

CURRICULUM-2023 (C-23)
FOR DIPLOMA COURSES IN ANDHRA PRADESH

1. PREAMBLE

The world is constantly evolving, and so must our approach to education. Our 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.

At the heart of our curriculum is the belief that 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 his/her full 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: students, parents, industries, academia, and the society at large. 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. Accordingly the SBTET, AP under the aegis of the Department of Technical Education, Andhra Pradesh in its **57th** Board Meeting held on **05-02-2019** (vide item no: **18**) resolved to update the Polytechnic Curriculum C-20, to be implemented with effect from the academic year 2023-24.

Analysis of Curriculum C-20 was started in the month of January-2023. Feedback was collected from all stakeholders: Students, Lecturers, Senior Lecturers, Heads of Sections and Principals for all programmes for this purpose.



A Meeting was convened on 15th February 2023, from 10:00 A.M. onwards, by Smt. C. Naga Rani, I.A.S, Director of Technical Education & Chairperson, SBTET 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 14 Academicians from Higher level institutions and Officials of ITI, Skill Development, CTE and BTET attended the workshop.

Smt. C Naga Rani, I.A.S., Commissioner of Technical Education while addressing in the workshop, the necessity of industrial training and on hand experience, emphasised that the students need to undergo to support the industries. 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 constituted with experts from industry, higher level Institutions and faculty of Polytechnics are informed to study the possibility of incorporating the following while preparing the curriculum so as to improve employability.

- 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.
- Internships after 1st Year, 3rd Sem (2 to 3 weeks)

A series of workshops with subject experts followed in the subsequent weeks for thorough perusal and critique of draft curricula; and the suggestions thus received from Industrialists and academia have been recorded, validated by another set of experienced subject teachers from the Department of Technical education for incorporation into the Curriculum C-23.



Finally, the draft curriculum was sent to academicians of higher-level institutions, industrial experts and NITTTR (ECV) for wetting.

The design of new Curricula for the 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 designing of this curriculum to meet the requirements of NBA Accreditation, too.

The revised New Curriculum i.e., Curriculum-2023 (C-23) is approved by Board of Governors of SBTET for its implementation with effect from the academic year 2023-24.

2. HIGHLIGHTS OF CURRICULUM C-23

1. Duration of course for regular Diploma and for sandwich Diploma is 3 years and 3½ years respectively.
2. The Curriculum is prepared in Semester Pattern. However, First Year is maintained as Year-wise pattern.
3. 6 Months Industrial training has been introduced for 3 years Diploma Courses and 1 year Industrial Training is introduced for 3 ½ years Sandwich Diploma courses.
4. Updated subjects relevant to the industry are introduced in all the Diploma courses.
5. The policy decisions taken at the State and Central level with regard to environmental science are implemented by including relevant topics in Chemistry. This is also in accordance with the Supreme Court guidelines issued in Sri Mehta's case.
6. Keeping in view the increased need of communication skills which is playing a major role in the success of Diploma Level students in the industries, emphasis is given for learning and acquiring



listening, speaking, reading and writing skills in English. Further as emphasized in the meetings, Communication Skills lab and Life Skills lab are continuing for all the branches.

7. Upon reviewing the existing C-20 curriculum, it is found that the theory content is found to have more weightage than the Practical content. In C-23 curriculum, more emphasis is given to the practical content in Laboratories and Workshops, thus strengthening the practical skills.
8. With increased emphasis for the student to acquire Practical skills, the course content in all the subjects is thoroughly reviewed and structured as outcome based than the conventional procedure based.
9. Curricula of Laboratory and Workshops have been thoroughly revised based on the suggestions received from the industry and faculty, for better utilization of the equipment available in the Polytechnics. The experiments /exercises that are chosen for the practical sessions are identified to confirm to the field requirements of industry.
10. Student Centric activities(Library, Mini project, Sports, Preparation for placements, Reporting etc) are introduced in each year/semester with a weightage of 3 periods per week.
11. A new concept “Study on societal problems” is introduced to resolve the village level issue during Summer Vacation after completion of I Year & II Year at nearby village. A mini project report is to be submitted by the student.
12. Industrial Visits for students at least once in a year.
13. Industrial seminars by industrial experts in each year/semester.

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, and Sri. Saurab Gaur, I.A.S, Principal Secretary, Skill Development & Training for their guidance and valuable inputs during process of revising, modifying and updating the Curriculum C-20 to Curriculum C-23.

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, Mangaglagiri involving faculty from Polytechnics, Premier Engineering



Colleges (List of Colleges) & Industries (List of Industries) to analyse the Previous C-20 Curriculum and to design C-23 Curriculum is highly appreciated and gratefully acknowledged.

The invaluable contribution of Sri K. Vijaya Bhaskar, Secretary, SBTET, Andhra Pradesh, Sri V. Padma Rao, Joint Director of Technical Education, officials of Directorate of Technical Education and the State Board of Technical Education, Andhra Pradesh and all teaching fraternity from the Polytechnics who are directly or indirectly involved in preparation of the curriculum C-23 are much appreciable and indebted.

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, Mangalagiri. Only the candidates satisfying the following requirements will be eligible to appear for the Common Entrance Test for admissions into Polytechnics (POLYCET).



- b. 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.
- c. 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.
- d. 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 in 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.

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 / 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 / year when offered in the next subsequent academic semester/year.
- f) 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 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 Marks for internal assessment i.e. sessional marks for each practical Course with an end examination of 3 hours duration carrying 60 marks. However, there are no minimum marks prescribed for sessionals.

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.**

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

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	05
(iii)	Dynamic Learning activities : Project Work/ Seminar/Tech-fest/Group Discussion, Quizzes etc./Extra-curricular activities/NSS/NCC/IPSGM/Cleaning & Greening of Campus etc.	05
	T O T A L	50

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

At least one 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) HoDs from 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	24 week	1.The faculty	1.Demonstration of any	30



Evaluation		member concerned,	one of the skills listed in learning outcomes	
		2.HoD concerned and	2.Training Report	20
		3.An external examiner	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.



Add Industrial Training Policy Guidelines

GUIDELINES FOR INDUSTRIAL TRAINING OF DIPLOMA IN COMPUTER ENGINEERING PROGRAMME

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/ ***TWO Online Certificate courses***

i. First 3 Months/12 weeks- Registration and training at either of Nptel/ Swayam/ Moocs/course era / lectera / caltech / oxford / hckerrank / udemy for First Certificate Course

ii. Next 3 Months/12 Weeks- - Registration and training at either of Nptel/ Swayam/ Moocs/course era / lectera / caltech / oxford / hckerrank / udemy for Second Certificate Course.

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 including 1. 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

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 Shorthand 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.

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 the 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%) 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, AP 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 AP 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 the required percentage of attendance in the 4th semester
- b) Should not have failed in more than four Courses in 1st year

For IVC & ITI Lateral Entry Students:

- a) A candidate is eligible to appear for the 4th semester examination if he/she puts the required percentage of attendance in the 4th semester
- b) A candidate is eligible to appear for the 4th semester examination if he/she clears at least two subjects in third 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 examination if he/she

- a) Puts the required percentage of attendance in the 5th semester
- b) Should get eligibility to appear for 4th Semester examination.

The first backlog exam in 5th semester will be conducted only in instant/supplementary diploma examination.

For IVC& ITI Lateral Entry students:

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



v) A candidate shall be sent to Industrial training provided he/she puts in the required percentage of attendance in the 4th 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)

a) Puts the required percentage of attendance, i.e., 90% in 6th semester Industrial Training

For IVC & ITI Lateral Entry students:

a) Puts the required percentage of attendance, ie., 90% in 6th semester Industrial Training.

b) should get eligibility to appear for 5th Semester Examination.

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

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



- b). Should not have failed in more than Four backlog Courses of 1st year.

For IVC & ITI Lateral Entry students:

- 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
b) Should get eligibility to appear for 4th semester Examination.

For IVC & ITI Lateral Entry students:

- a) Puts in the required percentage of attendance in the 7th semester
b) Should not have failed more than four backlog Courses of 3rd 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
- b) Should not have failed in more than Four backlog Courses of 1st year

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.
- b) Should get eligibility to appear for 4th Semester examination.

For IVC & ITI Lateral Entry students:

- a) Puts in the required percentage of attendance in the 5th semester.
- b) Should not have failed in more than Four backlog Courses of 3rd 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 and
- b) should get eligibility to appear for 4th Semester Examination.

For IVC & ITI Lateral Entry students:

- a) Puts in the required percentage of attendance in 6th semester.
- b) Should get eligibility to appear for 5th Semester Examination.

- 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
- b) Should get eligibility to appear for 4th Semester Examination.

For IVC & ITI Lateral Entry students:

- a) Puts in the required percentage of attendance, ie., 90% in 7th semester Industrial Training.
- b) Should get eligibility to appear for 5th Semester Examination.

Important Note:

Seminar/Viva-voce should not be conducted for Not-Eligible Candidates, till the candidate gets eligibility. However, the record of internal Assessment for Industrial Training for 260 marks shall be maintained at Institution Level for all candidates and the data is to be uploaded only for eligible candidates. For not eligible candidates the data is to be uploaded as and when the candidate gets eligibility.

Other Details

- a) In case a candidate does not successfully complete the Industrial training, he / she will have to repeat the training at his / her own cost.
- b) The First spell of Industrial training shall commence 10 days after the completion of the last theory examination of 4th Semester.
- c) The Second spell of Industrial training shall commence within 10 days after the completion of first spell of 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% and above 50% of marks.
- 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.

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.

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 i.e., Either/Or type, and each question carries 8 marks.

The sum of marks of 3 tests for I year and 2 tests for semesters 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 carries 3 marks, i.e., $10 \times 3 = 30$.

Section 'B' with Max marks of 50 contains 8 essay type questions. Only 5 questions are to be answered and each carries 8 marks. Max. Marks: $5 \times 8 = 40$.

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. $4 \times 5=20$.

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., $4 \times 10 = 40$.

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.

16. ISSUE OF MEMORANDUM 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.

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.

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 has 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.

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 i.e., 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.

a. 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 /Plea 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.

4.25. 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., Mangalagiri is final.

--:o0o:--

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

VISION

Develop Computer Engineers to be technologically adept, innovative, self-motivated and responsible citizen with human values, high quality skills and to contribute significantly



towards ever changing Artificial Intelligence and Machine Learning Technologies.

MISSION

M1	To provide opportunity to Diploma students who are capable of playing pivotal role in wide aspects of Artificial Intelligence and Machine Learning Technologies.
M2	To make the students understand basic concepts underlie in Computer Engineering and able to apply them creatively in the fields of Artificial Intelligence and Machine Learning.
M3	To train the student sensitive to the Environment, safety and economic context.
M4	To produce technically skilled students through intensive training in Artificial Intelligence and Machine Learning Engineering tools and applications and to prepare the students for professional career and further research.

PROGRAMME EDUCATIONAL OBJECTIVES(PEOs)

Artificial Intelligence and Machine Learning Engineering programme is ever changing to transform students into competent professionals with qualities, ethics and human values. On completion of the integrated programme, the students should have acquired the following characteristics

PEO1	To produce best DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING technicians by correlating growing need of the industries in modern topics with the academic input and giving the technical knowledge for further learning.
PEO2	To prepare the students as productive Artificial Intelligence and Machine Learning Engineers, possessing supportive and leadership skills in multidisciplinary domains, expertise in Practical orientation, Communication Skills and latest developments.
PEO3	To give the depth of related skills and expertise in a single field, and the ability to collaborate with other disciplines and work at the Supervisory cadre.
PEO4	To promote the students in professionalism, by successful completion of the DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING by emphasizing Field Practices in industry oriented activities.

PEO5	To sensitize the students on social and economic commitment and to inculcate a nature to guard the values of community and protect environment.
------	---

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1	Foundation of Computer System: Ability to understand the principles and working of computer systems and can assess the hardware and software aspects of computer systems.
PSO2	Foundations of Artificial Intelligence and Machine Learning: Ability to understand the structure and development methodologies of Artificial Intelligence and Machine Learning possess professional skills and knowledge of usage of Python in Artificial Intelligence and Machine Learning. Familiarity and practical competence with a broad range of Python programming language and open source platforms.
PSO3	Foundation of mathematical concepts: Ability to apply mathematical methodologies to solve computation task, model real world problem using appropriate data structure and suitable algorithm, methodologies in developing computer related problem solutions as well as apply them in establishing new firms in small scale with the help of experience gained as part of industrial training.

PROGRAM OUTCOMES (POs)

Students completing DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING are anticipated to have the following abilities



PO1	Basic and Discipline specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.
PO2	Problem analysis: Identify and analyse well-defined engineering problems using codified standard methods.
PO3	Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.
PO4	Engineering Tools, Experimentation and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.
PO5	Engineering practices for society, sustainability and environment: Apply appropriate technology in context of society, sustainability, environment and ethical practices.
PO6	Project Management: Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.
PO7	Life-long learning: Ability to analyse individual needs and engage in updating in the context of technological changes.

MAPPING OF PEOs WITH MISSIONS

PEO	M1	M2	M3	M4
To produce best DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING technicians by correlating growing need of the industries in modern topics with the academic input and giving the technical knowledge for further learning.	✓	✓	✓	✓
To prepare the students as productive Artificial Intelligence and Machine Learning Engineers, possessing supportive and leadership skills in multidisciplinary domains, expertise in Practical orientation, Communication Skills and latest developments.	✓	✓	✓	✓
To give the depth of related skills and expertise in a single field, and the ability to collaborate with other disciplines and work at the Supervisory cadre.	✓	✓	✓	✓
To promote the students in professionalism, by successful completion of the DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING by emphasizing Field Practices in industry oriented activities.	✓	✓	✓	✓

To sensitize the students on social and economic commitment and to inculcate a nature to guard the values of community and protect environment.	✓	✓	✓	✓
---	---	---	---	---

NOTE :

In some of the courses PO5,PO6 and PO7 strength is between 1 and 2,to strengthen them, the following remedial measures for all the courses are suggested.

Short fall in PO	Remedial measures
PO5	<p>By conducting</p> <ol style="list-style-type: none"> 1)Guest lectures on motivational aspects and ethics 2) Concerned teacher will educate the students to follow ethics and morals in developing solutions 3)providing access to Online courses like Swayam program 4)seminars by senior students to the junior students to assimilate the methods followed by them to the juniors 5)Head of section will frequently visit and observe the activities being followed by the students to correct their behaviour and to inculcate morals and ethics
PO6	They can achieve this from industrial training module scheduled in 6 th semester of this curriculum by observing, analyzing and applying the mathematical and scientific fundamentals in solving the real time problems that will arise in day to day activities in industry.
PO7	<ol style="list-style-type: none"> 1. Providing access to Online courses like Swayam program 2. By utilizing Learning Management System(LMS) established by SBTET 3. By subscribing e-magazines/ print magazines to the institute library and made them accessible to the students. 4. By arranging Guest lectures from the technical experts.

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
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								
AIM-101	English-I	3	-	90	3	20	80	100
AIM-102	Engineering Mathematics - I	5	-	150	3	20	80	100
AIM-103	Engineering Physics 3	3	-	200 333		20	8080	100
AIM-104	Engineering Chemistry and Environmental studies	3	-	90	3	20	80	100
AIM-105	Basics of Computers, Artificial Intelligence & Machine Learning	5	-	150	3	20	80	100
AIM-106	C& Data Structures	5	-	150	3	20	80	100
PRACTICAL SUBJECTS								
AIM -107	Engineering Drawing		3	90	3	40	60	100
AIM -108	C& Data Structures Lab		6	180	3	40	60	100
AIM -109	Physics Lab		1.5	90	1.5	20	30	50
AIM -110	Chemistry Lab		1.5		1.5	20	30	50
AIM -111	Computer Fundamentals Lab		3	90	3	40	60	100
	Activities		3	90				
	Total	24	18	1260	-			1000

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
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								
AIM-301	Mathematics –II	4		60	3	20	80	100
AIM-302	Java Programming	4	-	60	3	20	80	100
AIM-303	Operating systems	4	-	60	3	20	80	100
AIM-304	Digital Electronics & Computer Organization	5	-	75	3	20	80	100
AIM-305	DBMS	5	-	75	3	20	80	100
PRACTICAL SUBJECTS								
AIM-306	Java Programming Lab	-	6	90	3	40	60	100
AIM-307	Computer Networking & Cyber Security Lab	-	3	45	3	40	60	100
AIM-308	DBMS Lab	-	4	60	3	40	60	100
AIM-309	Android Programming Lab		4	60	3	40	60	100
	ACTIVITIES		3	45				
	Total	22	20	630		260	640	900



**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2023
(IV Semester)**

Sub Code	Name of the Subject	Instruction		Total Periods P	Scheme Of Examinations			
		Periods/Week			Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
		Theory	Practicals					
THEORY SUBJECTS								
AIM-401	Web Technologies	5	-	75	3	20	80	100
AIM-402	Python Programming	5	-	75	3	20	80	100
AIM-403	Artificial Intelligence	5	-	75	3	20	80	100
AIM-404	Software Engineering	5	-	75	3	20	80	100
AIM-405	Fundamentals of Machine Learning	5	-	75	3	20	80	100
PRACTICAL SUBJECTS								
AIM-406	Web Technologies Lab	-	4	60	3	40	60	100
AIM-407	Python Programming Lab	-	4	60	3	40	60	100
AIM-408	Communication Skills	-	3	45	3	40	60	100
AIM-409	Artificial Intelligence Lab using PROLOG	-	3	45	3	40	60	100
	ACTIVITIES		3	45				
	Total	25	17	630	-	260	640	900



**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
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	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-501	Industrial Management and Entrepreneurship	5	-	75	3	20	80	100
AIM-502	BigData & Cloud Computing	5	-	75	3	20	80	100
AIM-503	Natural Language Processing	5	-	75	3	20	80	100
AIM-504	Internet of Things	5	-	75	3	20	80	100
AIM-505	Artificial Neural Networks & Deep Learning	3	-	45	3	20	80	100
PRACTICAL SUBJECTS								
AIM-506	NLP lab using Python	-	4	60	3	40	60	100
AIM-507	Machine Learning Lab	-	6	90	3	40	60	100
AIM-508	Life Skills	-	3	45	3	40	60	100
AIM-509	Project work	-	3	45	3	40	60	100
	ACTIVITIES		3	45				
	Total	23	19	630	-	260	640	900



**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SCHEME OF INSTRUCTIONS AND EXAMINATION**

CURRICULUM-2023

(VI Semester)

AIM-601 Industrial Training

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 22 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

- The candidate shall put a minimum of 90% attendance during Industrial Training.
- If the student fails to secure 90% attendance during industrial training, the student shall reappear for 6 months industrial training.



- 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.
- 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.
- 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.
- Final Summative assessment at institution level is done by a committee including Head of the section, External examiner and Faculty members who assessed the students during Industrial Training as members.

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



FIRST YEAR



**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
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								
AIM-101	English-I	3	-	90	3	20	80	100
AIM-102	Engineering Mathematics - I	5	-	150	3	20	80	100
AIM-103	Engineering Physics 3	3	-	200/333	3	20	80/80	100
AIM-104	Engineering Chemistry and Environmental studies	3	-	90	3	20	80	100
AIM-105	Basics of Computers, Artificial Intelligence & Machine Learning	5	-	150	3	20	80	100
AIM-106	C& Data Structures	5	-	150	3	20	80	100
PRACTICAL SUBJECTS								
AIM -107	Engineering Drawing		3	90	3	40	60	100
AIM -108	C& Data Structures Lab		6	180	3	40	60	100
AIM -109	Physics Lab		1.5	90	1.5	20	30	50
AIM -110	Chemistry Lab		1.5		1.5	20	30	50
AIM -111	Computer Fundamentals Lab		3	90	3	40	60	100
	Activities		3	90	3			
	Total	24	18	1260	-			1000

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

S. No.	Unit Title	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, Environmentto exhibit Universal Human Values.



CO No.	Course Outcomes
CO1	Apply and use various grammatical rules and 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 everyday texts.
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, Science and Environment for holistic and harmonious living through communication.

