYSQL workbench. 10) Using MYSQL workbench.
8	Exercise to Create AWS S3 Bucket – (Object Storage)	Create AWS S3 Bucket – (Object Storage) on AWS.	7) Creating S3 Bucket with S3 Glacier. 8) Configuring S3 bucket as per requirement.
9	Exercise on AWS S3 Lifecycle Management	AWS S3 Lifecycle Management on AWS.	1) Managing existing S3 Bucket 2) Lifecycle Management configuration for S3 bucket.
10	Exercise on S3 Bucket Replication to Cross-Region	S3 Bucket Replication to Cross-Region on AWS	1) Replicating S3 Bucket to cross-Region. 2) Configuring Replicating S3 Bucket to cross-Region as per requirement.
11	Exercise on S3 Bucket Policies to control Access	S3 Bucket Policies to control Access on AWS.	1) Implement required access control policies on existing S3 bucket.

Exp. No.	Name of the experiment	Objectives	Key Competencies
12	Exercise to Create VPC – Virtual Private Cloud (isolated Network)	Create VPC – Virtual Private Cloud (isolated Network) on AWS.	8) Creating Virtual Private Cloud (isolated Network) 9) Configure VPC as per requirement.
13	Exercise to Create subnets	Create subnets on AWS..	1) Creating subnets on existing VPC 2) Configure subnets as per requirement.
14	Exercise to Create Internet gateway and attach to VPC	Create Internet gateway and attach to VPC on AWS	10) Creating Internet gateway and attaching to VPC 2) Configure Internet gateway as per requirement.
15	Exercise to Create Virtual Private Gateway and Attach to VPC	Create Virtual Private Gateway and Attach to VPC on AWS	1) Creating Virtual Private Gateway and attaching to VPC 2) Configure Virtual Private Gateway as per requirement.
16	Exercise to Create route tables and attach to subnets	Create route tables and attach to subnets on AWS.	1) Creating route tables and attach to subnets 2) Configure route tables as per requirement
17	Exercise to create AWS Elastic Load Balancer (ELB)	create AWS Elastic Load Balancer (ELB) on AWS.	1) Creating AWS Elastic Load Balancer (ELB) 2) Configuring AWS Elastic Load Balancer (ELB) as per requirement.
18	Exercise on Installing CloudSim software by using Netbeans IDE	Installing CloudSim software by using Netbeans IDE	1) Download suitable version of CloudSim software. 2) Installing CloudSim software by using Netbeans IDE. 3) Configuring CloudSim software
19	Exercise on Modelling the cloud computing environment using CloudSim	Modelling the cloud computing environment using CloudSim	1) Model the cloud computing environment using CloudSim
20	Exercise to Create a Dataset with CloudSim	Create a Dataset with CloudSim	6) Creating a Dataset with CloudSim. 7) Configuring the Dataset as per requirement.

C-23 CBD-507 Big Data analytics lab

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD- 507	**Big Data analytics Lab**	6	90	40	60

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Hadoop	18	CO1
2.	MapReduce	18	CO2
3.	Pig Latin Script	18	CO3
4	Hive	18	CO4
5	Spark	18	CO5
	Total Periods	90	

Course Outcomes	Upon completion of the course the student shall be able to		
	CO1	CBD-507.1	Install and configure Hadoop Framework.
	CO2	CBD-507.2	Use big data analytics for different file management tasks in Hadoop.
	CO3	CBD-507.3	Apply Map Reduce Paradigm for writing programs using Hadoop framework.
	CO4	CBD-507.4	Perform different operations on data using Pig Latin Script.
	CO5	CBD-507.5	Illustrate different operations on relations and database using Hive.

Course Objectives	i) optimize business decisions and create competitive advantage with big data analytics ii) Demonstrate the knowledge of big data analytics and different file management tasks in Hadoop. iii)Develop MapReduce programs iv) To familiarize with various programming Tools. V)Implement best practices for Hadoop development

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-507.1	**2**	**2**	**1**					**2**	**3**	
CBD-507.2	**1**	**3**	**2**	**3**	**1**			**3**	**3**	**1**
CBD-507.3	**2**	**2**	**3**	**2**	**1**	**1**	**1**	**2**	**3**	**2**
CBD-507.4	**1**	**3**	**3**	**2**	**2**	**3**	**2**	**2**	**3**	**2**
CBD-507.5	**1**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**