CO-PO Matrix

Course Code Common-101	Course Title: English Number of Course Outcomes: 4			No. of Periods: 90	
POs	Mapped with CO No.	CO Periods Addressing PO in Column 1		Level of Mapping (1,2,3)	Remarks
		Number	Percentage		
PO1		Not directly Applicable for English course, however activities that use content from science and technology relevant to the Programme taken up by the student shall be exploited for communication in the Course.			
PO2					
PO3					
PO4					
PO5	CO5	16	18%		>50%: Level 3
PO6	CO1, CO2, CO3, CO4,	52	58%		21-50%: Level 2
PO7	CO1, CO2, CO3, CO4,CO5	22	24%		Up to 20%: Level 1

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 for 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. Acquire 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
- 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 a goal 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. Speak and write about 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 Textbook 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

PART-A: 10 Questions 3 marks each =30 Marks

PART-B: 5 out of 8 are to be answered : 10 marks each =50 Marks

Unit Tests 1,2,3 @ 40 Marks each



Part A: 16 marks: One question for 4 marks + 4 questions for 3 marks each (4+12 Marks=16 Marks)

Part B: 24 marks: 3 questions for 8 marks each with internal choice.(3X8 Marks= 24 Marks)

Weightage Table : C23-AIM-101: English													
S. No.	Name of the Unit	Periods Allocated (Total 90 periods)	Weightage of Marks Allocated (Short + Long Answer question)	Weightage (Long answer questions) @10 Marks	Marks Distribution of Weightage (Short answer questions) @3 Marks				CO's Mapped				
					R	U	A p	A n					
1	English for Employability	8	20+9	2	3	+	3		CO1,CO2, CO3, CO4, CO5				
2	Living in Harmony	8										CO1, CO2, CO3, CO4, CO5	
3	Connect with Care	8								3			CO1, CO2, CO3, CO4, CO5
4	Humour for Happiness	8	20+9	2	3	+	3		CO1, CO2, CO3, CO4, CO5				
5	Never Ever Give Up!	8										3	CO1, CO2, CO3, CO4, CO5
6	Preserve or Perish	9											CO1, CO2, CO3, CO4, CO5
7	The Rainbow of Diversity	8										3	CO1, CO2, CO3, CO4, CO5
8	New Challenges - Newer Ideas	8	10+3	1				3	CO1, CO2, CO3, CO4, CO5				
9	The End Point First!	8	10+3	1				3	CO1, CO2, CO3, CO4, CO5				
10	The Equal Halves	8	10+3	1				3	CO1, CO2, CO3, CO4, CO5				
11	Dealing with Disasters	9	10+3	1				3	CO1, CO2, CO3, CO4, CO5				
Short Answer Questions			30		6	6	1	3					
Long Answer Questions			80	8 (Integration of the cognitive skills of									

Total	110	Understanding, Applying &Analysing)						
-------	-----	-------------------------------------	--	--	--	--	--	--

C23- AIM-101: ENGLISH: END EXAM (80 Marks)

Question Paper Pattern (Division of Topics: Question wise)

S.No. of the Question	Weightage of Marks	Language Skill / grammatical Concept of the question	Sub aspects & Description
PART-A ; 10 questions X3 marks = 30 Marks			
1	3 (6 Questions X ½ Mark)	Articles & Prepositions	a) Definite, indefinite articles b) prepositions of place, time, directions
2	3 (6 Questions X ½ Mark)	Vocabulary	Synonyms, Antonyms, affixes, words& phrases, Phrasal Verbs, words matching with meanings, one word substitutions,
3	3 (6 Questions X ½ Mark)	Helping Verbs	a) Primary helping verbs (be/do/have) b) Modal verbs
4	3 (3 questions 1 mark each)	Tenses	Using appropriate Verb forms
5	3 (3 questions 1 mark each)	Voice	Conversion : Active & Passive voice
6	3 (3 questions 1 mark each)	Adjectives	Using appropriate adjective form/ conversion : Degrees of comparison
7	3 (3 questions 1 mark each)	Types of sentences & positive, negative sentences	Conversion from one type of sentence to the other , making negative sentence
8	3 (3 questions 1 mark each)	Syntheses of Sentences / Conjunctions / linkers	Transformation of sentences : Simple, complex & compound sentences / use of linkers/ conjunctions
9	3 (3 questions 1 mark each)	Direct& Indirect Speech	Conversion from Direct to Indirect & Vice versa
10	3 (3 questions 1 mark each)	Correction of Sentences	Remaining grammar aspects (concord & usage based...etc)
PART –B ; 5 QX10 M = 50 Marks			

11	10 Marks	Paragraph Writing	From Units 1,2,3 (theme based- focus on importance English learning and using)
12	10	Giving instructions or directions	From Units 4,5,6,7 Theme based / Situation based /role play/ general topic
13	10	Dialogue writing	
14	10	Essay writing	From Units 8,9,10,11 (theme based)
15	10	Letter writing	Formal / informal letters
16	10	Report Writing	Report on Mini projects/ industrial visits / camps/ events / celebrations
17	10 (2 questions X 5 Marks)	a) E-Mail writing b) Framing questions	a) E mail etiquette b) Wh& Yes-No questions
18	10 (Ten questions 1 mark each)	Reading Comprehension	An unseen piece of prose with 10 questions for reading comprehension check

Model Question Paper: End Exam C23- AIM- 101

SBTET – I Year End Examinations

C23-Common-101: ENGLISH

Time: 3 Hrs.

Max.Marks: 80

PART-A

10X3=30 Marks

Instructions: Answer all the questions and each question carries 3 marks. Marks will be awarded only for the desired and accurate language / grammatical expressions.

1. A) Fill in the blanks with appropriate articles:

My father sent me _____ envelope through _____ messenger and _____ cover contained a bank cheque in my favour.

B) Fill in the blanks with suitable prepositions:

My mother arranged a beautiful flower vase _____ my study table, just beside my computer, _____ which she keeps fresh flowers every day. The vase is made _____ ceramic.

2. A) Give synonyms for the words: i) depressed ii) caricature

B) Give antonyms for the words: i) natural ii) visible

C) Add affixes to the words: i) prefer ii) proper

3. A) Fill in the blanks with suitable Primary Helping Verbs (Be/ do/ have forms):

i) All the books _____ already been sold out.

ii) She paid condonation fees as she _____ not attend the classes regularly last semester.

iii) Why _____ you not giving me reply?

B) Fill in the blanks with suitable Modal verbs based on the clue given in brackets.

i) Pratap is an ambidextrous; he _____ write with his two hands. (ability)

ii) Jyothsna _____ pay the tuition fees by tomorrow. (obligation)

iii) My grandfather _____ to ride a horse in his youth. (Past habit)

4. Fill in the blanks with suitable verb form using the base form given in the brackets.

i) Suma _____ (bring) a pup to the class yesterday.

ii) Johnny _____(play) the piano in a music band every weekend.

iii) Girija _____ (watch) a movie on TV when I visited her last Sunday.

5. Change the voice of the following:

i) My elder brother paid my exam fees yesterday.

ii) These two chapters will be taught in next month.

iii) They are constructing a new house.

6. i) Pacific is _____(big) ocean of all. (Fill in with appropriate degree of the adjective given in the bracket)

ii) No other food item is as nutritious as honey. (Change into Comparative degree)

iii) Bangalore is one of the beautiful cities of India. (Change into Positive degree)

7. i) You need two thousand rupees to buy a new pair of shoes. Write a polite expression asking your father for money.

ii) Radhika has been invited for the wedding. (Convert into a negative sentence)

iii) Our pet pigeons flew away last night. (Convert into a negative sentence)

8. i) Ramesh can't reach on time _____ he travels by a superfast train. (Fill in with suitable conjunction)

ii) Though the long bell was given, the children stayed in the classroom. (Change into a simple sentence)

iii) Get a ticket on a sleeper coach, and then you can sleep during journey. (Change into a complex sentence)

9. i) Tarun said, “ Prathima, I shall return your notes tomorrow”. (change into a reported speech)
- ii) Arjun requested his sister Priya not to disturb him while he was studying. (change into a direct speech)
- iii) Teacher said, “Students, why are you talking in the class?” (change into a reported speech)
10. Correct the following sentences:
- i) These flowers are smelling sweet.
- ii) Either the father or his children has arrived home early.
- iii) Every bike rider should abide to the traffic rules.

PART-B

10X5=50Marks

Instructions: a) Answer any FIVE questions and each question carries TEN marks.

b) The criterion for the award of marks is the appropriate content, quality and clarity of expression but not the length of your answer.

11. Write a paragraph in 120 words about the problems you are experiencing in speaking English and your own solutions to overcome them.
12. Write a set of instructions to create a word file and insert a Table using MS office on a computer.
13. Write a dialogue in at least eight turns between a sales person at a readymade garment showroom and you as you want to buy a readymade dress.
14. Write an essay in about 175 words on valuing opposite gender and show mutual respect.
15. Write a letter to the Municipal Commissioner about the menace of street dogs in your area.
16. Imagine that your class had visited an industry / organisation relevant to your branch of Engineering; write a report about the visit to submit to your HOD.
17. a) Write an E-mail to your cousin requesting him/her to send you the diploma study material by a courier or post.

b) Frame THREE ‘wh’ questions & TWO ‘Yes-No’ questions from the following passage.

Dolphins are intelligent animals. A dolphin’s nose is on top of its head. So, it can easily breathe on the surface of the water. The skin of a dolphin has no scales. It is soft and smooth. They swim in ‘pods’; a very large pod is called a ‘herd’. They are very social and help each other fight off predators. Dolphins brain has two sides. One side sleeps while the other side stays awake.

18. Read the following passage and answer the questions that follow. Your answer should be accurate, precise and limited to a word or phrase or a simple sentence.

The Indian Army is the land-based branch and the largest component of the Indian Armed Forces. The President of India is the Supreme Commander of the Indian Army, and it is commanded by the Chief of Army Staff (COAS), who is a four-star general. The primary mission of the Indian Army is to ensure national security and national unity, defending the nation from external aggression and internal threats, and maintaining peace and security within its borders. It conducts humanitarian rescue operations during natural calamities and other disturbances, like Operation Surya Hope, and can also be requisitioned by the government to cope with internal threats. It is a major component of national power alongside the Indian Navy and the Indian Air Force. The army has been involved in four wars with neighboring Pakistan and one with China. Other major operations undertaken by the army include: Operation Vijay, Operation Meghdoot and Operation Cactus.

- a) What is the largest component of Indian Armed Forces?
 - b) Who is the four-star general?
 - c) “Maintaining internal peace and security is not one of the responsibilities of Indian Army”. Is the statement True or False ?
 - d) What is the primary mission of the Indian Army?
 - e) Name the operation held by the Indian Army during natural disaster.
 - f) What are the other two forces mentioned in the passage?
 - g) If you were to join Armed forces, which wing do you prefer? State your reason in a sentence.
 - h) Pick the word from the passage that would mean: ‘forcefulness or violent behavior’
 - i) Give the antonym for the word: ‘internal’
 - j) Suggest a suitable title for the passage in a word or phrase.
-

C23-Common-101 :English : Bifurcation of Syllabus for UNIT TESTS 1,2,3

Unit Test	Lessons / Chapters	Grammar / Language aspects (Topics or Short Answer questions)	Writing Skills (Topics for Long answer/ Essay Questions)
U.T 1	Chapters 1,2,3	a)articles & prepositions, b)Vocabulary: Affixes, synonyms, Antonyms, matching meanings, words & phrases, one word substitutes) c)Adjectives (degrees of comparison) d) Main& Auxiliary Verbs e) phrasal verbs/ word order	a) Theme based Paragraph (focus on LSRW skills, importance of English, Self-esteem, SWOC analysis, Social media) b) Dialogue on themes of lessons 2&3 / Dialogue on General topic / a situation c) Reading comprehension
U.T 2	Chapters 4,5,6,7	a) concord b) Tenses c) Types of sentences d) Framing questions e) words&phrases, linkers	a) Theme based paragraph (Humour for happy living, learning from failures, Environmental protection, multi- culture /global culture) b) Letter writing (formal& informal), c) instructions/ directions, E-mail writing
U.T 3	Chapters 8,9,10,11	a) Voice (active &passive) b) Speech(direct& indirect) c) Synthesis of sentences (simple, complex, compound sentences) d) Error analysis e) words &phrases, linkers	a) Theme based paragraph/ Essay writing (Technical innovations, Goal setting, gender sensitivity, dealing with disaster) b) Essay writing, Report writing c) Reading Comprehension
Unit Test Question Paper pattern (40 Marks)	Total Marks (Part A=16 Part B =24)	Short Answer questions (Part-A) Q. 1 = 4 marks Q. 2 to 5 = 3 Marks each Total=16 Marks	Long Answer Questions: (Part-B) Q. 6,7,8 @ 8 marks each ; Each question with Internal choice Total: 8X3 = 24 Marks

C23- COMMON-101: ENGLISH:UNIT TEST Exams 1,2,3 (40 Marks each)**Question Paper Pattern (Division of Topics: Question wise)**

S.No. of the Question	Weightage of Marks	Language Skill / grammatical Concept of the question	Sub aspects & Description
UNIT TEST-1 Marks : 40 ; Time 90 Mnts. (Lessons 1,2,3) :			
PART-A : 16 Marks			
S.No.	Marks allotted	Grammatical concept/ aspect/ skill	Sub topics / concepts
1	4 Marks (8 Questions X ½ Mark)	Vocabulary	a) Affixes, b) Synonyms c) antonyms d) one word substitutes
2	3(6 Questions X ½ Mark)	Articles & Prepositions	a) Definite, indefinite articles b) Prepositions of place, time direction
3	3(3 questions 1 mark each)	Adjectives	a) Using appropriate forms of adjectives b) Conversion of Degrees of comparison
4	3 (6 questions ½ mark each)	Helping Verbs	a) Primary helping verbs (be/do/have) b) Modal verbs
5	3 Marks (3 questions 1 mark each)	Phrasal verbs	Using phrasal verbs in sentences of one's own
Part – B : 8X3 = 24 Marks			
6	8 Marks	Paragraph question A or B (internal choice)	Theme based questions : Lesson 1 : Focus on LSRW skills, problems and solutions in using English, Importance of English, English for employability, SWOC analysis
7	8	Dialogue making A or B (internal choice)	Conversation / Role play between two people : a) Dialogue on themes of lessons 2&3 b) Dialogue on General topic/ a situation
8	8	Reading Comprehension A or B (internal choice)	Unseen prose passages with 8 different questions (FIVE model questions+ Others)
Unit Test -2: Marks : 40 ; Time 90 Mnts. (Lessons 4,5,6,7)			
Part – A: 16 Marks			
1	4Marks	Tenses	Present, Past, Future tenses : Filling in

			with proper verb forms using the given base form	
2	3	Concord	Concord: agreement between subject and verb	
3	3	Framing questions	Framing Wh& Yes-No questions	
4	3	Types of sentences	Conversion of sentences (except questions) , Using of proper linkers / discourse markers	
5	3 Marks	Words& Phrases , linkers	Using words& phrases, linkers in sentences of one's own	

Part – B : 8X3 = 24 Marks

6	8 Marks	Paragraph writing A or B (internal choice)	a) Themes on lessons 4/5 b) Themes based on lessons 6/7	
7	8	Letter Writing (internal choice : A or B)	a) Letter writing : formal b) Letter writing: Informal	
8	8	a) Paragraph: Tenses Reinforcement b) Email & Instructions/ directions	a) Paragraph on Routines/ past narration / Future plans b) i) E- Mail writing (formal or informal) ii) Giving instructions/ directions	

Unit Test -3: Marks : 40 ; Time 90 Mnts. (Lessons 8,9,10,11)

Part – A ; 16 Marks				
1	4 Marks	Error Analysis	Find errors and make corrections	
2	3	Voice	Conversion: Active & Passive voice	
3	3	Synthesis of sentence	Conversion: Simple, complex & compound sentences	
4	3	Reported speech	Conversion: Direct & Indirect speech	
5	3	Words & phrases, linkers	Matching words with their meanings/ Using words& phrases, linkers in sentences of one's own	
Part- B : 8X3 = 24 Marks				
6	8 Marks	Essay writing A or B (internal choice)	a) Theme based (lessons 8 / 9) b) Theme based (Lessons 10/11)	
7	8	Report writing A or B (internal choice)	a) Report on Mini projects/ industrial visits / camps/ events /exhibitions / celebrations b) themes from lessons 8 to 11 ...like disaster management / technical inventions / gender equality/ goal setting	
8	8	Reading Comprehension A or B (internal choice)	Reading passages with 8 different questions (FIVE model+ others)	

Model Question Papers : Unit Tests

Unit Test-1: C23- Common-101: English

Time: 90 Mnts.

Max. Marks: 40

Part-A

16 Marks

Instructions: Answer all the questions and the first question carries 3 marks. Question numbers from 2 to 5 carries three marks each. The marks will be awarded only for the desired and accurate language / grammatical expressions.

1. A) Give synonyms for the words: i) abruptly ii) advantage
B) Give antonyms for the words: i) pure ii) dry
C) Add affixes for the words: i) connect ii) worth
D) Give one word substitute for the following:

- i) The interactive web page that can be updated frequently by an individual or group.
ii) An ability that can be acquired by anyone through practice.

2. A) Fill in the blanks with proper Articles:

- i) My cousin joined M.Tech in _____ University in Tamil Nadu.
ii) Mrs. Rekha Chatterjee is _____ MLA from the West Bengal.
iii) My father came to _____ college yesterday to pay my exam fees.

B) Fill in with appropriate prepositions:

- i) What can I do _____ you ,Sarat?
ii) Mr. Agarwal distributed his property _____ his two daughters.
iii) The coach was pleased _____ the performance of the players.

3. a) Fill in with proper form of the adjective given in the brackets :

BurjKhalifa is one of _____(tall) buildings in the world.

b) The tiger is more ferocious than the leopard. (Change into Positive degree)

c) Very few cities in India are as populous as Mumbai. (Change into comparative degree)

4. A) Fill in with proper Primary Helping Verbs (be/do/have forms)

i) Prasad _____ (be) at the canteen when I saw him a few minutes ago.

ii) He _____ (do) this work always.

iii) The teacher _____just left the classroom.

B) Fill in with appropriate Modal verbs based on the clue given in the brackets:

i) We all _____ respect our elders. (moral obligation)

ii) Sir, _____ I come in please? (seeking permission)

iii) Tarun _____ easily win the match. (ability)

5. Use the following phrasal verbs in sentences of your own.

i) bring up ii) give away iii) put off

Part-B

8X3=24 Marks

Instructions: Answer all the questions. Each question carries 8 marks. The marks will be awarded for the appropriate content, quality and clarity of expressions, but not the length of your answer.

6. A)Write a paragraph in around 120 words about the significance of learning and using English in your present and future life.

OR

B) Write a paragraph in around 120 words about challenges you are facing in speaking and writing English and the solutions to overcome them.

7. A) Write a dialogue between two friends in at least six turns discussing the advantages and disadvantages of social media.

OR

B) Write a dialogue between two friends, who have joined different courses in different colleges after their tenth class and now exchanging information about their newly joined courses and colleges.

8. A) Read the following passage and answer the questions that follow. Your answer should be accurate, precise and limited to a word or phrase or a simple sentence:

Treating life as an adventure is the best quality of successful people. A person's security lies not in his comfort zone, but in his initiative, creativity and courage. Effective people do not label others from their past success or failure, but rediscover each time they meet them. These people are not overawed by top celebrities, cine personalities and sadhus. Winning people are excellent team players to take part in the process of creative problem solving. They are skillful at balancing their strengths and weaknesses with others. The final character of victorious people is exercising the four dimensions of life i.e., physical, mental, emotional, and enthusiastic.

Questions:

- a) What is the best quality of successful people?
- b) List out the three qualities which make a person secure?
- c) Why are the effective people not wondered at the lives of celebrities?
- d) What do the team players do?
- e) What is the special skill of the winning people?
- f) What is the final character of victorious people?
- g) What qualities of effective or winning people do you want to inculcate?
- h) Pick the word from the passage that would mean: “the feeling of respect, wonder and fear all together at something or someone”

OR

B) Read the following passage and answer the questions that follow. Your answer should be accurate, precise and limited to a word or phrase or a simple sentence:

Benjamin Franklin was born in 1706 in Boston, Massachusetts. He came from a big family. He had 16 brothers and sisters. When Benjamin was 15, his brother started the first Boston newspaper. It was called ‘The New England Courant’. He worked for the newspaper for a short time, but he was not happy. So, he went to Philadelphia and worked as a printer. In 1729, he bought a newspaper business. The newspaper was the ‘Pennsylvania Gazette’. He was very busy. In 1733, he started publishing ‘Poor Richard’s Almanac’. His pen name (the name he used as an author) was Richard Saunders. This book came out every year. Almanacs have information about weather and crops. They also have wise sayings. The wise saying “A penny saved is a penny earned” comes from Poor Richard’s Almanac. Benjamin Franklin was also an inventor. In 1743 he invented a very good stove called the Franklin stove. He invented swim fins. He invented bifocal glasses. He also invented the first odometer. He retired from his newspaper business in 1749. He stopped working on it. Then he became busy with science. Benjamin Franklin was also very interested in American politics. He helped Thomas Jefferson write the Declaration of Independence. In 1776, he and other people signed the Declaration of Independence. Franklin died on April 17, 1790. He was 84 years old.

Questions:

- a) How many siblings did Benjamin Franklin have?
- b) What was the newspaper started by his brother?
- c) What did he buy after working as a printer?
- d) What information was available in his Almanacs?
- e) Mention any two inventions made by Benjamin Franklin?
- f) Rewrite the meaning of the saying in your own words: "A penny saved is a penny earned"
- g) Which American president was Benjamin Franklin associated with?
- h) Pick the word from the passage that would mean: "external limbs of fish that help them swim and steer".

Unit Test-2: C23- Common-101: English

Time: 90 Mnts.

Max. Marks: 40

Part-A

16 Marks

Instructions: Answer all the questions and the first question carries 4 marks. Question numbers from 2 to 5 carry Three marks each. The marks will be awarded only for the desired and accurate language / grammatical expressions.

1. Fill in with proper verb form using the base form given in the brackets.

- a) The match _____ (start) already before we entered the stadium.
- b) Rani _____ (clean) dishes when the phone rang.
- c) They _____(hold) the thief tightly until the police arrived.
- d) Mr. Rajesh and his team _____(work) on this project since last month.

2. Fill in with the appropriate word from the pair given in the brackets.

- a) Bread and butter _____ a wholesome breakfast. (is / are)
- b) The minister accompanied by his staff _____already arrived. (have/ has)
- c) Not only the film director but also all the actors _____ facilitated by the committee. (was/ were)

3. Frame two different 'Wh' questions and one 'Yes-No' question from the following:

India is the second most populous country just behind China. It is expected that in a few months, India stands top on the list due to our unprecedented birth rate. On the contrary, Japan is losing its population. The rate of death in Japan is double when compared to its birth rate of the country.

4. Convert the following sentences as directed.

- a) I want your bike for one hour. (convert into an imperative sentence)

b) It is a very beautiful garden. (convert into an exclamatory sentence)

c) Alas! what a great tragedy. (convert into a declarative sentence)

5. Use the following words/ phrases/ linkers in sentences of your own:

a) struggle ii) ground breaking iii) however

Part-B

8X3=24 Marks

Instructions: Answer all the questions. Each question carries 8 marks. The marks will be awarded for the appropriate content, quality and clarity of expressions, but not the length of your answer.

6. A) Write a paragraph in around 120 words about dealing with obstacles and failures in one's life.

OR

B) Write a paragraph in around 120 words about protecting our environment.

7. A) Write a letter to your Principal requesting him / her to issue your Original Tenth marks list as you

need to update your ADHAR card with date of birth and other details and return the certificate after the updating work.

OR

B) Write a letter to your father requesting him to send you two thousand rupees as you have to pay your hostel fees.

8. A) Write a paragraph in around 120 words about your future plans after Diploma.

OR

B) i) Draft an E-mail to your friend inviting him/her to your village to spend the weekend with you.

ii) Write a set of instructions at least in five sentences about drawing money from an ATM.

Unit Test-3: C23- Common-101: English

Time: 90 Mnts.

Max. Marks: 40

Part-A

16 Marks

Instructions: Answer all the questions and the first question carries 4 marks. Question numbers 2 to 5 carry Three marks each. The marks will be awarded only for the desired and accurate language / grammatical expressions.

1. Correct the following sentences:

- a) All the books have been sold out last week.
- b) I, Ramesh and you will together book a cab.
- c) I am feeling terribly cold.
- d) The police has arrested the gang of robbers.

2. Change the voice of the following:

- a) A cat is chasing two rats.
- b) The news has been published recently.
- c) They will certainly win the match.

3. Rewrite the sentences as directed:

- a) Though Rakesh studied well, he could not get the first class.(Convert into a simple sentence)
- b) It was raining heavily, and so the match was cancelled. (Convert into a complex sentence)
- c) The horse was too old to gallop. (Convert into a compound sentence)

4. Change the speech of the following as directed:

- a) Satwik said to his mother, "I forgot my water bottle in my classroom."
- b) The teacher ordered the students not to make noise.
- c) Swapna said, "Rajesh, what are you searching for?"

5. Use the following words /phrases/ linkers in sentences of your own:

- i) apologize to
- ii) occasionally
- iii) for a while

Part-B

8X3=24 Marks Instructions: Answer all the questions. Each

question carries 8 marks. The marks will be awarded for the appropriate content, quality and clarity of expressions, but not the length of your answer.

6. A) Write an essay in around 180 words on how the technical inventions changed our lives.

OR

B) Write an essay in around 180 words about the significance of the gender equality.

7 A) Write a report about any disaster that you have read in newspaper or witnessed including your suggestions for better preventive measures to mitigate the loss.

OR

B)Write a report about the Inter Polytechnics Sports and Games Meet (IPSGM) held in your District headquarters.

8 A) Read the following passage and answer the questions that follow. Your answer should be accurate, precise and limited to a word or phrase or a simple sentence.

Animals living in modern zoos enjoy several advantages over animals in the wild; however, they must also suffer some disadvantages. One advantage of living in the zoo is that the animals are separated from their natural predators; they are protected and can, therefore, live without risk of being attacked. Another advantage is that they are regularly fed a special, well-balanced diet; thus, they do not have to hunt for food or suffer times when food is hard to find. On the other hand, zoo animals face several disadvantages. The most important disadvantage is that since they do not have to hunt for food or face their enemies, some animals became bored, discontented or even nervous. Another disadvantage is that zoo visitors can endanger their lives. Some animals can pick up airborne diseases from humans.

Questions:

- a) What are the two animal habitations mentioned in the passage?
- b) Give the main advantage of animals living in zoo.
- c) What kind of food is the zoo animals fed with?
- d) What is the most disadvantage aspect faced by the zoo animals?
- e) How do you think that the visitors can harm the zoo animals?
- f) Do you support keeping the animals in a zoo for our entertainment? Justify your answer in a sentence.
- g) Pick the word from the passage that would mean: A violent or bigger animal that kills and eats the other tiny animal.
- h) Suggest a suitable title for the passage.

OR

B) Read the following passage and answer the questions that follow. Your answer should be accurate, precise and limited to a word or phrase or a simple sentence.

“I say to you today, my friends, even though we face the difficulties’ of today and tomorrow, I still have a dream. I have a dream that one day this nation will rise up, live out the true meaning of its creed. I have a dream that one day on the red hills of Georgia sons of former slaves and sons of former slave-owners will be able to sit down together at the table of brotherhood. I have a dream that my four little children will one day live in a nation where they will not be judged by the colour of their skin but by the content of their character. I have a dream.... I have a dream that one day in Alabama, with its vicious racists, with its governor having his lips dripping with the words of interposition and nullification, one day right there in Alabama little black boys and black girls will be able to join hands with little white boys and white girls as sisters and brothers:” On 28th August in 1963, Dr. Martin Luther King, Jr. spoke these immortal words to a crowd of over 200000 people who had gathered for the now historic march in Washington to demand an end to racial segregation in the USA, and for equality in jobs and civil rights.

Questions:

- a) Who is the speaker of the above speech and what is his nationality?
- b) What is the occasion of the above speech: ()
 - i) a birthday party ii) an election campaign
 - iii) a movement for a right cause iv) a government function
- c) What sort of discrimination did the speaker fight against?
- d) What good does he expect regarding the children of slaves and masters?
- e) What is the contextual meaning of the frequently used word “dream” ?
- f) How should a nation be judged?
- g) What are the two places mentioned by the speaker in his speech?
- h) Pick the word from the passage that would mean: “that lives for ever without death”

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

C-23 - ENGINEERING MATHEMATICS-I

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	<p>(i) To apply the principles of Algebra, Trigonometry and Co-Ordinate Geometry to real-time problems in engineering.</p> <p>(ii) To comprehend and apply the concept of Differential Calculus in engineering applications.</p>
--------------------------	--

Course Outcomes	CO1	Identify functions as special relations, resolve partial fractions and 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.
--	-----	--

**C-23 - ENGINEERING MATHEMATICS – I
(COMMON TO ALL BRANCHES)**

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 in finite sets – simple examples.

1.4 Define rational, proper and improper fractions of polynomials.

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

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

1.6 Define a matrix and order of a matrix.

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

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

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

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

1.11 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 of determinants to solve problems.

1.12 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.

1.13 Solve 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 $\sin(A\pm B)$, $\cos(A\pm B)$, $\tan(A\pm B)$ and $\cot(A\pm B)$.
- 2.4 Give simple examples on compound angles to derive the values of $\sin 15^\circ$, $\cos 15^\circ$, $\sin 75^\circ$, $\cos 75^\circ$, $\tan 15^\circ$, $\tan 75^\circ$ 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 angles $A/2$ 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 above 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 $a \cos x + b \sin x = c$.
- 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 complex number, its modulus, conjugate, amplitude and list their properties.
- 2.22 Define the 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 the 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 the 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.4 Evaluate the limits and derivatives of various functions.

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

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

4.3 State the Standard limits $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$, $\lim_{x \rightarrow 0} \frac{\sin x}{x}$, $\lim_{x \rightarrow 0} \frac{\tan x}{x}$, $\lim_{x \rightarrow 0} \frac{a^x - 1}{x}$,

$\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$, $\lim_{x \rightarrow 0} (1+x)^{\frac{1}{x}}$, $\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^x$ (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 $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ 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 the elementary functions x^n , a^x , e^x , $\log x$, $\sin x$, $\cos x$ using the first principle.
- 4.8 Find the derivatives of standard algebraic, logarithmic and exponential functions.

- 4.9 Find the derivatives of trigonometric, inverse trigonometric and hyperbolic functions.
- 4.10 State the rules of differentiation of sum, difference, scalar multiplication, product and quotient of functions with simple illustrative examples.
- 4.11 Explain the method of differentiation of a function of a function (Chain rule) with illustrative examples.
- 4.12 Explain the method of differentiation of parametric functions with examples.
- 4.13 Explain the procedure for finding the derivatives of implicit functions with examples.
- 4.14 Explain the need of taking logarithms for differentiating some functions of $[f(x)]^{g(x)}$ type – examples on logarithmic differentiation.
- 4.15 Explain the concept of finding the second order derivatives with examples.
- 4.16 Explain the concept of functions of several variables, finding partial derivatives and difference between the ordinary and partial derivatives with simple examples.
- 4.17 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 the curve $y=f(x)$ at any point on it.
- 5.2 Find the equations of tangent and normal to the curve $y=f(x)$ at any point on it – examples.
- 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 volumes, areas vary 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 in simple problems.

Syllabus for Unit test-III completed



C-23 - ENGINEERING MATHEMATICS – I

CO/PO – Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	1	2				3	2	3
CO2	3	3	3	2				3	3	1
CO3	3	2	2	1				3	2	2
CO4	3	3	2	2				3	2	1
CO5	3	3	3	3				3	3	3
Avg.	3	2.6	2.2	2				3	2.4	2

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

Note:

PO5: Appropriate quiz programme may be conducted at intervals and duration as decided by concerned teacher.

PO6: Seminars on applications of mathematics in various engineering disciplines are to be planned and conducted.

PO7: Such activities are to be planned that students visit library to refer standard books on Mathematics and latest updates in reputed national and international journals, attending seminars, learning mathematical software tools.

PSO1: An ability to understand the concepts of basic mathematical concepts and to apply them in various areas like computer programming, civil constructions, fluid dynamics, electrical and electronic systems and all concerned engineering disciplines.

PSO2: An ability to solve the Engineering problems using latest software tool, along with analytical skills to arrive at faster and appropriate solutions.

PSO3: Wisdom of social and environmental awareness along with ethical responsibility to have a successful career as an engineer and to sustain passion and zeal for real world technological applications.



C-23 - ENGINEERING MATHEMATICS – I

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	100%	3	>40% Level 3 Highly addressed
2	CO1, CO2, CO3,CO4,CO5	138	92%	3	
3	CO1, CO2, CO3,CO4,CO5	133	88.6%	3	
4	CO1, CO2, CO3,CO4,CO5	120	80%	3	25% to 40% Level 2 Moderately addressed
PSO 1	CO1, CO2, CO3,CO4,CO5	150	100%	3	5% to 25% Level 1 Low addressed
PSO 2	CO1, CO2, CO3,CO4,CO5	135	90%	3	
PSO 3	CO1, CO2, CO3,CO4,CO5	125	83.3%	3	
					<5% Not addressed



C-23 - ENGINEERING MATHEMATICS – I

(COMMON TO ALL BRANCHES)

COURSE CONTENT

Unit-I

Algebra

1. Functions:

Definitions of Set, Ordered pair, Cartesian product of two sets, Relations, functions, domain & range of functions in finite sets.

2. Partial Fractions:

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

$$i) \quad \frac{f(x)}{(ax+b)(cx+d)}$$

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

3. Matrices:

Definition of a matrix, types of matrices-examples, algebra of matrices-equality of two matrices, sum, difference, scalar multiplication and product of matrices. Transpose of a matrix-Symmetric, skew symmetric matrices-Minor, cofactor of an element-Determinant of a square matrix-Laplace's expansion, properties of determinants. Singular and non-singular matrices-Adjoint and multiplicative inverse of a square matrix- examples-System of linear equations in 3 variables-Solutions by Cramer's rule and Matrix inversion method-examples.

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 $\sin(A \pm B)$, $\cos(A \pm B)$, $\tan(A \pm B)$, $\cot(A \pm B)$, and related identities with problems.

6. Multiple and sub multiple angles:

Formulae for trigonometric ratios of multiple angles $2A$, $3A$ and sub multiple angles $A/2$ with problems.

7. Transformations: Transformations of products into sums or differences and vice versa - simple problems.

8. Inverse trigonometric functions:

Definition, domains and ranges-basic properties- problems.

9. Trigonometric equations:

Concept of a solution, principal value and general solution of trigonometric equations:

$\sin x = k$, $\cos x = k$, $\tan x = k$, where k is a constant. Solutions of simple quadratic equations and equations of type $a \cos x + b \sin x = c$.



10. Properties of triangles:

Relation between sides and angles of a triangle- sine rule, cosine rule, tangent rule and projection rule-area of a triangle- problems.

11. Complex Numbers:

Definition of a complex number, Modulus, conjugate and amplitude of a complex number, Arithmetic operations on complex numbers, Modulus- Amplitude (polar) form , Exponential form (Euler form) of a complex number- Problems.

UNIT-III

Coordinate geometry

12. Straight lines: various forms of straight lines, angle between lines, perpendicular distance from a point, intersection of non-parallel lines and distance between parallel lines-examples.

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 – finding centre, 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 -Simple Problems-Continuity of a function at a point- Simple Examples only.

16. Concept of derivative- Definition (first principle)- different notations-derivatives of elementary functions. Derivatives of algebraic, logarithmic, trigonometric, inverse trigonometric and hyperbolic functions. Derivatives of sum, product, quotient, scalar multiplication of functions - problems. Chain rule, derivatives of parametric functions, derivatives of implicit functions, logarithmic differentiation – problems in each case. Second order derivatives – examples. Functions of several variables –First and second order partial differentiation-simple problems.

UNIT-V

Applications of Derivatives

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

18. Physical applications of derivatives – velocity, acceleration, derivative as a rate measure –Problems.

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

20. Using the concept of derivative of a function of single variable, find the absolute error, relative and percentage errors and approximate values due to errors in measuring.

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. M.Vygodsky, Mathematical Handbook, Mir Publishers, Moscow.
4. Frank Ayers & Elliott Mendelson, Schaum's Outline of Calculus, Schaum's Series.



C-23 - Engineering Mathematics – I
Blue print

S.No.	Chapter/Unit title	No. of Periods	Weightage Allotted	Short type			Essay type			COs mapped
				R	U	Ap	R	U	Ap	
Unit - I : Algebra										
1	Functions	5	3	1	0	0	0	0	0	CO1
2	Partial Fractions	6	3	1	0	0	0	0	0	CO1
3	Matrices and Determinants	20	16	2	0	0	0	0	1	CO1
Unit - II : Trigonometry										
4	Trigonometric Ratios	2	0	0	0	0	0	0	0	CO2
5	Compound Angles	5	3	1	0	0	0	0	0	CO2
6	Multiple and Submultiple angles	8	3	1	0	0	0	0	0	CO2
7	Transformations	6	5	0	0	0	0	1/2	0	CO2
8	Inverse Trigonometric Functions	6	5	0	0	0	0	1/2	0	CO2
9	Trigonometric Equations	6	5	0	0	0	0	1/2	0	CO2
10	Properties of triangles	5	5	0	0	0	0	0	1/2	CO2
11	Complex Numbers	6	3	1	0	0	0	0	0	CO2



Unit III : Co-ordinate Geometry										
12	Straight Lines	6	5	0	0	0	0	1/2	0	CO3
13	Circles	5	3	1	0	0	0	0	0	CO3
14	Conic Sections	12	5	0	0	0	0	1/2	0	CO3
Unit – IV : Differential Calculus										
15	Limits and Continuity	6	6	1	1	0	0	0	0	CO4
16	Differentiation	28	20	0	0	0	1	1	0	CO4
Unit – V : Applications of Derivatives										
17	Geometrical Applications	4	5	0	0	0	0	0	1/2	CO5
18	Physical Applications	6	5	0	0	0	0	0	1/2	CO5
19	Maxima and Minima	4	5	0	0	0	0	0	1/2	CO5
20	Errors and Approximations	4	5	0	0	0	0	0	1/2	CO5
Total		150	110	9	1	0	1	3 1/2	3 1/2	
Marks				27	3	0	10	35	35	

R: Remembering Type : 37 Marks
U: understanding Type : 38 Marks
Ap: Application Type : 35 Marks

C-23 Engineering Mathematics – I

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

Unit Test I **C –23, AIM-102**
State Board of Technical Education and Training, A. P.
First Year
Subject name: Engineering Mathematics-I
Sub Code: AIM-102

Time : 90 minutes

Max.marks:40

Part-A

16Marks

Instructions: (1) Answer all questions.
(2) First question carries four marks and the remaining questions carry Three marks each.

1. Answer the following:
 - a. If $X = \{1, 2, 3, 4\}$ and $Y = \{1, 4, 9, 16, 25\}$, then $f : X \rightarrow Y$ defined by $f = \{(1, 1), (2, 4), (3, 9), (4, 16)\}$ is a function: State TRUE/FALSE. (CO1)
 - b. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, then $3A =$ _____. (CO1)
 - c. The value of $\sin 45^\circ + \cos 45^\circ$ is _____. (CO2)
 - d. The formula for $\tan 2A$ in terms of $\tan A$ is _____. (CO2)
2. If $A = \begin{bmatrix} 1 & 3 \\ 4 & -9 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 4 \\ -3 & 1 \end{bmatrix}$ then find $A + B$. (CO1)
3. Find the determinant of $\begin{bmatrix} 2 & -1 & 4 \\ 0 & -2 & 5 \\ -3 & 1 & 3 \end{bmatrix}$. (CO1)
4. Find the value of $\sin 75^\circ$. (CO2)
5. Prove that $\frac{\sin 2A}{1 - \cos 2A} = \cot A$ (CO2)

Part-B

3×8=24

Instructions: (1) Answer all questions.
(2) Each question carries eight marks
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

6. A) Resolve $\frac{2x}{(x-1)(x-3)}$ into partial fractions. (CO1)

or

B) Resolve $\frac{x-4}{(x-2)(x-3)}$ into partial fractions. (CO1)

7. A) If $A = \begin{bmatrix} 2 & 3 & 4 \\ 5 & 7 & 9 \\ -2 & 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 & -5 \\ 2 & 1 & 4 \\ 0 & 3 & 1 \end{bmatrix}$, then find AB (CO1)

Or

B) If $P = \begin{bmatrix} 3 & 1 & 4 \\ 1 & -2 & 0 \\ 3 & 1 & 6 \end{bmatrix}$ and $Q = \begin{bmatrix} 1 & 5 & -3 \\ 0 & 6 & 9 \\ -2 & 7 & 8 \end{bmatrix}$, show that $(P+Q)^T = P^T + Q^T$. (CO1)

8. A) Find the adjoint of the matrix $\begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 5 \\ 2 & 7 & -4 \end{bmatrix}$ (CO1)

or

B) Solve the following system of linear equations by Cramer's rule:
 $x - y + z = 2, 2x + 3y - 4z = -4, 3x + y + z = 8$ (CO1)

-o0o-



Unit Test II
State Board of Technical Education and Training, A. P.
First Year
Subject name: Engineering Mathematics-I
Sub Code: AIM- 102

C –23, AIM -102

Time : 90 minutes

Max.marks:40

Part-A

16Marks

Instructions: (1) Answer all questions.

(2) First question carries four marks and the remaining questions carry three marks each

1. Answer the following.

a. $\sin C + \sin D = 2 \cos\left(\frac{C+D}{2}\right) \sin\left(\frac{C-D}{2}\right)$: State TRUE/FALSE (CO2)

b. If $\sin^{-1}\left(\frac{3}{5}\right) = \tan^{-1}(x)$, then $x =$ _____ . (CO2)

c. If $z = 2 + 3i$, then $|z| =$ _____ . (CO2)

d. The eccentricity of the rectangular hyperbola is _____ . (CO3)

2. Express $(3 - 4i)(7 + 2i)$ in terms of $a + ib$ (CO2)

3. Find the intercepts made by the straight line $x + 5y - 10 = 0$. (CO3)

4. Find the centre and radius of the circle $x^2 + y^2 - 2x + 4y - 4 = 0$ (CO3)

5. Find the vertex and focus of the parabola $y^2 = 8x$. (CO3)

Part-B

3×8=24

Instructions: (1) Answer all questions.

(2) Each question carries eight marks

(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

6. A) Prove that $\frac{\sin 5\theta + \sin \theta}{\cos 5\theta + \cos \theta} = \tan 3\theta$. (CO2)

or

- B) Prove that $\tan^{-1}\left(\frac{1}{4}\right) + \tan^{-1}\left(\frac{3}{5}\right) = \frac{\pi}{4}$ (CO2)
7. A) Solve $2\sin^2\theta - \sin\theta - 1 = 0$ (CO2)
or
- B) If $a=3, b=4, c=5$, find the area of the ΔABC . (CO2)
8. A) Find the equation of the line passing through $(1,1)$ and perpendicular to the line $2x + 3y - 1 = 0$. Also find the perpendicular distance from the given point to the given line. (CO3)
or
- B) Find the equation of the ellipse whose focus is $(2, 0)$, directrix is $x+y-1=0$ and eccentricity is $\frac{1}{2}$. (CO3)

-o0o-



Unit Test III
State Board of Technical Education and Training, A. P
First Year
Subject name: Engineering Mathematics-I
Sub Code: AIM-102

C –23, AIM -102

Time : 90 minutes

Max.Marks:40

Part-A

16 Marks

Instructions: (1) Answer all questions.

(2) First question carries four marks and the remaining questions carry threemarks each.

1. Answer the following:

a. $\lim_{x \rightarrow 1} \frac{x^2 + 1}{x + 5} = \frac{1}{3}$: State TRUE/FALSE. (CO4)

b. $\frac{d}{dx}(x^n) = \underline{\hspace{2cm}}$ (CO4)

c. $\frac{d}{dx}(3 \tan^{-1} x) = ?$ (CO4)

d. Write the formula for finding the percentage error in x. (CO5)

2. Evaluate $\lim_{\theta \rightarrow 0} \frac{\sin 2\theta}{\theta}$ (CO4)

3. Find the derivative of $3 \tan x + 4 \log x$ w.r.t. x. (CO4)

4. Differentiate $x^2 \sin x$ w.r.t. x. (CO4)

5. Find the slope of the tangent to the curve $y = x^3 - 3x + 2$ at the point (1, 7). (CO5)

Part-B

3×8=24

Instructions: (1) Answer all questions.

(2) Each question carries eight marks

(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

6. A) if $x = at^2$ and $y = 2at$ then find $\frac{dy}{dx}$ (CO4)

or

B) Find $\frac{dy}{dx}$, if $y = x^x$ (CO4)

7. A) If $y = ae^x + be^{-x}$, then prove that $\frac{d^2y}{dx^2} - y = 0$. (CO4)

or

B) If $u(x, y) = \log(x + y)$, then find $\frac{\partial u}{\partial x}$ and $\frac{\partial u}{\partial y}$ (CO4)

8. A) The radius of a sphere is decreasing at a rate of 0.2 cm/sec. How fast is its surface area decreasing when the radius is 10 cm. (CO5)

or

B) Find the maximum and minimum values of the function $f(x) = x^3 - 3x$. (CO5)

-o0o-



END-EXAM MODEL PAPERS
STATE BOARD OF TECHNICAL EDUCATION, A.P
C-23 ENGINEERING MATHEMATICS-I, AIM- 102

TIME : 3 HOURS

MODEL PAPER- I

MAX.MARKS : 80M

PART-A

Answer All questions. Each question carries THREE marks.

10x3=30M

1. If $A = \left\{0, \frac{\pi}{4}, \frac{\pi}{2}\right\}$ and $f : A \rightarrow B$ is a function defined by $f(x) = \cos x$, then find the range of f .

(CO1)

2. Resolve the function $\frac{x}{(x-1)(x-2)}$ into partial fractions. (CO1)

3. If $A = \begin{bmatrix} 3 & 9 & 0 \\ 1 & 8 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 0 & 2 \\ 7 & 1 & 4 \end{bmatrix}$, find $A+B$ (CO1)

4. Find the determinant of the matrix $\begin{bmatrix} 2 & -1 & 4 \\ 0 & -2 & 5 \\ -3 & 1 & 3 \end{bmatrix}$ by Laplace's expansion. (CO1)

5. Show that $\frac{\cos 16^\circ + \sin 16^\circ}{\cos 16^\circ - \sin 16^\circ} = \tan 61^\circ$. (CO2)

6. Prove that $\frac{\sin 2\theta}{1 - \cos 2\theta} = \cot \theta$. (CO2)

7. Find the modulus of the complex number $3 + 4i$. (CO2)

8. Find the equation of the circle with centre (0, 0) and radius 5. (CO3)

9. Evaluate $\lim_{x \rightarrow 0} \frac{2x^2 - 3x + 1}{x^2 - 2x + 4}$. (CO4)

10. Find $\lim_{x \rightarrow 0} \frac{\sin 77x}{\sin 11x}$. (CO4)

PART-B

Answer any FIVE questions. Each question carries TEN marks.