Average	**1.4**	**2.6**	**2.4**	**2.0**	**1.2**	**1.4**	**1.0**	**2.4**	**3**	**1.6**

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

LEARNING OUTCOMES:

1. Write a generic method to count the number of elements in a collection
2. Write a generic method to exchange the position of two different elements in an array
3. Exercise on Hadoop installation and setup.
4. Exercise on Implementing various file management tasks in Hadoop (adding files and directories, Retrieving files, deleting files).
5. Exercise on Usage of different shell commands in Hadoop.
6. Write a MapReduceword count program to understand MapReduceparadiagm
7. Exercise on implementation of Matrix multiplication with HadoopMapReduce.
8. Write a MapReduce program to count the number of lines in a document.
9. Write a MapReduce program to mines weather data set.
10. Write a MapReduce program to find the maximum cost of each product across all the stores.
11. Exercise on Installation and configuration of apache pig in ubuntu.
12. Write a Pig Latin script to count the number of occurrences of each word in an input text file.
13. Write a Pig Latin script to sort, group, joins, project and filter your data.
14. Exercise on Install and run Hive in ubuntu.
15. Exercise on the basic commands of Hive Eg: create, alter, drop,views,functions and Indexes.
16. Exercise to Install, deploy and configure apache spark.

KEY COMPETENCIES

Exp. No.	Name of the experiment	Objectives	Key Competencies
1	Write a generic method to count the number of elements in a collection	Java code using generics which counts number of elements in a collection	1) Open note pad 2) Type java program with generic methods 3) Set path and class path 4) Save the program with .java extension 5) Run the program in command prompt
2	Write a generic method to exchange the position of two different elements in an array	Java code using generics which performs exchange the position of two different elements in an array	1) Open note pad 2) Type java program with generic methods 3) Set path and class path 4)Save the program with .java extension 5)Run the program in command prompt
3	Exercise on Hadoop installation and setup	Installation of Hadoop framework and configure setup	1)Identify the minimum tools required 2)Familiar with the open source frame work like hadoop and tools of it 3)Run ssh server 4) Add hadoop and java paths in bash file 5) Edit Hadoopconfig file

Exp. No.	Name of the experiment	Objectives	Key Competencies
4	Exercise on Implementing various file management tasks in Hadoop	Implementing various file management tasks like adding files and directories, retrieving files, deleting files etc., in Hadoop	1) Start HDFS 2) Create user account. 3) Add files and directories 4) Retrieving files 5) Deleting files
5	Exercise on Usage of different shell commands in Hadoop.	Usage of different shell commands like mkdir, fsck, count, df, etc., in Hadoop.	1) Start Hadoop 2) Open linux virtual box. 3) Create new directory 4) Change permissions of the directory 5) Create new file
6	Write a wordcount program using Mapreduce	Word count Mapreduce program to understand MapReduceparadism	1) Open linux virtual box 2) Create new directory 3) Upload the file into input directory 4) Display output in the output directory
7	Exercise on Implementation of Matrix multiplication with HadoopMapReduce	Implement of Matrix multiplication which multiplies two matrices and store the result in output directory.	1) Write a mapper 2) Give input files for A and B are streams of pairs in sparse matrix format. 3) Write a reducer to reduce key and value 4) Map task outputfiles for matrix C=A*B. 5) Write a driver to configure and run the MapReduce job
8	Write a MapReduce program to count the number of lines in a document	Write a MapReduce program which counts number of lines in a input document and displays output	1) Identify the editor required for creating XML 2) Add required elements for student data 3) Save the XML file as .xml extension 4) Open the XML document in browser 5) Test the results
9	Write a MapReduce program that process a weather dataset.	Write a MapReduce program that mines weather dataset	1) Write a mapper 2) Give input value of the word count. 3) Write a reducer 4) Map task output for each word in the line of text. 6) Write a driver to configure and run the MapReduce job