5x10=50M

11. Solve the system of linear equations $x + y + z = 6$, $x - y + z = 2$ and $2x + y - z = 1$ using matrix inversion method. (CO1)

12. A) Show that $\frac{\sin 7\theta + \sin 5\theta}{\cos 7\theta + \cos 5\theta} = \tan 6\theta$. (CO2)

- B) Prove that $\tan^{-1}\left(\frac{1}{7}\right) + \tan^{-1}\left(\frac{1}{13}\right) = \tan^{-1}\left(\frac{2}{9}\right)$ (CO2)



13. A) Solve $(2 \sin x - 1)(\tan x - \sqrt{3}) = 0$. (CO2)
- B) If $a = 10$, $b = 12$, $c = 5$, then find the area of the ΔABC . (CO2)
14. A) Find the distance between the parallel lines $4x - 3y + 9 = 0$ and $4x - 3y + 5 = 0$. Also find their slopes. (CO3)
- B) Find the equation of the conic whose focus is $(1, 0)$, directrix is $3x + 4y + 1 = 0$ and eccentricity is 2. (CO3)
15. A) Find the derivative of $3 \tan x - 4 \log x - 7x^2 + \sqrt{x}$ w.r.t x . (CO4)
- B) Find the derivative of $x^2 e^{3x}$ w.r.t x . (CO4)
16. A) If $x = a(1 - \cos \theta)$, $y = a(\theta + \sin \theta)$, then find $\frac{dy}{dx}$. (CO4)
- B) If $u(x, y) = x^2 y + y^2 x$, then find $\frac{\partial u}{\partial x}$ and $\frac{\partial u}{\partial y}$ (CO4)
17. A) Find the equation of tangent to the curve $y = x^2 + 1$ at $(2, 1)$. (CO5)
- B) The radius of a circular plate is increasing at 0.7 cm/sec. What is the rate of increase in its area when radius is 10 cm? (CO5)
18. A) Find maximum or minimum value of $f(x) = x^2 - 4x + 3$. (CO5)
- B) If an error of 0.02 cm is made in the side of a square, what is the approximate error in the area and perimeter of the square? (CO5)

-o0o-



STATE BOARD OF TECHNICAL EDUCATION, A.P.
C-23 ENGINEERING MATHEMATICS-I, AIM- 102

TIME : 3 HOURS

MODEL PAPER- II

MAX.MARKS : 80M

PART-A

Answer All questions. Each question carries THREE marks.

10x3=30M

1. If $A = \{-1, 0, 1\}$ and $f: A \rightarrow B$ is defined by $f(x) = x^2 - x + 1$, then find the range of f .
(CO1)
2. Resolve the function $\frac{1}{(x+1)(x-2)}$ into partial fractions. (CO1)
3. If $A = \begin{bmatrix} 3 & 9 & 0 \\ 1 & 8 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 0 & 2 \\ 7 & 1 & 4 \end{bmatrix}$, then find $(A+B)^T$. (CO1)
4. If $A = \begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix}$, then find A^2 . (CO1)
5. Find the value of $\frac{\cos 36^\circ + \sin 36^\circ}{\cos 36^\circ - \sin 36^\circ} = \tan 81^\circ$. (CO2)
6. Prove that $\frac{1 + \cos 2\theta}{\sin 2\theta} = \cot \theta$. (CO2)
7. Find the modulus of the complex number $3+2i$. (CO2)
8. Find the equation of the circle with centre $(1,2)$ and radius 4. (CO3)
9. Find $\lim_{x \rightarrow 0} \frac{2x^2 - 3x + 1}{x^2 - 2x + 4}$. (CO4)
10. Find $\lim_{x \rightarrow 0} \frac{\sin 5x}{\tan 3x}$. (CO4)

PART-B

Answer any FIVE questions. Each question carries TEN marks.

5x10=50M

11. Solve the system of linear equations $x - y + 3z = 5$, $4x + 2y - z = 0$ and $-x + 3y + z = 5$ using Cramer's rule. (CO1)
- 12 A) Show that $\cos 40^\circ + \cos 80^\circ + \cos 160^\circ = 0$. (CO2)
B) Prove that $\tan^{-1} \left(\frac{1}{4} \right) + \tan^{-1} \left(\frac{3}{5} \right) = \frac{\pi}{4}$ (CO2)
13. A) Solve $2 \cos^2 \theta - 3 \cos \theta + 1 = 0$. (CO2)



B) If $a=5$, $b=7$, $C=30^\circ$, then find the area of the ΔABC . (CO2)

14. A) Find the line passing through the point (2,3) and perpendicular to the line $x - 7y + 15 = 0$. Also find the distance from the given point to the given line. (CO3)

B) Find the vertex, focus, directrix and latus rectum of the parabola $y^2 = 16x$. (CO3)

15. A) Find the derivative of $3\cos x + \log x + 21x + 8e^{-x}$ w.r.t.x. (CO4)

B) Find the derivative of $\frac{1-x^2}{1+x^2}$ w.r.t. x. (CO4)

16. A) If $y = x^{\sin x}$, then find $\frac{dy}{dx}$. (CO4)

B) If $y = \tan^{-1} x$, then prove that $(1+x^2)\frac{d^2y}{dx^2} + 2x\frac{dy}{dx} = 0$. (CO4)

17. A) Find the equation of tangent to the curve $y = x^3 - 2x^2 + 4$ at (2,4). (CO5)

B) If $s(t) = t^2 + 2t + 3$ is the displacement of a particle, find its velocity and acceleration at the time $t=3$ sec. (CO5)

18. A) Find maximum or minimum value of $f(x) = 3 + 10x - 5x^2$. (CO5)

B) If an error of 0.02 cm is made in the side of a square, then what is the percentage error in the calculated value of its area? (CO5)

-o0o-



Course code	Course Title	No. of Periods per week	Total No. of Periods	Marks for FA	Marks for SA
AIM-103	Engineering Physics	3	90	20	80

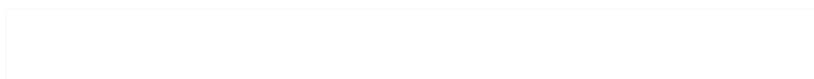
TIMESCHEDULE

S.No	Major Topics	No. of Periods	COs
1.	Units and measurements	09	CO1
2.	Statics	11	
3.	Gravitation	12	CO2
4.	Concepts of energy	10	
5.	Thermal physics	10	CO3
6.	Sound	12	
7.	Electricity & magnetism	13	CO4
8.	Modern physics	13	
	Total:	90	

Course objectives	<p>(1) To understand the basic concepts of physics for various Engineering applications as required for industries.</p> <p>(2) To equip the students with the scientific advances in technology and make the student suitable for any industrial organization.</p>
-------------------	--



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, provides the knowledge of various forms of energy and their working principles.
	CO3	Familiarize with the knowledge of conduction of heat and gas laws; provides 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 effect, optical fibers, semiconductors, superconductors and nanotechnology.



MATRIX SHOWING MAPPING OF COURSE OUT COMES WITH PROGRAMME OUTCOMES

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

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

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
- 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 vectors, Position vector)
- 2.6 Resolve the vector into rectangular components
- 2.7 State and explain triangle law of addition of vectors
- 2.8 Define concurrent and co-planar forces
- 2.9 State and explain Lami's theorem
- 2.10 State parallelogram law of addition of forces with diagram



- 2.11 Write the expressions for magnitude and direction of resultant (no derivation)
- 2.12 Illustrate parallelogram law with examples (i) flying of bird and (ii) working of sling.
- 2.13 Define moment of force and couple.
- 2.14 Write the formulae and S.I units of moment of force and couple.
- 2.15 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 law 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 PSLV
- 3.12 Write a brief note on GSLV
- 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 the modes of transmission of heat
- 5.3 Define 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 Celcius, Kelvin and Fahrenheit temperatures
- 5.8 State Charles 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
- 5.13 Calculate the value of R for 1 gram mole of gas.

5.14 Solve simple problems on (i) Interconversion 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 parameters contained
- 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 Kirchoff's first law.
- 7.6 State and explain Kirchoff's second law.
- 7.7 Describe Wheatstone's bridge with legible sketch.
- 7.8 Derive an expression for balancing condition of Wheatstone's 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 and write the properties of magnetic lines of force
- 7.14 State and explain the Coulomb's inverse square law of magnetism
- 7.15 Define magnetic permeability
- 7.16 Define para, dia, ferro magnetic materials with examples
- 7.17 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 State laws of photoelectric effect
- 8.3 Explain the Working of photoelectric cell
- 8.4 List the Applications of photoelectric effect
- 8.5 Recapitulate refraction of light and its laws
- 8.6 Define critical angle



- 8.7 Explain the Total Internal Reflection
 - 8.8 Explain the principle and working of Optical Fiber
 - 8.9 List the applications of Optical Fiber
 - 8.10 Explain the energy gap based on band structure
 - 8.11 Distinguish between conductors, semiconductors and insulators based on energy gap
 - 8.12 Define doping
 - 8.13 Explain the concept of hole
 - 8.14 Explain the types of semiconductors : Intrinsic and extrinsic
 - 8.15 What are n-type and P-type semiconductors
 - 8.16 Mention the applications of semiconductors
 - 8.17 Define superconductor and superconductivity
 - 8.18 List the applications of superconductors
- 8.19 Nanotechnology definition, non 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, principle 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 - Charles'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 - Wheatstone'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, nanomaterials, 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 | Resnick & Holiday |
| 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 | |



Blue Print for setting question paper at different levels

S.No	Major Topics	Weightage of Marks	Short Answer Type(Marks)			Essay Type(Marks)		
			R	U	A	R	U	A
1	Units and measurements	03	0	0	3	0	0	0
2	Statics	13	0		3	0	10	0
3	Gravitation	20	0	0	0	10	10	0
4	Concepts of energy	13	0	0	3	0	10	0
5	Thermal physics	13	0	3	0	0	0	10
6	Sound	16	0	3	3	0	10	0
7	Electricity & magnetism	16	0	3	3	0	10	0
8	Modern Physics	16	3	0	3	0	0	10
	<i>Total:</i>	110	3	9	18	10	50	20



(C-23) AIM-103
UNIT TEST - I, FIRST YEAR
ENGINEERING PHYSICS

Time : 90 Minutes

Total Marks : 40

.....
PART—A

16 Marks

Instructions : (i) Answer all questions.

(ii) Question 1 carries 4 marks. Question numbers from (2) to (5) carries 3 marks each.

1. (i) Which among the following is a fundamental quantity.
(a) Force (b) Momentum (c) Time (d) Density (CO1)
(ii) Pascal is the S.I unit of pressure. (True/ False) (CO1)
(iii) Displacement is vector quantity (Yes/No) (CO1)
(iv) The formula for orbital velocity is _____ (Fill in the blank) (CO2)
2. Define absolute, relative errors and percentage errors. (CO1)
3. Define equal vectors, unit vector and co-initial vectors. (CO1)
4. A force of 100 N acts at a point at an angle of 60° to the horizontal. Find the horizontal and vertical components of force. (CO1)
5. Define natural and artificial satellites. Give one example each. (CO2)

PART—B

24 Marks

Instructions : (i) Answer all questions.

(ii) Each question carries 8 marks with internal choice.

- 6.(a) Define concurrent and co-planar forces. Explain Lami's theorem. (CO1)
OR
(b) Two forces 20 N and 30 N act at a point at an angle of 60° between them. Find the magnitude and direction of the resultant. (CO1)
7. (a) State and explain Kepler's law of planetary motion. (CO2)
OR
(b) Define acceleration due to gravity (g). Write any three factors affecting the value of g. (CO2)
8. (a) Write a brief note on PSLV and GSLV. (CO2)
(OR)
(b) State Newton's universal law of gravitation and derive the relationship between g and G. (CO2)



(C-23) AIM-103

UNIT TEST - II, FIRST YEAR

ENGINEERING PHYSICS

Time : 90 Minutes

Total Marks : 40

PART—A

16 Marks

Instructions : (i) Answer all questions.

(iii) Question 1 carries 4 marks. Question numbers from (2) to (5) carries 3 marks each.

- 1 (i) Which among the following is unit of Work. (CO2)
(a) newton (b) pascal (c) joule (d) watt
- (ii) According to Boyle's law, at constant temperature, the pressure of a gas is directly proportional to its volume (True/ False) (CO3)
- (iii) Velocity of sound in a medium varies with temperature (Yes/No) (CO3)
- (iv) The S.I unit of intensity of sound _____ (Fill in the blank) (CO3)
- 2 Define potential energy, give one example. (CO2)
- 3 Briefly write about absolute scale of temperature. (CO3)
- 4 An ideal gas of given mass at temperature 100 °C occupies a volume of 240 CC at constant pressure. Find its volume at 150 °C. (CO3)
5. Write any three differences between musical sound and noise. (CO3)

PART—B

24 Marks

Instructions : (i) Answer all questions.

(ii) Each question carries 8 marks with internal choice.

- 6.(a) Write about solar energy and solar thermal conversion. (CO2)
OR
(b). Define kinetic energy and derive the relationship between KE and momentum. (CO2)
7. (a) Write ideal gas equation and calculate the value of R for 1 gram mole of a gas. (CO3)
OR
(b) Define conduction, convection and radiation with one example each. (CO3)
8. (a) Write four methods of reducing an echo and four applications of echo. (CO3)
(OR)
(b) What are ultrasonics. Mention six applications of it. (CO3)



(C-23) AIM-103

UNIT TEST - III, FIRST YEAR
ENGINEERING PHYSICS

Time : 90 Minutes

Total Marks : 40

PART—A

16 Marks

Instructions : (i) Answer all questions.

(ii) Question 1 carries 4 marks. Question numbers from (2) to (5) carries 3 marks each.

1. (i) The unit of specific resistance is

(a) Ω (b) Ω/m (c) $\Omega\cdot m$ (d) pascal (CO4)

(ii) Magnetic field lines are open curves. (True/False) (CO4)

(iii) At the critical angle, the angle of refraction is equal to 90° . (Yes/No) (CO4)

(iv) Photoelectric cell converts _____ energy into electric energy (Fill in the blank) (CO4)

2. Find the current passing through a conductor of resistance $2\ \Omega$ when P.D of $50\ V$ is applied across it. (CO4)

3. State the Coulomb's inverse square law of magnetism and write the equation for it. (CO4)

4. State three laws of photo electric effect. (CO4)

5. Write any three applications of superconductors. (CO4)

PART—B

24 Marks

Instructions : (i) Answer all questions.

(ii) Each question carries 8 marks with internal choice.

6.(a) State and explain Kirchoff's laws. (CO4)

OR

(b) Draw circuit diagram of Meter bridge. Two resistors of $10\ \Omega$ and $30\ \Omega$ are connected in the left and right gaps of a meter bridge. Find the balancing length. (CO4)

7. (a) Define para, ferro and dia magnetic materials with two examples each. (CO4)

OR

(b) Explain the principle and working of an optical fiber. (CO4)

8. (a) Explain intrinsic and extrinsic semiconductors. (CO4)

(OR)

(b) Explain conductors, semiconductors and insulators based on energy gap. (CO4)



AIM-103

BOARD DIPLOMA EXAMINATION, (C-23)
FIRST YEAR EXAMINATION
ENGINEERINGPHYSICS

Time : 3hours

Total Marks :80

PART—A

3×10=30

Instructions : (1) Answer all questions.

(2) Each question carries three marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Write any three advantages of S.I units. (CO1)
2. Define moment of force. Write its SI unit. (CO1)
3. Find the work done in lifting a body of mass 10 kg through a height of 20 m against gravity. (CO2)
4. Define absolute zero temperature. Convert -10°C into Kelvin temperature. (CO3)
5. Define Doppler effect. Mention one application. (CO3)
6. Write the Sabine's formula for reverberation time and name the parameters in it. (CO3)
7. Define specific resistance. Write its S.I unit. (CO4)
8. Write any three characteristics of magnetic lines of force. (CO4)
9. Draw a neat diagram of photoelectric cell and name the parts. (CO4)
10. Write any three applications of optical fibers. (CO4)



Instructions : (1) Answer *any* five questions.

(2) Each question carries tenmarks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) State and explain triangle law of vectors 6+4

(b) A force of 100 N acts on a particle at an angle of 30° to the horizontal. Find the Horizontal and vertical components of force. (CO1)

12. State and explain Kepler's law of planetary motion. 10 (CO2)

13. (a) Derive the relationship between g and G . 5+5 (CO2)

(b) Calculate the orbital velocity of a satellite so that it revolves around the earth if the Radius of earth = 6.5×10^6 m, mass of earth = 6×10^{24} kg and

Gravitational constant $G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$. 5+5

14. Explain the principle of solar thermal conversion and photo voltaic effect. 5+5
(CO2)

15. (a) Derive the ideal gas equation.

(b) Volume of a gas at 27°C is 100 CC. Keeping the pressure constant, find its volume at a temperature of 50°C . 7+3
(CO3)

16. (a) Write any five methods of reducing noise pollution.

(b) Define echo. Write three applications of it. 5+2+3
(CO3)

17. (a) Derive an expression for balancing condition of Wheatstone's bridge with neat circuit diagram.

(b) The values of resistance of P, Q, R are 50Ω , 10Ω and 15Ω respectively in the balanced condition of the bridge.

Find the unknown resistance S. 7+3
(CO4)

18. Explain n-type and P-type semiconductors. 5+5
(CO4)

Course code	Course Title	No. of Periods per week	Total No. of Periods	Marks for FA	Marks for SA
AIM-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	<ol style="list-style-type: none"> 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	Explain Bohr's atomic model, chemical bonding, mole concept, acids and bases, P^H and Buffer solutions
	CO2	Explain electrolysis, Galvanic cell, batteries and corrosion
	CO3	Explain the chemistry involved in the treatment of hardness in water

	CO4	Explain the methods of preparation of polymers and chemical composition and applications of alloys, composite materials, liquid crystals and Nano materials
	CO5	Explain Global impacts due to air pollution, causes, effects and control methods of water pollution and Understand the environment, forest resources, E-Pollution and Green Chemistry Principles.

Course code C-104	Engineering. Chemistry and Environmental studies No of Course Objectives:5			No Of periods 90	
POs	Mapped with CO No	CO periods addressing PO in Col 1 NO	%	Level 1,2,3	remarks
PO1	CO1,CO2,CO3 , CO4,CO5	42	46.7 %	3	>40% level 3 (highly addressed) 25% to 40% level2(moderately addressed 5% to 25% level1 (Low addressed < 5%(not addressed)
PO2	CO1,CO2	9	10.0%	1	
PO3	CO2,CO3	8	8.9%	1	
PO4	CO1	10	11.1%	1	
PO5	CO4,CO5	13	14.4%	1	
PO6					
PO7	CO4	8	8.9%	1	

COs-POs mapping strength (as per given table)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	1	1	1			1	1	
CO2	3	2	2					1	1	
CO3	3		2	3						
CO4	3			2			2			
CO5	3				3			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	Weight age of marks	Marks wise distribution of Weightage				Question wise distribution of Weightage				Mapped with CO
				R	U	Ap	An	R	U	Ap	An	
1	Fundamentals of Chemistry	14	21	15*	3	3		1½*	1	1		CO1
2	Solutions, Acids and Bases	16	21	8*	10	0	3	1½*	1		1	CO1

3	Electrochemistry	12	13	0	10	3			1	1		CO2
4	Corrosion	8	13	3	10	0		1	1			CO2
5	Water Treatment	8	13	10	0	0	3	1			1	CO3
6	Polymers & Engineering materials.	12	13	0	10	3		0	1	1		CO4
7	Fuels	6	3	0	0	3		0		1		CO4
8	Environmental Studies	14	13	0	13	0			2			CO5
Total		90	110	36	56	12	6	5	7	4	2	

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

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

ENGINEERING CHEMISTRY 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 Explain 1. Aufbau principle, 2 Pauli's exclusion principle 3 Hund's principle.
- 1.5 Define Orbital of an atom and draw the shapes of s, p and d-Orbitals.
- 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. Solute and 3. Solvent
- 2.2 Classify solutions based on solubility.
- 2.3 Define mole and problems on mole concept.
- 2.4 Define the terms 1. Atomic weight, 2. Molecular weight and 3. Equivalent weight and 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 , $CaCO_3$)
- 2.5 Define molarity and normality and 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 of Acids and Bases and give the limitations of Arrhenius theory of Acids and Bases.
- 2.7 Define ionic product of water and pH and 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 terms 1. Conductor 2. Semiconductor 3. Insulator, 4. Electrolyte 5. Non-electrolyte. Give two examples each.
- 3.2 Distinguish between metallic conduction and Electrolytic conduction
- 3.3 Explain electrolysis by taking example fused NaCl and list out the applications of electrolysis.
- 3.4 Define Galvanic cell and 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.
- 3.5 Explain the construction, working and applications of i) Dry cell (Leclanche cell, ii) Lead storage battery iii) Lithium-Ion battery iii) 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
 - 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) or (ppm).
- 5.6 Numerical problems on hardness.
- 5.7 Explain the methods of softening of hard water by : a) Ion-exchange process, b) Reverse Osmosis.

6.0 Polymers & Engineering materials.

A) Polymers

- 6.1 Explain the concept of polymerisation
- 6.2 Describe the methods of polymerization a) addition polymerization of ethylene b) condensation polymerization of Bakelite (Only flowchart)
- 6.3 Explain the methods of preparation and uses of the following plastics:
 1. PVC 2. Teflon 3. Polystyrene 4. Nylon 6,6

B) Engineering materials

- 6.4 Define an alloy. Write the composition and applications of the following.
1. Nichrome 2. Duraluminium 3. Stainless Steel.
- 6.5. Define elastomers: Write the composition and applications of the following
1. Buna- S 2. Neoprene
- 6.6 Define Composite materials: Write the composition and applications of the following:
1. Glass Fibre Reinforcement composites(GFR) 2. Carbon Fibre Reinforcement Composites(CFR)
- 6.7 Define Liquid Crystals. Classify and give applications of the following:
1. Nematic 2. Smectic crystals
- 6.7 Define Nanomaterials. Write the composition and applications of the following:
1. nanotubes 2. Nanocrystals.

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 Define the term environment and explain the scope and importance of environmental studies.
- 8.2 Define the segments of environment 1). Lithosphere 2). Hydrosphere 3). Atmosphere 4). Biosphere
- 8.3 Define the following terms:
1) Pollutant 2). Pollution 3). Contaminant 4) receptor 5) sink 6) particulates 7) dissolved oxygen (DO) 8) Threshold limit value (TLV) 9). BOD 10) COD 11) eco system 1 2) Producers 1 3) Consumers 1 4) 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 give its Global impacts (1) Greenhouse effect, 2) Ozone layer depletion and 3) Acid rain)
- 8.8 Define Water pollution. Explain the causes, effects and control 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. Fundamentals of Chemistry

Atomic Structure: Introduction - Fundamental particles – Bohr's theory – Quantum numbers – Aufbau principle - Hund's rule - Pauli's exclusion Principle- Orbitals, shapes of s, p and d orbitals - Electronic configurations 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: Terms and 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- 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 coating methods, cathodic protection methods.

5. Water Technology

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.

6. Polymers & Engineering materials

Polymers: concept of polymerization – types of polymerization – addition, condensation with examples – Preparation and uses of the following plastics i) PVC ii) Teflon iii) Polystyrene iv) Nylon 6,6

Elastomers: Preparation and application of the following elastomers i) Buna-s ii) Neoprene

Engineering materials:

Alloys- composition and applications of i) Nichrome, ii) Duraluminium iii) Stainless Steel.

Composite materials- Composition and applications of i) GFR ii) CFR

Liquid Crystals- types- applications of i) Nematic Crystals ii) Smectic crystals

Nano materials- Composition and applications of i) Nanotubes ii) Nano crystals..

7. Fuels

Definition and classification of fuels – composition and uses of i) LPG ii) CNG iii) Biogas

iv) Power alcohol

8. ENVIRONMENTAL STUDIES

Environment – scope and importance of environmental studies – 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- 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. Sharma Engineering Chemistry
5. A.K. De Engineering Chemistry

Model question paper for Unit Test with Cos mapped**UNIT TEST –I****Model Question Paper (C-23)****ENGINEERING CHEMISTRY & ENVIRONMENTAL STUDIES (104)**

TIME: 90 minutes

Total Marks: 40

PART-A

16 Marks

Instructions: (1) Answer all questions.

(2) First question carries 4 marks and each of rest carries 3 marks.

(3) Answers for Q.No. 2 to 5 should be brief and straight to the point and shall not exceed five simple sentences.

1. a. Number electrons present in Na^+ ion is ----- (CO1)
b. The molarity and normality of NaOH is the same (True or False) (CO1)
c. Acid with pH 6 is stronger than Acid pH 4 (True or False) (CO1)
d. 2s is spherical shaped orbital but 3p is ----- (CO1)
2. Distinguish between orbit and orbital. (CO1)
3. Define buffer solution. Give two examples. (CO1)
4. Calculate the number of moles present 10.6 gm. of Na_2CO_3 . (CO1)
5. Draw the atomic structures of Si and Ge. (CO1)

PART – B

3x8M = 24M

Answer either (A) or (B) from each questions from Part-B.

Each question carries 8 marks.

- 6.a) Explain Postulations of Bhor's atomic theory. Give its limitations. (CO1)(OR)
b) Explain the significance of Quantum numbers. (CO1)
- 7.a) Define molarity normality. Calculate the molarity and normality of 10.6 gm of Na_2CO_3 present in 500 ml solution. (CO1)
(OR)
- b) Explain Arrhenius theory of acids and bases. Give its limitations (CO1)
- 8.a) Define ionic bond. Explain the formation of ionic bond in NaCl. (CO1)
(OR)
- b) Define solution. Explain the types of solutions based on its solubility. (CO1)

UNIT TEST –II

Model Question Paper (C-23)

ENGINEERING CHEMISTRY & ENVIRONMENTAL STUDIES (104)

TIME: 90 minuts

Total Marks:40

PART-A

16 Marks

Instructions: (1) Answer all questions.

(2) First question carries 4 marks and each of rest carries 3 marks.

(3) Answers for Q.No. 2 to 5 should be brief and straight to the point and shall not exceed five simple sentences.

- a) Graphite is an insulator. (True of False) (CO2)
b) ----- is an electrolyte in Hydrogen-Oxygen fuel cell (CO2)
c) Zinc is more active than Iron. (True or False) (CO2)
d) Write the Chemical formula of rust. (CO2)
- Write any three differences between metallic conduction and electrolytic conduction. (CO2)
- Write a short note on stress cell. (CO2)
- Define hard water. Mention any two salts that cause hardness (CO3)
- What is the role of salt bridge? (CO2)

PART – B

3x8M = 24M

Answer either (A) or (B) from each questions from Part-B.

Each question carries 8 marks.

6. a) Explain construction and working of galvanic cell with neat diagram. (CO2)
(OR)
b) Explain construction and working of Lead storage battery. (CO2)

7. a) Calculate the temporary, permanent and total hardness of water containing the following salts:
 $\text{CaSO}_4 = 13.6 \text{ mg/lit}$, $\text{Mg}(\text{HCO}_3)_2 = 7.3 \text{ mg/lit}$, $\text{Ca}(\text{HCO}_3)_2 = 16.2 \text{ mg/lit}$, $\text{MgCl}_2 = 9.5 \text{ mg/lit}$ (CO3)
 (OR)
 b) Explain Ion-Exchange process of softening of hard water. (CO3)
8. a) What is rusting of iron? Explain Mechanism of rusting of iron. (CO2)
 (OR)
 b) Explain cathodic protection methods. (CO2)

UNIT TEST –III

Model Question Paper (C-20)

ENGINEERING CHEMISTRY & ENVIRONMENTAL STUDIES (104)

TIME: 90 minutes

Total Marks:40

PART-A

16 Marks

Instructions: (1) Answer all questions.

(2) First question carries 4 marks and each of rest carries 3 marks.

(3) Answers for Q. No. 2 to 5 should be brief and straight to the point and shall not exceed five simple sentences.

1. a) Semiconductor Nano Crystals are called (CO4)
 b) Chloroprene is the monomer of Neoprene. (True/False) (CO4)
 c) Give any two examples for green house gases. (CO5)
 d) Presence of ozone in stratosphere is a pollutant. (Yes/No) (CO5)
2. Define liquid crystals. State the types. (CO4)
3. Write the commercial production of Hydrogen by electrolysis of water. (CO4)
4. Define Green Chemistry. List any two benefits. (CO5)
5. Define TLV. Give one example. (CO5)

PART – B

3x8M = 24M

Answer either (A) or (B) from each questions from Part-B.

Each question carries 8 marks.

6. a) Define polymerisation. Explain condensation polymerisation by taking nylon 6,6

- asan example. (CO4)
- (OR)
- b) Define elastomers. Give a method of preparation and applications of Buna-S. (CO4)
7. a) What is air pollution? Discuss any one of Global impacts of air pollution. (CO5)
- (OR)
- b) Write the composition and uses of the following:
- i) LPG ii) CNG iii) Biogas iv) Power Alcohol (CO4)
8. a) Define e-waste. State the sources and explain e-waste management. (CO5)
- (OR)
- b) Define water pollution. Write the causes of water pollution. (CO5)

Model Question Paper (C-23)

ENGINEERING CHEMISTRY & ENVIRONMENTAL STUDIES (104)

TIME: 3hrs

Total Marks:80

PART-A

Instructions: (1) Answer all questions. (2) Each question carries Three marks. 3x10=30M

1. Draw the atomic structures of Si and Ge. (CO1)
2. Write the anomalous electronic configuration of Chromium and Copper. (CO1)
3. State the limitations of Arrhenius theory of acids and bases. (CO1)
4. Define solution. Classify solutions based on solubility. (CO1)
5. State the applications of Li-ion batteries. (CO2)
6. List the factors that influence the rate of corrosion of metals. (CO2)
7. Mention disadvantages of hard water used in industries. (CO3)
8. State any three applications of nanotubes. (CO4)
9. Write the composition and uses of LPG. (CO4)
10. What is e-waste? State the sources of e-waste. (CO5)

PART – B

Instructions: (1) Answer any five questions. (2) Each question carries Ten marks. 10x5=50M

11. Explain the significance of quantum numbers. (CO1)

12. Define molarity and normality. Calculate the molarity and normality of 250 ml of solution that contains 5.3 gm of sodium carbonate. (CO1)

13. a) Define ionic bond. Explain the formation of ionic bond in NaCl. (CO1) b)

Define Buffer solution. Give any two examples and applications. (CO1)

14. a) Explain the construction and working of Fuel cells. (CO2) b) State

any four differences between electrolytic cells and Galvanic cells. (CO2)

15. a) Explain mechanism of rusting of iron. (CO2)

b) Write a short note on Sacrificial anodic method of prevention of corrosion. (CO2)

16. Define hard water. Explain ion-exchange of softening of hard water with a neat diagram. (CO3)

17. a) Define elastomer. Write a method of preparation and any two applications of Buna-s. (CO4)
b) What are Liquid Crystals? Give any two examples and applications. (CO4)
18. a) Define deforestation. State the impacts of deforestation. (CO5)
short note on Ozone layer depletion. (CO5) b) Write a

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-105	Basics Of Computers, Artificial Intelligence and Machine Learning	5	150	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Fundamentals of Computers	30	CO1,CO3,CO4
2.	Programming Methodology	20	CO2
3.	Operating System basics	25	CO1,CO3
4.	Computer Hardware and Networking Basics	35	CO1,CO4,CO5
5.	Emerging Trends in Computer Technologies	40	CO2,CO6
Total Periods		150	

Course Objectives	<ul style="list-style-type: none"> 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	AIM-105.1	Explain computer fundamentals
	CO2	AIM-105.2	Explain various flowchart, algorithm methods
	CO3	AIM-105.3	Explain the importance of Basic Computer operating systems
	CO4	AIM-105.4	Analyse functioning of various

			Hardware components
	CO5	AIM-105.5	Explain Networking process in computers
	CO6	AIM-105.6	Explain basics of emerging technologies in the world

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-105.1	3							3	1	1
AIM-105.2	1	2	2	1		3		1	3	1
AIM-105.3	3	1		1		1	1	3	1	1
AIM-105.4	3		2	2	1		1	2	1	2
AIM-105.5	3		2		1	1	1	2	1	2
AIM-105.6	3			1	2		2	2	2	1
Average	2.7	1.5	2	1.25	1.3	1.7	1.25	2.2	1.3	1.3

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. Explain Drive 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 Emerging Trends in Computer Technology

- 5.1. Artificial Intelligence
 - 5.1.1. Define AI
 - 5.1.2. Types of AI
 - 5.1.3. Current Trends in AI
 - 5.1.4. Applications of AI
- 5.2. Machine Learning
 - 5.2.1. Define Machine Learning
 - 5.2.2. Compare Traditional Programming with Machine Learning
 - 5.2.3. List the applications and key elements of Machine Learning
- 5.3. Introduction to Big data
 - 5.3.1. Define and list sources of Big data
 - 5.3.2. Evolution of data/big data
 - 5.3.3. List and explain the characteristics of big data – the three V's of big data
 - 5.3.4. Describe Storing and selecting of Big Data
 - 5.3.5. State the Need of Big Data
 - 5.3.6. List types of tools used in Big Data
 - 5.3.7. List applications of big data
- 5.4. Introduction to BlockChain Technology
 - 5.4.1. Definition
 - 5.4.2. Need for BlockChain Technology
 - 5.4.3. List the Characteristics of BlockChain Technology
 - 5.4.4. List the components of BlockChain Technology
 - 5.4.5. Explain the Architecture of Blockchain
 - 5.4.6. Define Public, private and Hybrid Blockchains
 - 5.4.7. Define Transactions
 - 5.4.8. State the purpose of Chaining Blocks
 - 5.4.9. List the Applications of BlockChain Technology.

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 Emerging Trends in Computer Technology

Artificial Intelligence - Define AI - Types of AI- Current Trends in AI-Applications of AI- Machine Learning - Define Machine Learning - Compare Traditional Programming with Machine Learning - List the applications and key elements of Machine Learning - Introduction to Big data - Define and list sources of Big data - Evolution of data/big data - List and explain the characteristics of big data – the three V’s of big data - Describe Storing and selecting of Big Data - State the Need of Big Data - List types of tools used in Big Data - List applications of big data - Introduction to BlockChain Technology – Definition - Need for BlockChain Technology - List the Characteristics of BlockChain Technology - List the components of BlockChain Technology - Explain the Architecture of Blockchain - Define Public, private and Hybrid Blockchains - Define Transactions - State the purpose of Chaining Blocks - List the Applications of BlockChain Technology.

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. Big Data Basics part1 and 2 in www.mssqltips.com
5. Basics of AI & ML – Dr Dheeraj Mehrotra
6. Block Chain Technology and Applications – Dr Jogendra Kumar – kindle edition

Model Blue Print:

S. No.	Chapter Name	Period allocated	Weightage allotted	Mark wise Distribution of Weightage		Question wise Distribution of Weightage		COs Mapped
				R	U	R	U	
1.	Fundamentals of Digital Computers	30	16	6	10	2	1	CO1,CO3, CO4
2.	Programming Methodologies	20	13	3	10	1	1	CO2
3.	Operating system basics	25	26	6	20	2	2	CO1,CO3
4.	Computer Hardware and Networking Basics	35	29	9	20	3	2	CO1,CO4, CO5

5.	Emerging Computer Technologies	40	26	6	20	3	2	CO2,CO6
	Total	150	110	30	80	10	8	

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 4.1
Unit test-3	From 4.2 to 5.4

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER**
Basics of Computers, Artificial Intelligence and Machine Learning
UNIT TEST-1

SCHEME: C-23

SUBJ CODE: AIM-105

MAX MARKS:40

TIME: 90Minutes

PART-A

16Marks

Instructions:1) Answer all questions

2) First question carries 4marks, and each question of remaining carries 3marks

1. a) All computer physical components are treated as software(True/False) (CO1)
- b) -----is the fastest memory in the computer (CO2)
- c) Step by step procedure to solve problem is ----- (CO2)
- d) Which one of the following is not an internal command [] (CO3)
- i) FORMAT II)RD III)COPY IV)CLS

- 2) State the importance of binary number system for use in Digital Computers (CO1)
- 3) List different steps involved in problem solving (CO2)
- 4) What is the need for an operating system? (CO3)
- 5) Write about analog computers. (CO1)

PART-B

3X8=24Marks

Instructions:1) Answer all questions

2) Each question carries 8 Marks

3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

- 6.a) Draw and explain block diagram of computer in detail (CO1)

Or

- b) Explain various generation of computers (CO1)

7. a) Draw the flow chart to find biggest of three numbers (CO2)
 Or
 b) Write an algorithm to find the area of triangle when base and height are given.(CO2)
8. a) Explain any three external commands in detail (CO3)
 Or
 b) Explain components of a window. (CO3)

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER – YEAR END EXAMINATION
 Basics of Computers, Artificial Intelligence and Machine Learning

SCHEME: C-23
 MAX MARKS:80

SUBJ CODE:AIM-105
 TIME: 3HOURS

PART-A

10X3=30Marks

Note: Answer all questions

1. Define terms Hardware and Software. (CO1)
2. State the importance of binary system usage in Digital Computers (CO1)
3. Define algorithm (CO2)
4. State the different steps involved in problem solving (CO2)
5. List the features of Windows desktop (CO3)
6. State the meaning of a file and folder (CO3)
7. What is intranet? (CO5)
8. List various browsers (CO5)
9. Define Machine Learning (CO6)
10. List any three applications of Blockchain (CO6)

PART-B

5x10=50Marks

Note: Answer any five questions

- 11.Explain the generations of computers? (CO1)
- 12.Differentiate algorithm and flowchart with suitable examples? (CO2)
- 13.Explain about at least 10 Internal Commands and 5 External Commands. (CO3)
14. Briefly explain installing and uninstalling of software. (CO3)
- 15.Explain the role of search engines with suitable examples. (CO5)

- 16.Explain functions of BIOS. (CO4)
- 17.Explain the Architecture of BlockChain (CO6)
- 18.Explain in detail about Penetrate testing. (CO6)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-106	C and Data Structures	5	150	20	80

S.No.	Chapter/Unit Title	No. of Periods	CO's Mapped
1.	Introduction to C Language, I/O statements and operators in C	20	CO1,CO2
2.	Decision making Statements, Iterative Statements, Arrays and Strings	25	CO1,CO2,CO3
3.	Functions, Pointers, Structures and Unions	40	CO1,CO2,CO3
4.	Introduction to Data Structures	30	CO1,CO2,CO3
5.	Stacks, Queues and Trees	35	CO1,CO2,CO3,CO4,CO5
Total Periods		150	

Course Objectives	Up on completion of the course the student shall be able to		
	<ol style="list-style-type: none"> 1. Relate basics of programming language constructs using C Language 2. Classify and implement datatypes, derived data types, pointers. 3. To know the various types of Data Structures 4. To familiarize with the representation of Data Structures 5. Construct mathematical, logical and scientific problems and real-time applications using C-language 		

Course Outcomes	Up on completion of the course the student shall be able to		
	CO1	AIM106.1	Develop, compile and debug programs using C-fundamentals and various operators in C language.
	CO2	AIM106.2	Use decision-making statements, Arrays and Strings in C.
	CO3	AIM106.3	Analyze programs using pre defined functions, Pointers, Structures and Unions

	CO4	AIM106.4	Explain Sorting, Searching and Dynamic memory allocation with creation of nodes.
	CO5	AIM106.5	Analyze the operations of stacks, queues and Trees.

CO-PO/PSOMatrix:

CO NO.	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO1	PSO2	PSO 3
AIM106.1	3		2	2				3	2	
AIM106.2				2				3	3	
AIM106.3		2	3	3				3	1	2
AIM106.4	3		1	1	2			3	2	2
AIM106.5			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. Introduction to C-Language, I/O statements and Operators in C

- 1.1. Describe the structure of C-language program
- 1.2. Explain the steps involved in Editing, compiling, executing and debugging of C program
- 1.3. Describe character set, C-Tokens, Keywords, Identifiers, Constants, Variables
- 1.4. Classify Data Types and explain them with examples.
- 1.5. Explain declaration of constants and variables
- 1.6. Explain initializing values to variables in declaration
- 1.7. Explain getch(), getchar(), putchar(), putch()
- 1.8. Explain scanf(), printf(), character functions
- 1.9. Define operator, expression
- 1.10. Explain
 - 1.10.1. Various arithmetic operators
 - 1.10.2. Various relational operators
 - 1.10.3. Various logical operators
 - 1.10.4. Various assignment operators, increment and decrement operators
 - 1.10.5. Conditional operators with an example
 - 1.10.6. Bit-wise operators and explain each with an example
 - 1.10.7. Special operators with examples
 - 1.10.8. Precedence and Associativity of operators
 - 1.10.9. Illustrate type conversion techniques

2. Decision making Statements, Iterative Statements, Arrays and Strings

- 2.1. Explain decision making statements and its need in programming
- 2.2. Explain
 - 2.2.1. Simple if and if-else statement with syntax and sample program
 - 2.2.2. Nested if..else statements with syntax and sample program
 - 2.2.3. if-else-if ladder with syntax and sample program
 - 2.2.4. switch statement with syntax and sample program
- 2.3. Define Looping or Iteration
- 2.4. List and explain iterative statements with syntax and examples.
- 2.5. Compare different loop statements
- 2.6. Explain Nested loop statements.
- 2.7. Explain the usage of Null statement, goto, break and continue statements with loop statements
- 2.8. Differentiate break and continue statements.
- 2.9. Define Array
- 2.10. Describe
 - 2.10.1. Declaration and initialization of One Dimensional (1D) Array with syntax and sample programs.
 - 2.10.2. Accessing the elements in 1D-Array with sample programs.
 - 2.10.3. Explain declaration and initialization and usage of two Dimensional (2D) Arrays.
 - 2.10.4. Illustrate the concept of arrays with sample programs on matrix addition, subtraction and matrix multiplication
- 2.11. Define String
- 2.12. Describe
 - 2.12.1. Declare and initialize of String variables.
 - 2.12.2. gets() and puts()
- 2.13. Explain about various String handling functions with sample programs.

3. Functions, Pointers, Structures and Unions

- 3.1. Define function
 - 3.1.1. Need of user defined functions
 - 3.1.2. Advantages of the functions
 - 3.1.3. Return values and their types
- 3.2. Explain

- 3.2.1. Function declaration in programs
- 3.2.2. Functions with no arguments and no return values with sample programs
- 3.2.3. Functions with arguments with no return values with sample programs
- 3.2.4. Functions with arguments with return values with sample programs
- 3.2.5. Functions with no arguments with return values with sample programs
- 3.2.6. Recursion with sample programs
- 3.2.7. Passing arrays to functions with sample programs
- 3.2.8. Differentiate Local and External variables
- 3.3. Declaration and initialization of Pointers.
 - 3.3.1. Define pointer
 - 3.3.2. Accessing the address of a variable using & operator
 - 3.3.3. Accessing the value of a variable through pointer
 - 3.3.4. Pointer Arithmetic
 - 3.3.5. Pointers as function arguments
 - 3.3.6. Dynamic memory allocation
- 3.4. Structures
 - 3.4.1. Explain
 - 3.4.1.1. Define structure
 - 3.4.1.2. Declaration, Initialization and Accessing of structure members
 - 3.4.1.3. Structure assignment.
 - 3.4.1.4. Array of structures
 - 3.4.1.5. Self referential structures with examples.
- 3.5. Define Union
 - 3.5.1. Declaration, Initialization and Accessing of union members
 - 3.5.2. Distinguish between Structures and Unions.