Exp. No.	Name of the experiment	Objectives	Key Competencies
10	Write a MapReduce program to find the maximum cost of each product across all the stores	Procedure to find the maximum cost of each product across all the stores	1) .Open MapReduce framework 2)Write mapper 3)Perform distributed and parallel processing on datasets 4)Write a reduces 5)Map task output into smaller set
11	Exercise on Installation and configuration of apache pig in ubuntu	Install and configure apache pig in Ubuntu to run Pig Latin Script	1) Extract the pig and move to home directory 2)Configure the environment of pig in bashrc file. 3)Run the pig in local mode and hadoop mode 4)Open Grunt Shell. 5)Loading data into Grunt Shell. 6)Describe and dump data
12	Write a Pig Latin script to count the number of occurrences of each word in an input text file	Perform Pig Latin script to count the number of occurrences of each word in an input text file	1)Open VMWare 2) Write a logic to count number of occurances in each word 3)Upload the file into input directory 4)Display output in the output directory
13	Write a Pig Latin script to sort, group, joins, project and filter your data	Use Pig Latin script to sort, group, joins, project and filter your data	1) Open VMWare 2) Write a program logic to sort data 3) Write a logic to group data 4) Write a logic to group data 5) Write a logic to join data 6) Write a logic to project and filter data
14	Exercise to Install and run Hive in ubuntu	Install and run Hive in Ubuntu to perform Hive commands	1) Install MySQL-Server 2)Configure MySQL username and password. 3)Creating user and granting all privileges 4)Extract and configure Apache Hive 5)Move Apache Hive from local directory to home directory 6)Set class path in bashr 7)Configure Hive-default.xml.
15	Exercise on basic commands of Hive Eg: create ,alter, drop, views, functions and Indexes	Practice Hive basic commands like create ,alter, drop, views, functions and Indexes	1) Database creation 2)Drop database statement. 3)Creating and dropping table in Hive 4)Sorting functions 5)Creating Indexes 6)Altering Indexes 7)Dropping Indexes.

Exp. No.	Name of the experiment	Objectives	Key Competencies
16	Exercise to Install, deploy and configure apache spark	Install, deploy and configure apache spark to perform server-side operations	1) Navigate spark configuration directory 2) Edit the file spark-env.sh. 3) Start spark master. 4) Open the HTML page in a browser 5) Verify the log file

C23- Common-508: Life Skills

Course Title : Life Skills	**Course code : C23- Common-508 (Common to all Branches)**
Year/ Semester : V/ VI Semester	**Total periods : 45**
Type of Course : Lab Practice	**Max Marks : 100 (Sessional 40 + External 60)**

Course Objectives:	understand the relevance of life skills in both personal and professional lives
	practise life skills complementarily in life-management to lead a happy and successful life

	Course Outcomes:
CO1	exhibit right attitude and be adaptable in adverse and diverse situations
CO2	set appropriate goals and achieve them through proper planning, time management and self-motivation
CO3	solve diverse real-life and professional problems with critical thinking and creativity for a stress-free life
CO4	be an ideal team player and manifest as a leader

Course Delivery:

Text book: **"Life Skills" –** by State Board of Technical Education and Training, AP

Sl no	**Unit**	**Teaching Hours**
1	**Attitude**	**4**
2	**Adaptability**	**4**
3	**Goal Setting**	**4**
4	**Motivation**	**4**
5	**Time Management**	**4**
6	**Critical Thinking**	**4**
7	**Creativity**	**4**
8	**Problem Solving**	**5**
9	**Team work**	**4**
10	**Leadership**	**4**
11	**Stress Management**	**4**
	Total	**45**

Course Content:

UNIT I:Attitude ***matters!***
Preparatory activity-Role play; Generating word bank; Types of attitude. Read the passage and answer the related questions, read the story and discuss issues raised; Express opinions on the given topic and fill the grid with relevant words.

UNIT 2: **Adaptability…** ***makes life easy!***
Pair work-Study the given pictures and understand adaptability -read the anecdote and discuss, read the story and answer the questions, role play

UNIT 3: Goal Setting… *life without a goal is a rudderless boat!*
Short term goals and long term goals-SMART features, observe the pictures and answer questions-matching- read the passage and answer questions-filling the grid.

UNIT 4: Motivation… *triggers success!*
Types of motivation-difference between motivation and inspiration- matching different personalities with traits - dialogue followed by questions - writing a paragraph based on the passage.

UNIT 5: Time Management ... *the need of the hour!*

Effective Time Management- Time quadrant - Group task on management of time- Time wasters-fill in the grid, read the story and answer the questions- prioritising tasks.

UNIT 6: Critical Thinking… *Logic is the key!*

Preparatory activity-read the passage and answer the questions- differentiate between facts and assumptions- components of critical thinking- complete the sets of analogies- choose the odd one out- true or false statements- decide which of the conclusions are logical.