4. Introduction to Data Structures

- 4.1. Define Data Structure and classify them
- 4.2. Define internal Sorting
 - 4.2.1. State the need of internal Sorting
 - 4.2.2. List the methods of internal Sorting
- 4.3. Explain the Bubble Sort, Quick Sort and Merge Sort
- 4.4. Define searching
 - 4.4.1. State the need of searching
 - 4.4.2. List two types of searching
- 4.5. Explain the Linear Search, Binary Search
- 4.6. Explain the following for Singly Linked List and Doubly Linked List
 - 4.6.1. Perform insertion, deletion and display operations

5. Stacks, Queues and Trees

- 5.1. Stacks
 - 5.1.1. Define Stack
 - 5.1.2. Explain the push, pop and display operations of a Stack
 - 5.1.3. Explain Array implementation of a Stack with various operations.
 - 5.1.4. List the applications of Stacks
- 5.2. Queues
 - 5.2.1. Define Queue
 - 5.2.2. Explain the insertion, deletion and display operations on Queues
 - 5.2.3. Explain array implementation of a Queue with various operations.
- 5.3. Trees
 - 5.3.1. Define a Tree
 - 5.3.2. Explain the terminology related to Tree
- 5.4. Define Binary Tree
- 5.5. Explain the linear representation and linked list representation of a Binary Tree
- 5.6. Define Binary Search Tree
 - 5.6.1. Perform insertion, deletion, search and various traversal operations on a Binary Search Tree.
- 5.7. List the Applications of trees

COURSE CONTENT

- 1. Introduction to C Language, I/O Statements and Operators in C:** Structure 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 – reading and writing a single character functions-formatted input and output statements-operators-classification of operators-operator precedence and associativity –expressions - type conversion techniques.
- 2. Understand Decision making statements, iterative statements, Arrays and Strings:** simple if, if-else, nested if-else – else if ladder- switch statement - Classification of various loop statements- while statement – do.. while statement- for loop statement-nesting of loops-Comparison of different loop statements– goto statement-break and continue statements–Arrays-One Dimensional Arrays –array programs-two Dimensional Arrays-programs on matrix –Strings - String handling functions
- 3. Functions, Pointers, Structures and Unions:** Function – user defined functions – Advantages - Recursion concept -parameter passing –Local and External variables- Pointer- Pointer Arithmetic - Pointers as Function Arguments –Dynamic memory Allocation - Structures- Array of structures - Self referential structures – Union - difference between Structures and Union
- 4. Data Structures:** Data structures – Internal Sorting – Bubble, Quick, Merge - Searching – Linear, Binary - Single Linked list - Insertion, Deletion and display operations - Double Linked List - Insertion, Deletion and display operations
- 5. Stacks, Queues and Trees:** Stack – definition - Insertion, Deletion and display operations Queues - definition - Insertion, Deletion and display operations – Trees – Definition- Terminology – Binary Tree – Linear and Linked representation – Binary Search Tree - insertion, deletion, search and various traversal operations - Applications

REFERENCE BOOKS

- 1 Programming in ANSI C E.Balaguruswamy Tata McGrawHill
- 2 Programming with C Gottfried TataMcGrawHill
- 3 C The complete Reference Schildt TataMcGrawHill
- 4 Data structures through C - Yashwanth Kanetkar
- 5 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 2.8
Unit test-2	From 2.9 to 3.5
Unit test-3	From 4.1 to 5.7

Model Blue Print

S.No	Chapter/ Unit title	No. of periods	Weightage Allocated	Marks Wise Distribution of Weightage			Question wise Distribution of Weightage			CO's Mapped
				R	U	Ap	R	U	Ap	
1	Introduction to C Language, I/O statements and operators in C	20	16	6	10		2	1		CO1,CO2
2	Decision making Statements, Iterative Statements, Arrays and Strings	25	26		16	10		3	1	CO1,CO2,C3
3	Functions, Pointers, Structures and Unions	40	26		16	10		3	1	CO1,CO2,CO3
4	Introduction to Data Structures	30	16	3	13		1	2		CO1,CO2,CO3
5	Stacks, Queues and Trees	35	26	3	13	10	1	2	1	CO1,CO2,CO3,CO4,CO 5
	Total*	150	110	12	68	30	4	11	3	CO1,CO2,CO3,CO4

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
C and Data Structures
UNIT TEST-1

SCHEME: C-23
MAX MARKS:40

SUBJ CODE:AIM-106
TIME: 90Minutes

.....

PART-A

16 Marks

Instructions: 1) Answer all questions
2) First question carries 4marks, and each question of remaining carries 3marks

1. a) char is a Data type in C language.(True/False) (CO1)
b) 'a' is an example for _____ constant. (CO1)
c) scanf() is used for _____. (CO2)
d) Which one of the following is a Relational operator [] (CO2)
I)+ II)- III)* IV)>=
- 2) Define the terms Keywords, Identifiers, Variables (CO1)
- 3) Describe type conversion techniques (CO2)
- 4) Differentiate break and continue statements (CO3)
- 5) Declaration and initialization of One Dimensional (1D) Array with syntax and sample example (CO3)

PART-B

3 X 8=24Marks

Instructions: 1) Answer all questions
2) Each question carries 8 Marks
3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

6. a) Explain the steps involved in Editing, compiling, executing and debugging of C program (CO1)

Or

b) Explain about Bit-wise operators with an example program (CO1)
7. a) Explain about Switch statement with syntax and sample program (CO2)

Or

b) List and explain iterative statements with syntax and examples (CO2)
8. a) Write a C program to perform Matrix multiplication. (CO2)

Or

b) Explain about various String handling functions with sample programs (CO2)

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER – YEAR END EXAMINATION
C and Data Structures

SCHEME: C-23
MAX MARKS:80

SUBJ CODE:AIM-106
TIME: 3HOURS

PART-A

10X3=30Marks

Note: Answer all questions

- | | | |
|--|-----|-----|
| 1. Define an identifier and write two valid identifiers | CO1 | |
| 2. Write a program to print the biggest of two numbers using conditional operators | CO1 | |
| 3. What is nesting of Loop? Give an example. | CO2 | |
| 4. What is an one dimensional array? How to declare it? | CO2 | |
| 5. State the importance of Pointer arithmetic | CO2 | |
| 6. Define a Structure? Give an example? | | CO3 |
| 7. List the methods of Internal sorting | CO4 | |
| 8. Define Data structure and classify them | CO4 | |
| 9. List the advantages of Stack | CO5 | |
| 10. List the applications of trees | CO5 | |

PART-B

5x10=50Marks

Note: Answer any five questions

- | | |
|---|-----|
| 11. Explain about Logical and Relational Operators. | CO1 |
| 12. Discuss in detail about Switch statement with an example program. | CO2 |
| 13. Write a C program to compute Matrix multiplication | CO2 |
| 14. Explain in detail about Recursive function with an example program. | CO3 |
| 15. Explain about Array of Structures with an example program. | CO3 |
| 16. Explain about Quick sort with an example program | CO4 |
| 17. Explain about Binary search with an example program | CO4 |
| 18. Explain array implementation of a Queue with various operations | CO5 |

ENGINEERING DRAWING

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

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

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 Outcomes	CO1	IM-107.1	Practice the use of engineering drawing instruments and Familiarise with the conventions to be followed in engineering drawing as per BIS
------------------------	------------	----------	---

	CO2	IM-107.2	Construct the i) basic geometrical constructions ii) engineering curves
	CO3	IM-107.3	Visualise and draw the projections of i) Points ii) Lines iii) Regular Planes iv) Regular Solids
	CO4	IM-107.4	Visualise and draw the sectional views of components
	CO5	IM-107.5	Visualise and draw the orthographic projections of components

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 for drawing– Mentioning of names under each classification and their brief description -Scales: Recommended scales reduced & enlarged -Lines: Types of lines, selection of line thickness - Selection of Pencils -Sheet Sizes: A0, A1, A2, A3, A4, A5, Layout of drawing sheets in respect of A0, A1, A3 sizes, Sizes of the Title block and its contents - Care and maintenance of Drawing Sheet,

Importance of lettering – Types of lettering -Guide Lines for Lettering Practicing of letters & numbers of given sizes (7mm, 10mm and 14mm)-Advantages of single stroke or simple style of lettering - 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.

PO-CO Mapping

AIM-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

3: High, 2: Moderate,1: Low

Blue Print

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

S.No	Unit Title	No. of Periods	Weightage Allocated	Marks wise distribution of weightage			Question wise distribution of weightage			CO'S Mapped
				R	U	AP	R	U	AP	
1	Use of Drawing Instruments, Free Hand Lettering and Dimensioning Practice	10	10	05	05	00	01	01	00	CO1
2	Principles of Geometric Constructions	15	15	00	00	15	00	00	02	CO2
3	Projections of points, lines, planes and solids	20	25	00	00	25	00	00	03	CO3
4	Sectional Views	20	10	00	00	10	00	00	01	CO4
5	Orthographic projection	25	20	00	00	20	00	00	02	CO5
Total		90	80	05	05	70	01	01	08	

UNIT TEST-I, C-23, I YEAR, AIM-107

ENGINEERING DRAWING

TIME:90 MINUTES

MAX MARKS: 40

PART-A

(4X5=20)

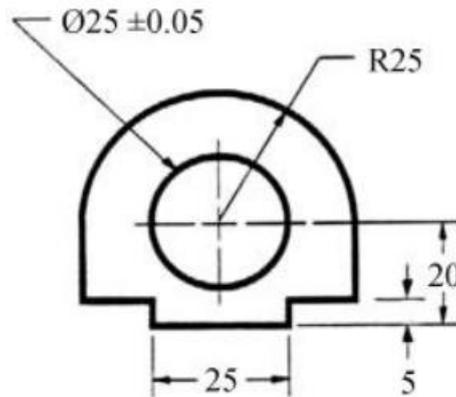
Instructions :

(1) Answer all questions. (2) Each question carries five marks. (3) All dimensions are in mm.

1. Write the following using single-stroke capital inclined letters of 14mm size **CO1**

“ALL THE BEST FOR YOUR EXAMINATION”

2. The component and its dimensions are shown in the fig. below. Redraw it to a full scale adopting the recommendations of SP : 46–1988. **CO1**



3. Divide a line of length 60 mm into seven equal parts. **CO2**
- 4.. Construct regular pentagon of side 25 mm by any one method. **CO2**

PART-B

(2X10=20)

5. . Draw an internal common tangent to two circles of radii 30 mm and 20 mm. **CO2**
6. . A circle of 50 mm diameter rolls along a line for one revolution clock wise. Draw the locus of a point on the circumference of circle which is in contact with the line. **CO2**
7. Draw an involute to a circle of radius 20 mm. **CO2**
8. Draw a helix of pitch 60 mm on a cylinder of diameter of 50 mm. **CO2**

UNIT TEST-II, C-23, 1st YEAR, AIM-107, ENGINEERING DRAWING

TIME:90 MINUTES

MAX MARKS: 40

PART-A (4X5=20M)

Answer all questions and each question carries four marks.

1. A point A is lying at 30 mm behind V.P and 60 mm below H.P. Draw its projections. **CO3**
2. A 60 mm long line pq has an end p at 20 mm above the H.P. and 30 mm in front of the VP. The line is inclined at 45° to the HP. And 30° to the VP. Draw its projections. **CO3**
3. A circular plane of diameter 60 mm is touching the VP with a point on its circumference. The plane is inclined at 45° to VP and perpendicular to HP. The centre of the plane is 40 mm above HP. Draw its projections. **CO3**
4. A square prism 40 mm base side and height 60 mm is standing vertically on its square base 10 mm above HP and one of its rectangular faces making an angle of 60° with V.P. Draw its projections. **CO3**

PART-B(2X10=20 M)

Answer any two questions and Each question carries ten marks

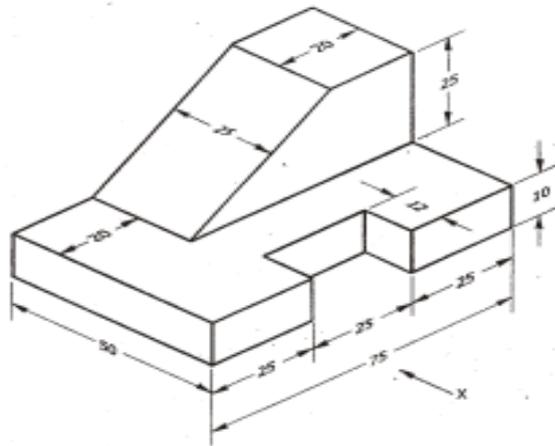
5. A pentagonal lamina of side 25 mm rest on the HP on one of its edges, such that the surface is inclined at 45° to the HP, and the edge on which it rests is inclined at 60° to the VP. Draw its projections **CO3**
6. A rectangular plane ABCD of size 40mm X 30mm is inclined to the HP at 30° . Its shorter side AB is parallel to HP and inclined at 45° to VP. Draw its projections. **CO3**
7. A hexagonal pyramid of base side 25 mm and height 60 mm is standing on HP with one of its base edges making an angle of 60° with VP and axis making an angle of 45° with HP. Draw its projection. **CO3**
8. Draw the projections of a cone , base 30mm diameter and axis 50mm long resting on HP on a point of its base circle with the axis making an angle 45° with HP and parallel to VP. **CO3**

**UNIT TEST-III, C-23, 1st YEAR, AIM-107,
ENGINEERING DRAWING
TIME:90 MINUTES MAX MARKS: 40**

PART-A (4X5=20M)

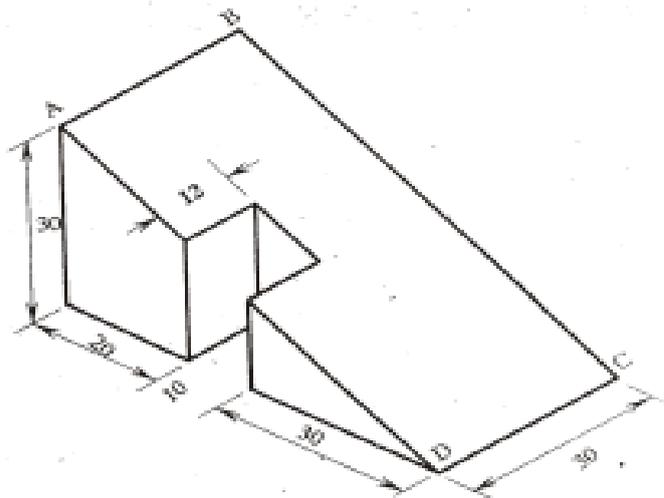
Answer all questions and each question carries four marks.

1. A triangular prism with a base side of 50 mm and height 70 mm is resting on one of its rectangular faces on HP with the axis perpendicular to VP. The prism is cut by a horizontal section plane passing through the axis. Draw front view and sectional top view of the prism. **CO4**
2. A square pyramid of base side 50mm and axis 75 mm long is resting on the ground with its axis vertical and sides of the base equally inclined to the VP. It is cut by a section plane perpendicular to VP inclined at 45° to HP and bisecting the axis. Draw its sectional top view. **CO4**
3. Draw the front view and top view of the following figure : **CO5**



4. Draw the front view and top view of the following figure

CO5

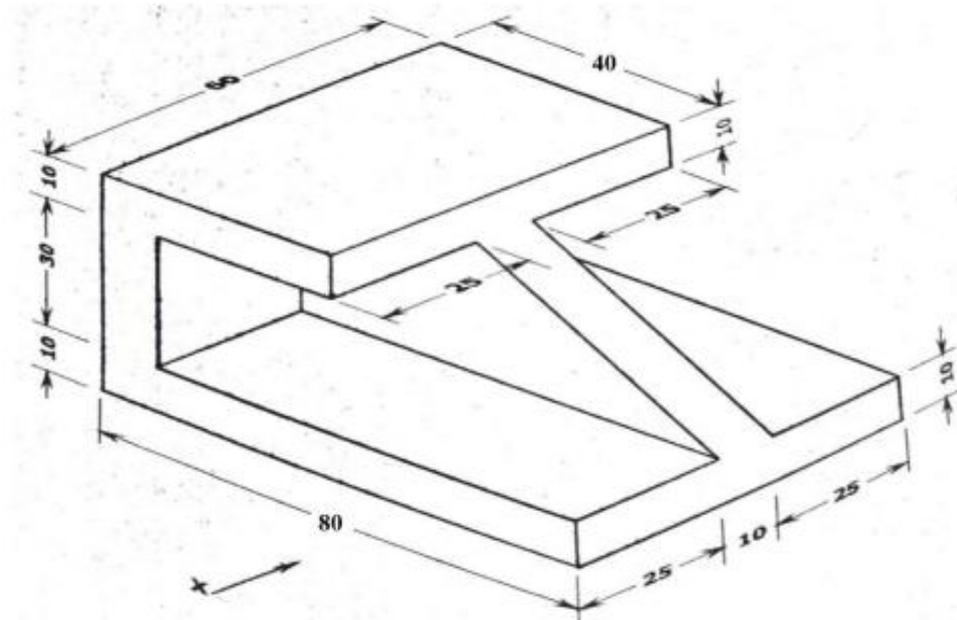


PART-B

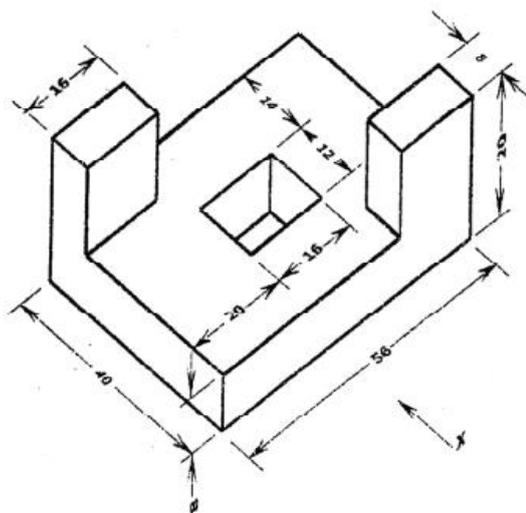
(2X10=20 M)

Answer any Two questions, Each question carries tenmarks.

1. A pentagonal pyramid of base side 40 mm and height 80mm is resting on HP on its base with one of its base side parallel to VP. It is cut by a plane inclined at 30° to HP, perpendicular to VP and is bisecting the axis. Draw its front view, sectional top view and the true shape of section. **CO4**
2. A cone of diameter 60 mm and height 70 mm is resting on ground on its base. It is cut by a section plane perpendicular to VP inclined at 45° to HP and cutting the axis at a point 40 mm from the bottom. Draw the front view , sectional top view and true shape. **CO4**
7. Draw the front view, side view and top view of the following figure: **CO5**



8. Draw orthographic views of front view and top view of the given isometric figure below. **CO5**



BOARD DIPLOMA EXAMINATIONS
MODEL QUESTION PAPER
DEEE – I-YEAR
AIM-107 :: ENGINEERING DRAWING

Time: 90 Minutes

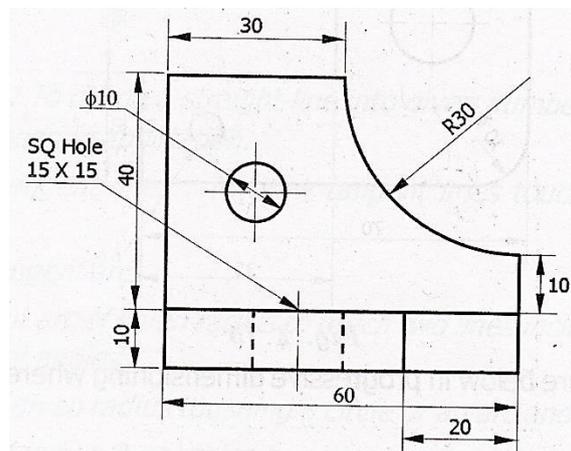
Total Marks: 40

- Instructions:**
- i. All the dimensions are in mm
 - ii. Use first angle projections only
 - iii. Due weightage will be given for the dimensioning and neatness

PART – A

05 x 04=20

- i. Answer all the questions
 - ii. Each question carries FIVE marks
1. Write the following in single stroke capital vertical lettering of size 10mm
 ORTHOGRAPHIC PROJECTIONS
 2. Redraw the given fig. and dimension it according to SP-46:1988. Assume suitable scale



3. Draw internal common tangents to two unequal circles of radii 26mm and 20mm. The distance between the circles is 75mm.
4. Draw the projections of a point A lying on HP and 25mm in front of V.P.

i. Answer any FOUR questions

ii. Each question carries TEN marks

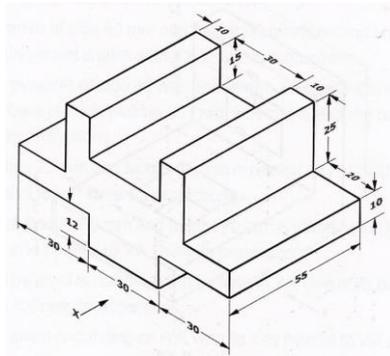
5. Draw the involute of a circle of diameter 30 mm and also draw a tangent to the curve at a distance of 60 mm from the centre of the circle.

6. A right circular cone of height 80 mm and base radius 60 mm is resting in the H.P. on one of its generators and its axis is parallel to V.P. Draw the projections of the solid.

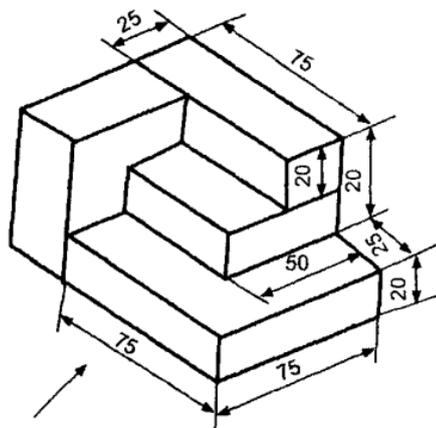
7. A cylinder with base 40mm diameter and 50mm long rests on a point of its base on HP such that the axis makes an angle of 30° with HP. Draw the projections of the cylinder.

8. A regular hexagonal prism of height 80 mm and base side 40 mm is resting in the H.P. on its base. It is cut by an auxiliary inclined plane of 60° inclination passing through the axis at a distance of 30 mm from the top base. Draw the sectional views of the solid and the true section.

9. Draw the front view, top view and left side view of the object shown in the fig.



10. Draw the front view, top view and left side view of the object shown in the fig.



Course Code	Course title	No of periods /week	Total no of periods	Marks for FA	Marks for SA
AIM-108	C & Data Structures Lab	06	180	40	60

SNo	Chapter/Unit title	No. of Periods	Cos Mapped
1.	Fundamentals and Input / Output statements, Control statements	15	CO1,CO2,CO4
2.	Arrays, Strings, Functions, Pointers	45	CO1,CO2,CO5,CO6
3.	Structures, unions, Sorting and Searching	50	CO1,CO2,,CO3,CO4,CO6
4.	Linear and Non Linear Data Structures	70	CO1,CO2,CO3,CO4,CO5, CO6
	Total	180	

COURSE OBJECTIVES	<p>Upon completion of the course the student shall be able to</p> <ol style="list-style-type: none"> 1. Edit, compile and debug execution of C-Programs 2. Learn the syntax of all the statements, keywords, user defined identifiers and usage of writing statements in C-Program. 3. Evaluate all the expressions using different primary types of data, derived data, operators and with their precedence, 4. Write C-programs using I/O statements, decision making statements. 5. Write structured and modular C-programs 6. Write C-programs to implement dynamic memory allocation using pointer concepts 7. To know the various types of Data Structures 8. To familiarize with the representation of Data Structures
--------------------------	--

Course Outcomes	Upon completion of the course the student shall be able to
CO1	AIM108.1 Perform Edit, compile and debug and execution of C-Programs

CO2	AIM108.2	Develop programs using different predefined functions, keywords, user defined identifiers
CO3	AIM108.3	Write different expressions using available C-operators and valid data supported by C-language
CO4	AIM108.4	Develop C-programs using control statements, arrays, structures, unions
CO5	AIM108.5	Develop C-programs using user defined functions and recursion
CO6	AIM108.6	Develop C-programs to implement dynamic memory and Data Structures concept

CO-PO/PSOMATRIX

CONO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3
AIM108.1	2	2			1			2		
AIM108.2	2	3		2					2	2
AIM108.3					2			2		3
AIM108.4	2		3	2	3	3	2		2	2
AIM108.5	2			2	3	2			2	2
AIM108.6				2	3				2	2
Average	2	2.5	3	2	2.4	2.5	2	2	2	2.2

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

LEARNINGOUTCOMES:

Fundamentals and Input/Output statements

- 1. Exercise on structure of C Program**
- Exercise on Keywords and identifiers
- 3. Exercise on constants and variables**
- Execution of simple C program
- 5. Exercise on operators**
- 6. Exercise on input and output of characters**
- Exercise on formatted input and output
- Exercise on escape sequence characters

Control statements

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

- Exercise on simple if statement
- 10. Exercise on if..else statement**
- Exercise on if..else..if ladder statement
- 12. Exercise on switch statement**
- Exercise on conditional operator comparing with if-elsestatement
- 14. Exercise on while statement**
- Exercise on for statement
- Exercise on do.While statement

Arrays, Functions and Pointers

- 17. Exercise on one dimensional arrays**
- Exercise on two dimensional arrays
- 19. Exercise on strings**
- 20. Exercise on user-defined function**
- 21. Exercise on parameter passing techniques**

22. Exercise on recursion

23. Exercise on pointers

Structures, unions, Sorting and Searching

24. Exercise on structure

25. Exercise on union

26. Exercise on array of structures

27. Bubble Sort

28. Quick Sort

29. Merge Sort

30. Linear Search

31. Binary Search

Linear and Non Linear Data Structures

32. Single Linked list operations

33. Double Linked list operations

34. Stack using Arrays.

35. Queues using Arrays.

36. Binary Tree Traversals using Recursion

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	Write a C program that uses different arithmetic operators	❖ Identify different arithmetic operators ❖ Identify the priorities of operators ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program ❖ Check the output for its correctness

6	Exercise on input and output of characters	Write a C program for reading and writing characters	<ul style="list-style-type: none"> ❖ Know the use of getchar() function ❖ Know the use of putchar() function ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program ❖ Check whether the correct output is printed for the given input
7	Exercise on formatted input and output	Write a C program using formatted input and formatted output	<ul style="list-style-type: none"> ❖ Know the use of format string for different types of data in scanf() function ❖ Know the use of format string for different types of data in printf() function ❖ Check whether the data is read in correct format ❖ Check whether the data is printed in correct format
8	Exercise on Escape Sequence Characters	Write a C program using Escape Sequence Characters	<ul style="list-style-type: none"> ❖ 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
9	Exercise on simple if statement	Write a C program using simple if statement	<ul style="list-style-type: none"> ❖ Build a relational expression ❖ Use the if statement for decision making ❖ Rectify the syntax errors ❖ Check the output for correctness
10	Exercise on if..else statement	Write a C program using if..else statement	<ul style="list-style-type: none"> ❖ Build a relational expression ❖ Use the if..else statement for decision making ❖ Rectify the syntax errors ❖ Check the output for correctness
11	Exercise on else..if ladder statement	Write a C program using else..if ladder statement	<ul style="list-style-type: none"> ❖ Use else..if ladder statements with correct syntax ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check the output for correctness
12	Exercise on switch statement	Write a C program using switch statement	<ul style="list-style-type: none"> ❖ 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

13	Exercise on conditional operator	Write a C program using (? :) conditional operator	<ul style="list-style-type: none"> ❖ 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
14	Exercise on while statement	Write a C program using while statement	<ul style="list-style-type: none"> ❖ 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
15	Exercise on for statement	Write a C program using for statement	<ul style="list-style-type: none"> ❖ 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
16	Exercise on do..while statement	Write a C program using do statement	<ul style="list-style-type: none"> ❖ 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
17	Exercise on one dimensional arrays	Write a C program to create and access one dimensional array	<ul style="list-style-type: none"> ❖ 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

18	Exercise on two dimensional arrays	Write a C program to create and access two dimensional array	<ul style="list-style-type: none"> ❖ 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
19	Exercise on strings	Write a C program for reading and writing strings	<ul style="list-style-type: none"> ❖ Declare and initialize string variables ❖ Read strings from keyboard ❖ Print strings to screen
20	Exercise on user-defined function	Write a C program to define and call user-defined functions	<ul style="list-style-type: none"> ❖ Identify the different parts of function declaration ❖ Define function with correct syntax ❖ 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
21	Exercise on parameter passing techniques	Write a C program using parameter passing techniques	<ul style="list-style-type: none"> ❖ 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
22	Exercise on recursion	Write a C program using recursion	<ul style="list-style-type: none"> ❖ 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
23	Exercise on pointers	Write a C program using pointer data type	<ul style="list-style-type: none"> ❖ 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
24	Exercise on structure	Write a C program using structure	<ul style="list-style-type: none"> ❖ 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

25	Exercise on union	Write a C program using union	<ul style="list-style-type: none"> ❖ 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
26	Exercise on array of structures	Write a C program to create an array of structures and store and retrieve data from that array	<ul style="list-style-type: none"> ❖ 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
27	Bubble Sort	Write a C program to implement bubble sort technique	<ul style="list-style-type: none"> ❖ Read an array with unsorted order of elements without duplicates ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
28	Quick Sort	Write a C program to implement Quick sort technique	<ul style="list-style-type: none"> ❖ Read an array with unsorted order of elements without duplicates ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
29	Merge Sort	Write a C program to implement Merge sort technique	<ul style="list-style-type: none"> ❖ Read 2 arrays with unsorted order of elements without duplicates ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
30	Linear Search	Write a C program to implement Linear Search	<ul style="list-style-type: none"> ❖ Read elements into an array in a random way without duplication to search a particular element ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input

31	Binary Search	Write a C program to implement Binary Search	<ul style="list-style-type: none"> ❖ Read elements into an array in a sorted sequence without duplication to search a particular element ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
32	Single Lined List Operations	Write a C program to implement Single Linked List Operations.	<ul style="list-style-type: none"> ❖ Create sequence of nodes to form a single linked list ❖ Perform different insertions and deletions from the linked list ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
33	Double Linked list operations	Write a C program to implement Double Linked List Operations.	<ul style="list-style-type: none"> ❖ Create sequence of nodes to form a double linked list ❖ Perform different insertions and deletions from the linked list ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
34	Stack using Arrays	Write a C program to implement stack using Arrays.	<ul style="list-style-type: none"> ❖ Perform push, pop and display operations ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
35	Queues using Arrays	Write a C program to implement queue using Arrays	<ul style="list-style-type: none"> ❖ Perform insert, delete and display operations ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
36	Binary Tree Traversals using Recursion	Write a C program to implement Binary tree traversals using Recursion	<ul style="list-style-type: none"> ❖ Create a Binary tree ❖ Perform in-order, pre-order and post-order traversals ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input

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

Course objectives	<p>(1) To provide strong practical knowledge of Physics to serve as a tool for various device applications in Engineering.</p> <p>(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.</p>
-------------------	---

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 Kirchoff'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 to micro currents as potential engineering application.

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
C0.1	3	2	2	2	2	1	2
C0.2	3		1	1	1	1	1
C0.3	3	2			1		
C0.4	3	2	2			1	2

Competencies and Key competencies to be achieved by the student

Name of the Experiment (No of Periods)	Competencies	Key competencies
1. Hands on practice on Vernier Calipers(03)	<ul style="list-style-type: none"> • Find the Least count • Fix the specimen in posit • Read the scales • Calculate the physical quantities of given object 	<ul style="list-style-type: none"> • Read the scales • Calculate the requisite physical quantities of given objects
2. Hands on practice on Screw gauge(03)	<ul style="list-style-type: none"> • Find the Least count • Fix the specimen in posit • Read the scales • Calculate thickness of glass place and cross section of wire and other quantities 	<ul style="list-style-type: none"> • Read the scales • Calculate thickness of given glass plate • Calculate cross section of wire and other quantities

3. Verification of Parallelogram law of forces and Triangle law of forces(03)	<ul style="list-style-type: none"> • Fix suitable weights • Note the positions of threads on drawing sheet • Find the angle at equilibrium point • Construct parallelogram • Compare the measured diagonal • Construct triangle • Find the length of sides • Compare the ratios 	<ul style="list-style-type: none"> • Find the angle at equilibrium point • Constructing parallelogram • Construct triangle • Compare the ratios of force and length
4. Simple pendulum(03)	<ul style="list-style-type: none"> • Fix the simple pendulum to the stand • Adjust the length of pendulum • Find the time for number of oscillations • Find the time period • Calculate the acceleration due to gravity • Draw I-T and I-T² graph 	<ul style="list-style-type: none"> • Find the time for number of oscillations • Find the time period • Calculate the acceleration due to gravity • Draw I-T and I-T² graph
5. Focal length and Focal power of convex lens (Separate & Combination) (03)	<ul style="list-style-type: none"> • Fix the object distance • Find the Image distance • Calculate the focal length and power of convex lens and combination of convex lenses • Draw u-v and 1/u – 1/v graphs 	<ul style="list-style-type: none"> • Calculate the focal length and power of convex lens • Draw u-v and 1/u – 1/v graphs
6 Refractive index of solid using traveling microscope(03)	<ul style="list-style-type: none"> • Find the least count of vernier on microscope • Place the graph paper below microscope • Read the scale • Calculate the refractive index of glass slab 	<ul style="list-style-type: none"> • Read the scale • Calculate the refractive index of glass slab

7 . Boyle's law verification (03)	<ul style="list-style-type: none"> 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 value $P \times l$ 	<ul style="list-style-type: none"> Find the length of air column Find the pressure of enclosed air Find the value $P \times l$
8. Mapping of magnet lines of force(03)	<ul style="list-style-type: none"> Draw magnetic meridian Placed the bar magnet in NN and NS directions Draw magnetic lines of force Locate the neutral points along equatorial and axial lines 	<ul style="list-style-type: none"> Draw magnetic lines of force Locate the neutral points along equatorial and axial lines
9. Velocity of sound in air –Resonance method (03)	<ul style="list-style-type: none"> Arrange the resonance apparatus Adjust the reservoir level for booming sound Find the first and second resonating lengths Calculate velocity of sound 	<ul style="list-style-type: none"> Adjust the reservoir level Find the first and second resonating lengths Calculate velocity of sound at room temperature Calculate velocity of sound at 0°C
10 Meter bridge(03)	<ul style="list-style-type: none"> Make the circuit connections Find the balancing length Calculate unknown resistance Find the radius of wire Calculate the specific resistance 	<ul style="list-style-type: none"> Find the balancing length Calculate unknown resistance Calculate the specific resistance

Scheme of Valuation for END Practical Examination :

A. Writing Aim, Apparatus, Formula, Graph, Precautions carries Marks		10 (Ten)
B. For Drawing the table, taking Readings, Calculation work, Drawing the graph, finding result carries (Fifteen) Marks		15
C. Viva Voice	05 (Five) Marks	
Total		30
(Thirty) Marks		

CHEMISTRY LABORATORY
(C-23 curriculum common to all Branches)

Subject Title : Chemistry Laboratory
 Subject Code : Common -110
 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

Course code Common- 110	Chemistry Laboratory No of Cos:5			No Of periods 45
	Linked with CO No	Periods addressing PO in Col 1 NO	%	
			1,2,3	level 3 (highly addressed) 25% to 40% level2(moderately addressed 5% to 25% level1 (Low addressed < 5%(not addressed)
	CO2,CO3, CO4,CO5			
	CO2,CO3, CO4,CO5			
	CO2,CO3, CO4,CO5			
	CO3, CO4,CO5			

COs-POs mapping strength (as per given table)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	3		1				1		
CO2	2	3		2	2			1		
CO3	2	3		2	2			1		
CO4	2	3		2	2			1		
CO5	2	3		2	2			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

TIMESCHEDULE

S.No	Name of the Experiment	No.ofPeriods	Mapped with COs
1.	Recognition of chemical substances and solutions used in the laboratory by senses. Familiarization of methods for Volumetric analysis	03	CO1
2.	Standardization of Na_2CO_3 and making solutions of different dilution solution.	03	CO1
3.	Estimation of HCl solution using Std. Na_2CO_3 solution	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.	Determination of Mohr's Salt using Std. KMnO_4	03	CO3

8.	Estimation of Ferrous ion by using Std. $K_2Cr_2O_7$	03	CO3
9.	Determination of total hardness of water using Std. EDTA solution	03	CO4
10.	Determination of Chlorides present in water sample	03	CO4
11.	Determination of Dissolved Oxygen (D.O) in water sample	03	CO5
12.	Determination of pH using pH meter	03	CO5
13.	Determination of conductivity of water and adjusting ionic strength	03	CO5
14.	Determination of turbidity of water	03	CO5
15.	Estimation of total solids present in water sample	03	CO5
	Total:	45	

Objectives:

Upon completion of the course the student shall be able to

- 1.0 Practice volumetric measurements (using pipettes, measuring jars, volumetric flask, burettes) and gravimetric measurements (using different types of balances), making dilutions, etc. To identify the chemical compounds and solutions by senses.
- 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_3 solution for estimation of HCl
- 4.0 Conduct titrations adopting standard procedures and using Std. HCl solution 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. $KMnO_4$ solution for estimation of Mohr's Salt
- 8.0 Conduct titrations adopting standard procedures and using Std. $K_2Cr_2O_7$ solution for 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
- 10.0 Conduct titrations adopting standard procedures to determine the chlorides present in the given samples of water and wastewater (One ground water and one surface / tap water)
- 11.0 Conduct the test using titrimetric / electrometric method to determine Dissolved Oxygen (D.O) in given water samples (One sample from closed container and one from open container / tap water)
- 12.0 Conduct the test on given samples of water / solutions (like soft drinks, sewage, etc.) to determine their pH using standard pH meter
- 13.0 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
- 14.0 Conduct the test on given samples of solutions (coloured and non-coloured) to determine their turbidity in NTU
- 15.0 To 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
Standardization of methods for Volumetric analysis. Recognition of chemical substances And solutions	-	--
Preparation of Std Na_2CO_3 and making solutions of different dilution (03)	<ul style="list-style-type: none"> ▪ 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 	<ul style="list-style-type: none"> ▪ 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
Estimation of HCl solution using Std. Na_2CO_3 solution (03)	<ul style="list-style-type: none"> ▪ Cleaning the glassware and rinsing with appropriate solutions ▪ Making standard solutions 	<ul style="list-style-type: none"> ▪ 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)	<ul style="list-style-type: none"> ▪ Measuring accurately the standard solutions and titrants 	
Determination of acidity of water sample (03)	<ul style="list-style-type: none"> ▪ Filling the burette with titrant ▪ Fixing the burette to the stand 	
Determination of alkalinity of water sample (03)	<ul style="list-style-type: none"> ▪ Effectively Controlling the flow of the titrant 	
Determination of Mohr's Salt using Std. KMnO_4 (03)	<ul style="list-style-type: none"> ▪ Identifying the end point 	
Determination of Ferrous ion by using Std. $\text{K}_2\text{Cr}_2\text{O}_7$ (03)	<ul style="list-style-type: none"> ▪ Making accurate observations ▪ Calculating the results 	
Determination of total hardness of water using Std. EDTA solution (03)		
Estimation of Chlorides present in water sample (03)		
Estimation of Dissolved Oxygen (D.O) in water sample (By titration method) (03)	<ul style="list-style-type: none"> ▪ Familiarize with instrument 	
		<ul style="list-style-type: none"> ▪ Prepare standard solutions

Determination of pH using pH meter (03)	<ul style="list-style-type: none"> ▪ Choose appropriate 'Mode' / 'Unit' ▪ Prepare standard solutions / buffers, etc. 	<ul style="list-style-type: none"> / buffers, etc. ▪ Standardize the instrument with appropriate standard solutions
Determination of conductivity of water and adjusting ionic strength to required level (03)	<ul style="list-style-type: none"> ▪ Standardize the instrument with appropriate standard solutions ▪ Plot the standard curve ▪ Make measurements accurately 	<ul style="list-style-type: none"> ▪ Plot the standard curve ▪ Make measurements accurately
Determination of turbidity of water (03)	<ul style="list-style-type: none"> ▪ Follow Safety precautions 	
Estimation of total solids present in water sample (03)	<ul style="list-style-type: none"> ▪ Measuring the accurate volume and weight of sample ▪ Filtering and air drying without losing any filtrate ▪ Accurately weighing the filter paper, crucible and filtrate ▪ Drying the crucible in an oven 	<ul style="list-style-type: none"> ▪ 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

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-111 (common to all branches)	Computer Fundamentals Lab	3	90	40	60

Time schedule:

S.No.	Chapter/Unit Title	No. of sessions each of 3 periods duration	No.of Periods
1.	Computer hardware Basics	2	6
2.	Windows Operating System	2	6
3.	MS Word	8	24
4.	MS Excel	7	21
5.	MS PowerPoint	5	15
6.	Adobe Photoshop	6	18
Total periods		30	90

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Computer hardware Basics	6	CO1
2.	Windows Operating System	6	CO1
3.	MS Word	24	CO2
4.	MS Excel	21	CO3
5.	MS PowerPoint	15	CO4
6.	Adobe Photoshop	18	CO5
Total periods		90	90

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	AIM-111.1	Identify hardware and software components
	CO2	AIM-111.2	Prepare documents with given specifications using word processing software
	CO3	AIM-111.3	Use Spread sheet software to make calculation and to draw various graphs / charts.
	CO4	AIM-111.4	Use Power point software to develop effective presentation for a given theme or topic.
	CO5	AIM-111.5	Edit digital or scanned images using Photoshop

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-111.1	3	3	3	3	3	3	3	3	2	3
AIM-111.2	3	3	3	3	3	3	3	3	2	3
AIM-111.3	3	3	3	3	3	3	3	3	2	3
AIM-111.4	3	3	3	3	3	3	3	3	2	3
AIM-111.5	3	3	3	3	3	3	3	3	2	3
Average	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 presentation

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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> a. Log in using the password b. Start and shut down the computer c. Use Mouse and Key Board 	<ul style="list-style-type: none"> a. Login and logout as per the standard procedure b. Operate mouse & Key Board
(c).	To Explore Windows	a. Familiarize with Start Menu,	a. Access application

	Desktop	<ul style="list-style-type: none"> Taskbar, Icons and Shortcuts b. Access application programs using Start menu, Task manager c. Use Help support 	<ul style="list-style-type: none"> programs using Start menu b. Use taskbar and Task manager
2.	To check the software details of the computer	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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....	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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. –	<ul style="list-style-type: none"> a. Create/Open a document b. Use Save and Save as features 	a. Create a Document and name

	Home – Insert- page layout- References-Review-View	<ul style="list-style-type: none"> c. Work on two Word documents simultaneously d. Choose correct Paper size and Printing options 	<ul style="list-style-type: none"> a. appropriately and save b. Set paper size and print options
7.	To practice Word Processing Basics	<ul style="list-style-type: none"> a. Typing text b. Keyboard usage c. Use mouse (Left click / Right click / Scroll) d. Use Keyboard shortcuts e. Use Find and Replace features in MS- word f. Use Undo and Redo Features g. Use spell check to correct Spellings and Grammar 	<ul style="list-style-type: none"> a. Use key board and mouse to enter/edit text in the document. b. Use shortcuts c. Use spell check/ Grammar features for auto corrections.
8.	To practice Formatting techniques	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> a. Insert table in the word document and edit b. Use sort option for arranging data.
10.	To Insert objects, clipart and Hyperlinks	<ul style="list-style-type: none"> a. Create a 2-page document. &Insert hyperlinks and t Bookmarks. b. Create an organization chart c. Practice examples like 	<ul style="list-style-type: none"> a. Insert hyperlinks &Bookmarks b. Create organization charts/flow charts

		preparing an Examination schedule notice with a hyperlink to Exam schedule table.	
11.	To Use Mail merge feature of MS Word	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> a. Familiarize with excel layout and use b. Use various features available in toolbar
14.	To access and Enter data in the cells	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> a. Enter formula b. Use Cell References in Formulae c. Use Automatic updating 	Enter formula for automatic calculations

		<p>function of Excel Formulae</p> <p>d. Use Mathematical Operators in Formulae</p> <p>e. Use Excel Error Message and Help</p>	
18.	To Create Excel Functions, Filling Cells	<p>a. Use Reference Operators</p> <p>b. Work with sum, Sum if , Count and Count If Functions</p> <p>c. Fill Cells Automatically</p>	<p>a. Create Excel sheets involving cross references and equations</p> <p>b. Use the advanced functions for conditional calculations</p>
19.	To sort and filter data in table	<p>a. Sort data in multiple columns</p> <p>b. Sort data in a row</p> <p>c. Sort data using Custom order</p> <p>d. Filter data in work sheet</p>	<p>a. Refine the data in a worksheet and keep it organized</p> <p>b. Narrow a worksheet by selecting specific choice</p>
20.	To Practice Excel Graphs and Charts	<p>a. Produce an Excel Pie Chart</p> <p>b. Produce</p> <p>c. Excel Column Chart</p>	<p>a. Use data in Excel sheet to Create technical charts and graphs Produce Excel Line Graph</p> <p>b. Produce a Pictograph in Excel</p>
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	<p>a. Shade alternate rows of data</p> <p>b. Add currency and percentage symbols</p> <p>c. Change height of a row and width of a column</p> <p>d. Change data alignment</p> <p>e. Insert Headers and Footers</p> <p>f. Set Print Options and Print</p>	<p>a. Format Excel sheet</p> <p>b. Insert headers & footers and print</p>
23.	To familiarize with Ribbon layout & features of PowerPoint 2007.	<p>Use various options in PowerPoint</p> <p>a. Home</p> <p>b. Insert</p> <p>c. Design</p> <p>d. Animation</p> <p>e. Slideshow</p> <p>f. View</p> <p>g. Review</p>	Access required options in the tool bar

24.	To create a simple PowerPoint Presentation	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 Design Template f. The Slide Show Footer in PowerPoint g. Add Notes to a PowerPoint Presentation 	<ul style="list-style-type: none"> a. Setup Master slide and format b. Add notes
26.	To Insert Text and Objects	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Insert Text and Objects Use 3d features
27.	To insert a Flow Chart / Organizational Charts	<ul style="list-style-type: none"> a. Create a Flow Chart in PowerPoint b. Group and Ungroup Shapes c. Use smart art 	<ul style="list-style-type: none"> Create organizational charts and flow charts using smart art
28.	To insert a Table	<ul style="list-style-type: none"> a. PowerPoint Tables b. Format the Table Data c. Change Table Background d. Format Series Legend 	<ul style="list-style-type: none"> Insert tables and format
29.	To insert a Charts/Graphs	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Create charts and Bar graphs, Pie Charts and format.