UNIT 7: Creativity…. The essential YOU!!

Definition- Pre-activity-read the anecdote and answer the questions- matching celebrities with their fields of specialisation- think of creative uses of objects- think creatively in the given situations.

UNIT 8: Problem Solving… *there is always a way out!*

Preparatory activity-read the story and answer the questions- discuss the given problem and come out with three alternative solutions- group activity to select the best solution among available alternatives- discuss the problem and plan to analyse it.

UNIT 9: Team Work… *Together we are better!*

Advantages of team work- Characteristics of a team player- Activity-Observe the pictures and classify them into two groups- team game - read the story and answer the questions- fill in the grid.

UNIT 10 : Leadership… the *making of a leader!*

Characteristics of effective leadership- styles of leadership- Activity-read the dialogue and answer the questions- identify the people in the picture and describe them- discuss leadership qualities of the given leaders- filling the grid- read the quotes and write the name of the leader.

UNIT 11: Stress Management … *live life to the full !!*

Types of stress- Strategies for Stress Management- Activity-read the passage and answer the questions, read the situation and write a paragraph about how to manage stress.

Mapping COs with POs

Pos	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Cos	**POs 1 to 5 are applications of Engineering Principles, can't directly be mapped with Life Skills**					**1,2,3,4**	**1,2,3,4**

Unit wise Mapping of COs- POs

CO	**Course Outcome**	**CO Unit Mapped**	**PO mapped**	**Cognitive levels as per Bloom's Taxonomy R/U/Ap/An/Ev/Cr (Remembering / Understanding/ Applying/Analysing/ Evaluating/ Creating)**
CO 1	To exhibit right attitude and be adaptable to adverse and diverse situations	All Units (1 to 11)	6,7	U/Ap/ An
CO2	To set appropriate goals and achieve them through proper planning, time management and self-motivation	Units 3,4,5	6,7	U/Ap/An
CO3	To solve diverse real-life and professional problems with critical thinking and creativity for a stress-free life	Units 6,7,8,11	6,7	U/Ap/An/ Ev/ Cr.
CO4	To be an ideal team player and manifest as a leader	Units 9,10	6,7	U/Ap/An/ Ev

C-23 CBD-509 **PROJECT WORK**

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
CBD-509	**PROJECT WORK**	3	45	40	60

Course Objectives	i)To inculcate team spirit among students ii)To apply software life cycle models iii)To design,develop,test and deploy project

Course Outcomes	At the end of course student able to		
	CO1	CBD-509.1	Identify the hardware, software problems and their feasibility
	CO2	CBD-509.2	Prepare SRS document based on gathered and analysed requirements
	CO3	CBD-509.3	Design the plan document based on SRS
	CO4	CBD-509.4	Code and test the software based on the design document
	CO5	CBD-509.5	Practice software maintenance skills and maintaining quality and reliability
	CO6	CBD-509.6	Calculate software metrics like cost, loc, scheduling, manpower and other resources.

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-509.1	3	2	1	3	1			2	3	
CBD-509.2	3	2	3	1	2	1		2	3	2
CBD-509.3	3	2	3	1	2	1		2	3	2
CBD-509.4	3	2	3	3	3	1		2	3	2
CBD-509.5	3		2	2	3	3	3	2	3	2
CBD-509.6	3	2		2	1	3	3	2	3	2
Average	**3**	**2**	**2.4**	**2**	**2.2**	**1.8**	**3**	**2**	**3**	**2**

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

LEARNING OUTCOMES

1. Identify different works to be carried out in the Project
2. Collect data relevant to the project work
3. Carryout need surveyand identify the problem(project)
4. Select the most efficient software life cycle from the available choices based on preliminary investigation
5. Estimate the cost of project, technological need, computer skills, materials and other equipment
6. Prepare the plan and schedule of starting time and sequence of operations to be carried out at various stages of the project work in detail
7. Prepare SRS document
8. Design the required elements of the project work as per standard models such as UML
9. Develop the working software modules required for the project work
10. Prepare critical activities at various stages of the project work

11. Test ,Debug, verify and validate the project
12. Record the results
13. Preparation of project report (and user manual if necessary) to enable the client to maintain the project

KEY COMPETENCIES (GUIDE LINES)

THE PROJECT CAN BE CHOSEN FROM THE FOLLOWING DOMAINS:

1. **SOFTWARE PROJECTS**
    a. Web site designing
    b. Banking
    c. Income tax calculation package
    d. Examinations cell.
    e. Student database management
    f. Library management
    g. Stores Management
    h. Staff data management
    i. Payrolls
    j. Inventory Control
    k. Hostel management
    l. Tourism package
    m. Institution management software
    n. Anti-Virus software development.
    o. Folder-locking.
    p. Terminate stay resident systems.

2. To develop **Cloud Computing and Big data** applications such as :
    a. Big Data for cyber security
    b. Tourist behaviour analysis
    c. Electricity price forecasting
    d. Health status prediction
    e. eBug Tracker
    f. Secure Text Transfer based on cloud
    g. Cloud based Attendance system

3. To develop **IOT** (Internet Of Things) based applications.

4. To maintain the software products based on the ever changing needs of and quality measures required by the clients

Evaluation Scheme for the Project Work

S. No.	Tasks	Max. Marks Allotted for each task INTERNAL /EXTERNAL (40+60=100)
1.	Feasibility study of the problem	4/6
2.	Requirement Analysis of the problem, SRS document preparation	4/8
3.	Designing the problem	6/10
4.	Implementation	8/10
5.	Testing and verification	10 /16
6.	Project report preparation and presentation	8/10
	Total:	**40/60 (100)**

VI SEMESTER

DIPLOMA IN CLOUD COMPUTING AND BIG DATA ENGINEERING
SCHEME OF INSTRUCTIONS AND EXAMINATION
CURRICULUM-2023 (VI Semester)
CBD-601 Industrial Training

Course Code	Course title	No of periods/week	Duration	Marks for FA	Marks for SA
CBD-601	INDUSTRIAL TRAINING (Online Certificate courses / Industry)	42	6 months	240	60

LEARNING OUTCOMES (In Industry): The student shall be able to display the following skill sets

1. Apply knowledge and skill already learnt in the institution.
2. Acquire the required skills of analysis, design and development, testing, verification and validation.
3. Acquire skills of deployment and distribution of the product.
4. Involve in product design, development, quality testing and maintenance production by exhibiting the strength, teamwork spirit and self-confidence
5. Prepare product documents like user manual and installation guide and operational manuals.
6. Perform the activities of deploying product at customer site and training the end user.
7. Maintaining the system at user site (Post product services)

S No	Unit Title	Duration	COs Mapped
1	Application of Knowledge acquired.	1 month	CO1
2	Skill Acquirement.	2 months	CO2
3	Participate in product development.	2 months	CO3
4	Preform onsite service.	1 month	CO4
	Total	6 months	

Course Objectives	1.Expose to real time working environment 2. Enhance knowledge and skill already learnt in the institution 3. Acquire the required skills in SDLC phases . 4. Instil the good qualities of integrity, responsibility and self confidence.

	At the end of course student able to:		
	CO1	**CBD-601.1**	Apply knowledge and skill already learnt in the institution.
	CO2	**CBD-**	Acquire the required skills of analysis, design and development, testing,

Course Outcomes		**601.2**	verification and validation, deployment and distribution of the product.
	CO3	**CBD-601.3**	Involve in product design, development, quality testing and maintenance production by exhibiting the strength, teamwork spirit and self-confidence
	CO4	**CBD-601.4**	Prepare product document, gain the skills in deploying product at customer site , training the end user, maintaining the system.

CO-PO/PSO MATRIX

CO No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CBD-601.1	3					3		3	3	
CBD-601.2	3			2	3	3	3	3	3	
CBD-601.3	3	3	3	3	3	3	3	3	3	3
CBD-601.4	3	3	3	3	3	3	3	3	3	3
Average	3	3	3	2.7	3	3	3	3	3	3

3=strongly mapped 2=moderately mapped 1=slightly mapped

LEARNING OUTCOMES – SCHEM OF EVALUATION (Two Online Certificate courses):

TRAINING MODULE NO.	TOPIC	LEARNING OUTCOMES (In-house training)	MARKS
First 3 Months/12 weeks	1) Registration at Nptel/ Swayam/ Moocs/course era/lectera/caltech/oxford/hckerrank/udemy… etc.,	i)Learning ii)Mini Application development iii)Report preparation iv)1st Assessment	120
Next 3 Months/12 Weeks	1) Registration at Nptel/Swayam/Moocs/course era/lectera/caltech/oxford/hckerrank/udemy… etc.,	i)Learning ii)Mini Application development iii)Report preparation iv)2st Assessment	120

External Evaluation	Seminar on two reports/viva	Evaluation by GUIDE/Co - Examiner,HOD and External Examiner	60
		TOTAL	300

Scheme of evaluation(Training at Industry)

The

SI.No.	Subject	Duration	Scheme of evaluation		
			Item	Nature	Max. Marks
1	Industrial Training	6 months	1.First Assessment at Industry (After 12 Weeks)	Assessment of learning outcomes by both the faculty and training mentor of the industry	120
			2.Second Assessment at the Industry (After 20 weeks))	Assessment of learning outcomes by both the faculty and training mentor of the industry	120
			Final Summative assessment at institution level	Training Report	20
				Demonstration of any one of the skills listed in learning outcomes	30
				Viva Voce	10
TOTAL MARKS					300

industrial training shall carry **300** marks and pass marks are **50**%.A candidate failing to secure the minimum marks should complete it at his own expenses.

During Industrial training the candidate shall put in a minimum of **75**%attendance.

Weightage of marks for Assessment of Learning Outcomes during first and second assessment (at industry)

Sl.No	Learning Outcome	Max Marks Allotted For first assessment	Max Marks Allotted For second assessment
1	Apply knowledge and skill already learnt in the institution.	50	10
2	Acquire the required skills of analysis, design and development , testing,	70	30

	verification and validation , deployment and distribution of the product.		
3	Involve in product design, development, quality testing and maintenance production by exhibiting the strength, teamwork spirit and self-confidence	-	40
4	Prepare product document, gain the skills in deploying product at customer site , training the end user, maintaining the system.	-	40
	Total	120	120

During assessment the performance of the students shall be assessed in those skills in which the student has been trained and be awarded the marks as per the weightage assigned as above. In case the student has undergone training in a few skill sets then the total marks obtained shall be raised to 120 marks for the given assessment i.e. either assessment 1 or 2. However the performance of the student shall be assessed at the most skill sets listed above but not less than three skill sets.

Illustration for First assessment:

If the student has undergone training in only in 2 skill sets (namely 1 □□for 50 marks, and 2□□for 40 marks) out of 3 (namely 1 □□for 50 marks, 2□□for 40 marks and 3 □□for 30 marks) in First assessment and marks awarded during assessment is 60 out of 90 marks, then the marks of 60 shall be enhanced to 120 proportionately as (60/90)*120=80.

Illustration for second assessment :

If the student has undergone training in only in 5 skill sets (namely 1 □□for 10 marks, 2□ for 20 marks , 3 - for 10 marks, 4□□for 25 marks, 5□□For 15 marks) out of 7 (namely 1 □□for 10 marks, 2□□for 20 marks , 3 □□For 10 marks, 4□□for 25 marks, 5□□For 15 marks, 6 □□for 25 marks and 7□□for 15 marks) in Second assessment and marks awarded during assessment is 65 out of 80 marks, then the marks of 65 shall be enhanced to 120 proportionately as (65/80)*120=97.5 = rounded to 98.

GUIDELINES FOR INDUSTRIAL TRAINING OF DIPLOMA IN COMPUTER ENGINEERING PROGRAMM

1. Duration of the training: 6 months.
2. Eligibility: The As per SBTET norms
3. Training Area: Students can be trained in either in In-house/Industry in the areas of
4. Application Software Development / system software Development / firmware development / Mobile application development/ Database applications / Web development/ IoT application development / smart technologies / Hardware interfacing/ Networking .
5. The candidate shall put a minimum of 90% attendance during Industrial Training.
6. If the student fails to secure 90% attendance during industrial training, the student shall reappear for 6 months industrial training.
7. Formative assessment at industry level shall be carried out by the Mentor from of the industry, where the student is undergoing training and the faculty in charge (Guide) from the concerned section in the institution.
8. 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.
9. If the student fails to secure 50% marks in final summative assessment at institution level, the student should reappear for final summative assessment in the subsequent board examination.
10. Final summative assessment at institution level is done by a committee including1. Head of the section (of concerned discipline ONLY), 2.External examiner from an industry and 3. Faculty member who assessed the student during Industrial Training as members.

Guidelines and responsibilities of the faculty members who are assessing the students performance during industrial training.