		<ul style="list-style-type: none"> g. Create 2D Bar Charts in PowerPoint h. Format the 2D Chart e. Format a Chart Background 	
30.	To Insert audio & video, Hyperlinks in a slide Add narration to the slide	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> a. Apply transitions to slides b. To explore and practice special animation effects like Entrance, Emphasis, Motion Paths & Exit 	Add animation effects
32.	Reviewing presentation	<ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> (a) Slides (b) Hand-out 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> a. Open Adobe Photoshop b. Use various tools such as <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	to edit image by using corresponding tools.
35	To insert Borders around photograph	<ul style="list-style-type: none"> 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 	create a border or frame around an image to add visual interest to a photo
36	To change Background of a Photograph	<ul style="list-style-type: none"> a. open the foreground and background image 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. 	swap background elements using the Select and Mask tool and layers.
37	To change colors of Photograph	<ul style="list-style-type: none"> a. Change colors using: <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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

I Year Internal Lab Examination

UNIT TEST - I MODEL QUESTION PAPER COMPUTER FUNDAMENTALS LAB

SCHEME: C-23

SUBJ CODE: AIM- 111

MAX MARKS:40

Time:90Min

1. Identify the internal hardware components of a PC and assemble them.
2. Identify the external components or peripherals of a PC and connect them.
3. Identify the components on motherboard.
4. Perform the process of placing processor on CPU slot.

5. Perform the process of removing and placing the RAM in the corresponding slot.
6. Identify the CMOS battery and test whether it is working it or not.
7. Find details of following:
 - a) Operating System being used.
 - b) Processor name
 - c) RAM
 - d) Hard disk
8. Create a folder by your name, search a file or folder and find its path.
9. Draw the National Flag using MS Paint.
10. Create a word document that contains TEN names of your classmates (boys-5 & girls-5) and perform the following tasks:
 - a) Save the document to your desktop.
 - b) Sort the names in each list alphabetically.
 - c) Set line spacing to 1.15.
 - d) Use bullet points for the names in both lists separately.

I Year Internal Lab Examination

UNIT TEST - II MODEL QUESTION PAPER COMPUTER FUNDAMENTALS LAB

SCHEME: C-23
MAX MARKS:40

SUBJ CODE:AIM- 111
Time:90Min

1. Write individually addressed letters to your friends about the Republic Day celebration using Mail Merge.
2. Create a Word document about your college and insert page numbers in footer and College Name in header.
3. Create your class time table using Tables in MS Word.
4. Create a 2-page document about your College & insert hyperlinks for courses offered in the college and insert Bookmarks next to College Name.
5. Write individually addressed letters to your friends (at least 5 members) to intimate the External Examination time table using Mail Merge.
6. Write an equation $\frac{(x+y)^2}{(x-y)^2} = \frac{x^2+2xy+y^2}{x^2-2xy+y^2}$ in MS word.
7. Create the organizational structure of your college in MS Word.
8. Create a spreadsheet by totaling marks of 3 or more subjects, then calculate percentage and hence find grade based on boundary conditions of FIVE students:
Grades O \geq 90%, A \geq 80%, B \geq 70%, C \geq 60%, D \geq 50%, E \geq 40%, F $<$ 40%
9. Create an Excel spreadsheet for the following data, making sure that the cell marked with Category (A1) is pasted in cell A1 in the spreadsheet and perform the questions below.

Category (A1)	Product Name	Quantity	Inventory	Price per Unit	Total Price
Office Supplies	Binder	2	20	12.99	25.98
Office Supplies	Pencil	20	20	0.99	
Electronics	Samsung 4K Smart TV	1	5	399.00	
Electronics	Bluetooth Speakers	4	5	44.49	
Computers	Lenovo X230 12in Laptop	2	2	279.90	

- a). Change the format of the "Total Price" column to "Currency" format.
 - b) Calculate Total Price by writing formula.
 - c) Turn on filtering for the table.
 - d) Sort the table by column "Category" from A to Z.
10. Create a spreadsheet to calculate Cumulative monthly attendance for a period of Three months.

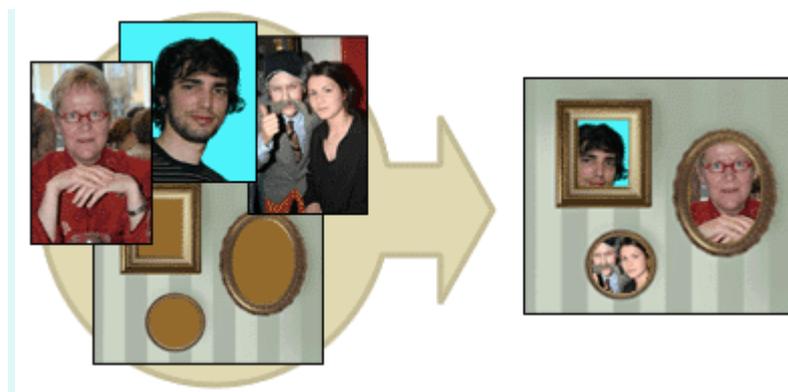
I Year Internal Lab Examination

UNIT TEST - III
MODEL QUESTION PAPER
COMPUTER FUNDAMENTALS LAB

SCHEME: C-23
MAX MARKS:40

SUBJ CODE: COMMON-111
Time:90Min

-
1. Create a PowerPoint Presentation about your College in 5 slides only.
 2. Create a PowerPoint Presentation on Computer Hardware in minimum 5 slides.
 3. Create a PowerPoint Presentation on Computer Fundamentals with *Entrance*, *Emphasise* effects in minimum 5 slides.
 4. Create a PowerPoint Presentation on any topic with special animation effects like *Entrance*, *Motion Paths* & *Exit*.
 5. Resize the image using photoshop.
 6. Change the background of a Photograph.
 7. Edit an image by using
 - a) Crop tool.
 - b) Resize the image
 - c) Save the new image with new name keeping original image as it is.
 8. A Picture of two parrots (parrots.jpg) is given to you. Make anyone of one of the parrots in Black & White.
 9. Convert a color image to monochrome and improve quality of photograph.
 10. Copy three pictures and fit into the empty frames.



BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PRACTICAL QUESTION PAPER-YEAR END EXAM
COMPUTER FUNDAMENTALS LAB

SCHEME: C-23
MAX MARKS:60

SUBJ CODE:AIM- 111
TIME: 3HOURS

1. Identify the internal hardware components of a PC and assemble them.
2. Identify the external components or peripherals of a PC and connect them.
3. Write the procedure to create the files and folders
4. Write the procedure to access Calculator, Paint and Notepad application
5. Write the procedure to perform the following in MS Word
 - (a) Change the Font Size
 - (b) Change the Font Style
 - (c) Change the Text Size
6. Write the procedure to perform the following in MS Word
 - (a) Change the Font Color.
 - (b) Use Various Text Alignment Options.
 - (c) Format text in Bold, Italic and Underline.
7. Create the hierarchy of your family in MS Word.
8. Write the procedure to perform the following in MS Word:
 - (a) Insert a Table
 - (b) Add a Row
 - (c) Add a column
 - (d) Delete a Row
 - (e) Delete a column
9. Write the procedure to use Equation $\frac{(x+y)^2}{(x-y)^2} = \frac{x^2+2xy+y^2}{x^2-2xy+y^2}$ and Symbols.
10. Write the procedure to perform the following in MS Excel
 - (a) To Modify Column Width
 - (b) To Modify Row Height
 - (c) Format text in Bold, Italic, and Underline.

11. Write the procedure to create charts and Graphs in MS Excel
12. Write the procedure to create simple Power Point Presentation on your college in Three slides.
13. Write the procedure to perform Animation on Text and Objects in your presentation.
14. Take a photographic image. Give a title for the image. Put the border. Write your names. Write the Name of Institution and Place.
15. Prepare a cover page for the book in your subject area. Plan your own design.
16. You are given a picture of a flower and associated background (Extract.jpg). Extract the Flower only from that and organize it on a background. Select your own background for organization.
17. You are given a picture (BrightnessContrast.jpg). Adjust the brightness and contrast of the picture so that it gives an elegant look.
18. You are given a picture (position.jpg). Position the picture preferably on a plain background of a color of your choice - Positioning include rotation and scaling.
19. Remove the arrows and text from the given photographic image (Filename: photo.jpg).
20. Type a word; apply the following effects. Shadow Emboss.

III SEMESTER

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
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								
AIM-301	Mathematics –II	4		60	3	20	80	100
AIM-302	Java Programming	4	-	60	3	20	80	100
AIM-303	Operating systems	4	-	60	3	20	80	100
AIM-304	Digital Electronics & Computer Organization	5	-	75	3	20	80	100
AIM-305	DBMS	5	-	75	3	20	80	100
PRACTICAL SUBJECTS								
AIM-306	Java Programming Lab	-	6	90	3	40	60	100
AIM-307	Computer Networking & Cyber Security Lab	-	3	45	3	40	60	100
AIM-308	DBMS Lab	-	4	60	3	40	60	100
AIM-309	Android Programming Lab		4	60	3	40	60	100
	ACTIVITIES		3	45				
	Total	22	20	630		260	640	900

Course Code	Course Title	No. of Periods/week	Total No. of periods	Marks for FA	Marks for SA
AIM-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	<p>(iii) To understand the concepts of indefinite integration and definite integration.</p> <p>(iv) To understand the formation of differential equations and learn various methods of solving first order differential equations.</p> <p>(v) To comprehend the concepts of graph theory and probability.</p> <p>(vi) To learn different statistical techniques for data analysis.</p>
--------------------------	--

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

ENGINEERING MATHEMATICS – II
(Common to Computer Science and allied branches)

Learning 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 involving standard functions using the above rules.

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) $\int (f(x))^n f'(x) dx$

iii) $\int [f'(x) / f(x)] dx$

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

1.5. Find the integrals of $\tan x, \cot x, \sec x$ and $\operatorname{cosec} x$ using the above.

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

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 $\int u.v dx$.
- 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 over an interval using the above concept.
- 1.14. State various properties of definite integrals.
- 1.15. Evaluate simple problems on definite integrals using the above properties.

Unit -II

Differential Equations

C.O. 2 Obtain 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 or constants.

Syllabus for Unit test-I completed

Unit-III

Graph Theory and Probability

C.O. 3 Able 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, multigraph, 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 Baye's theorem and solve simple problems.

Unit-IV

Statistics

C.O. 4 Apply 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 the above measures of dispersion

4.5 Explain bivariate data.

4.6 Explain the concept of covariance and correlation between two variables.

4.7 Calculate Pearson's correlation coefficient between two variables.

4.8 Find Spearman's rank correlation coefficient.

4.9 Explain 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**Engineering Mathematics – II****CO/PO – Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	2	2				2	1	2
CO2	2	2	2	2				2	1	2
CO3	3	3	3	3				3	3	3
CO4	3	3	3	3				3	3	3
Avg.	2.5	2.5	2.5	2.5				2.5	2	2.5

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

PO5: Appropriate quiz programme may be conducted at intervals and duration as decided by concerned teacher.

PO6: Seminars on applications of mathematics in various engineering disciplines are to be planned and conducted.

PO7: Such activities are to be planned that students visit library to refer standard books on Mathematics and latest updates in reputed national and international journals, attending seminars, learning mathematical software tools.

PSO1: An ability to understand the concepts of basic mathematical techniques and to apply them in computer engineering discipline.

PSO2: An ability to solve the Engineering problems using latest software tools, along with analytical skills to arrive at faster and appropriate solutions.

PSO3: Wisdom of social and environmental awareness along with ethical responsibility to have a successful career as an engineer and to sustain passion and zeal for real world technological applications.

Engineering Mathematics – II

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	100%	3	>40% Level 3 Highly addressed
2	CO3, CO4	30	50%	3	
3	CO3, CO4	30	50%	3	
4	CO3, CO4	30	50%	3	25% to 40% Level 2 Moderately addressed
5					
6					
7					
PSO 1	CO1, CO2, CO3,CO4	45	75%	3	5% to 25% Level 1 Low addressed
PSO 2	CO3, CO4	30	50%	3	
PSO 3	CO1, CO2, CO3,CO4	45	75%	3	<5% Not addressed

ENGINEERING MATHEMATICS – II**AIM-301(Common for Computer and Allied Branches)****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 $\tan x$, $\cot x$, $\sec x$, $\operatorname{cosec} x$.

Evaluation of integrals which are of the following forms:

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

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

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

Integration by decomposition of the integrand 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 methods, variables separable, 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 with simple problems, conditional probability with simple problems, dependent and independent events with multiplication theorem – simple problems, priori and posteriori probability – Baye's theorem with simple problems.

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.

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-301
 Periods/Week : 04
 Periods/Semester : 60

BLUE PRINT

S.No	Chapter/Unit title	No. of Periods	Weightage Allotted	Short type				Essay type				COs mapped
				R	U	A p	A n	R	U	A p	A n	
Unit – I: Integral Calculus												
1	Indefinite integration	17	26	2	0	0	0	0	2	0	0	CO1
2	Definite integrals	5	16	2	0	0	0	0	0	1	0	CO1
Unit – II: Differential Equations												
3	Differential equations	2	3	0	1	0	0	0	0	0	0	CO2
4	Solutions of Differential equations of first order	6	10	0	0	0	0	0	0	1	0	CO2
Unit – III: Graph Theory and Probability												
5	Graph theory	5	6	1	1	0	0	0	0	0	0	CO3
6	Probability	12	26	0	1	1	0	0	0	1	1	CO3
Unit – IV : Statistics												

6	Measures of Central Tendency	1	0	0	0	0	0	0	0	0	0	CO4
7	Measures of Dispersion	3	3	1	0	0	0	0	0	0	0	CO4
8	Correlation	4	10	0	0	0	0	0	0	0	1	CO4
9	Simple linear regression	5	10	0	0	0	0	0	0	0	1	CO4
Total		60	110	6	3	1	0	0	2	3	3	
Marks				18	9	3	0	0	20	30	30	

R: Remembering Type : 18 Marks
U: understanding Type : 29 Marks
Ap: Application Type : 33 Marks
An: Analyzing Type :30 Marks

C-23

Engineering Mathematics – II

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

UNIT TEST MODEL PAPERS

C –23, CM-

301

Unit Test I

State Board of Technical Education and Training, A. P

III SEM

Part-A**16 Marks****Instructions:** (1) Answer **all** questions.(2) First question carries **four** marks and the remaining questions carry **three** marks each.

1. Answer the following:

a. $\int x^6 dx = ---$

(CO1)

b. $\int \frac{1}{16+x^2} dx = ---$

(CO1)

c. $\int_0^1 x dx = ---$

(CO1)

d. Degree of $\left(\frac{dy}{dx}\right)^2 + \frac{dy}{dx} = 3$ is _____

(CO2)

2. Evaluate $\int (\sec^2 x + 2e^x) dx$.

(CO1)

3. Evaluate $\int \frac{\sin(\log x)}{x} dx$.

(CO1)

4. Evaluate $\int_0^{\frac{\pi}{2}} \cos x dx$

(CO1)5. Find the differential equation to the family of curves $y = mx + 1$, where m is arbitrary constant.**(CO2)****Part-B****3×8=24 Marks**

Instructions: (1) Answer **all** questions.(2) Each question carries **eight** marks
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

1. A) Evaluate $\int \sin^4 x \cos x dx$. **or**

(CO1)

B) Evaluate $\int \frac{1}{(x+1)(x+2)} dx$.

(CO1)

2. A) Evaluate $\int_{-1}^1 \frac{\sin^{-1} x}{\sqrt{1-x^2}} dx$ **or**

(CO1)

B) Evaluate $\int_0^{\pi/2} \frac{\sin^8 x}{\sin^8 x + \cos^8 x} dx$

(CO1)

3. A) Solve $\frac{dy}{dx} = \sqrt{\frac{1-y^2}{1-x^2}}$ **or**

(CO2)

B) Solve $\frac{dy}{dx} + \frac{2y}{x} = \frac{1}{x^2}$

(CO2)

-o0o-

Unit Test II

C -23, CM -301

State Board of Technical Education and Training, A. P

III Sem

Subjectname:**Engineering Mathematics-II**

Sub Code: **CM-301**

Time : 90 minutes

Max.marks:40

Part-A

16 Marks

Instructions: (1) Answer **all** questions.

(2) First question carries **four** marks and the remaining questions carry **three** marks each

1. Answer the following:

a. A null graph has _____ edges

(CO3)

b. $P(\text{at least one}) = 1 - P(\text{None})$: State TRUE/FALSE

(CO3)

c. $P(A) + P(B) - P(A \cap B) = \underline{\hspace{2cm}}$

(CO3)

d. Range = Highest value - Lowest value: State TRUE/FALSE

(CO4)

2. Define a simple graph.

(CO4)

3. Two cards are drawn at random from a well-shuffled pack of 52 cards. Find the probability that one is a king and the other is a queen.

(CO5)

4. Let A and B are events with $P(A) = \frac{1}{5}$, $P(B) = \frac{2}{3}$ and $P(A \cap B) = \frac{1}{15}$, find $P(A \cup B)$

(CO5)

5. Find the probability of getting at least one head when two coins are tossed.

(CO5)

Part-B

3×8=24 Marks

Instructions: (1) Answer **all** questions. (2) Each question carries **eight** marks

(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

6. A) A problem is given to three students, A,B,C whose chances of solving at are $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ respectively. If they try it independent, what is the probability that the problem will be solved?

or

(CO3)

B) In a class, 2% of boys and 3% of girls passed in the Programming subject. There are 30% girls in the class. If a student is selected who has passed the subject, what is the probability that the student is a girl.

(CO3)

7. A) Find the mean deviation about mean for the data: 85, 96, 76, 108, 85, 80, 100, 85, 70, 95 (CO4)

or

B) The number of runs made by six players in a cricket match is: 12, 18, 21, 26, 17, 20. Find the standard deviation.

(CO4)

8. A) Calculate the Spearman's rank correlation coefficient for the following data:

(CO4)

or

B) Calculate the regression coefficient of Y on X and obtain the regression equation for the following data:

(CO4)

BOARD DIPLOMA EXAMINATION (C-23)

CM-301

ENGINEERING MATHEMATICS – II

MODEL PAPER-I

TIME: 3 HOURS

TOTAL

MARKS:80

PART – A

Note: (1) Answer all questions.

Marks:10 x 3 = 30

(2) Each question carries three marks.

1. Evaluate $\int (e^x + 2 \cos x + \frac{6}{\sqrt{1-x^2}}) dx$

(CO1)

2. Evaluate $\int \frac{\tan^{-1} x}{1+x^2} dx$

(CO1)

3. Evaluate $\int_1^2 (x-1)(x+2) dx$

(CO1)

4. Evaluate $\int_0^\pi \sin x dx$

(CO1)

5. Find the differential equation of the family of the curves $x^2 - y^2 = a^2$ where 'a' is an arbitrary constant.

(CO2)

6. How many edges are there in a graph with 10 vertices each of degree 6?

(CO3)

7. Draw the graph with vertices A, B, C whose adjacency matrix is $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{bmatrix}$

(CO3)

8. Two cards are drawn from a well-shuffled deck of 52 cards. What is the probability that both are aces?

(CO3)

9. A ball is drawn at random from a bag containing 4 red and 3 blue balls. Find the probability that the ball is either red or blue.

(CO3)

10. Find the range of the set of integers 14, -12, 7, 0, -5, -8, 17, -11, 19?

(CO4)

Part B

Marks: 5 x 10 = 50

Note: Answer any **five** questions and each question carries 10 marks.

11. a) Evaluate $\int \frac{14x+11}{7x^2+11x+1} dx$

(CO1)

b) Evaluate $\int \frac{x}{(x-2)(x+1)} dx$

(CO1)

12. a) Evaluate $\int e^x (\sin x + \cos x) dx$

(CO1)

b) Evaluate $\int x^2 e^{2x} dx$

(CO1)

13. Show that $\int_0^{\pi/2} \frac{1}{1+\tan x} dx = \frac{\pi}{4}$.

(CO1)

14. Solve $\frac{dy}{dx} + y \cot x = \operatorname{cosec} x$

(CO2)

15. a) Compute $P(A/B)$ and $P(B/A)$ if $P(A) = \frac{3}{8}$, $P(B) = \frac{5}{8}$ and $P(A \cup B) = \frac{3}{4}$

(CO3)

- b) A bag contains 10 black and 5 white balls. Two balls are drawn from the bag one after the other without replacement. What is the probability that both balls drawn are black?

(C

O3)

16. It is observed that 50% of mails are spam. There is a software that filters spam mail before reaching the inbox. Its accuracy for detecting a spam mail is 99% and chances of tagging a non-spam mail as spam mail is 5%. If a certain mail is tagged as spam, find the probability that it is not a spam mail.

(CO3)

17. Calculate Spearman's rank correlation coefficient from the following data:

(CO4)

18. Calculate the regression coefficient of Y on X and obtain the regression equation for the following data:

(CO4)

BOARD DIPLOMA EXAMINATION (C-23)

CM-301

ENGINEERING MATHEMATICS – II

MODEL PAPER-II

TIME: 3 HOURS

TOTAL MARKS:80

PART – A

Note: (1) Answer all questions.

Marks: 10 x 3 = 30

(2) Each question carries three marks.

1. Evaluate $\int (\frac{1}{x} - e^x + x^4) dx$

(CO1)

2. Evaluate $\int \frac{\sin \sqrt{x}}{\sqrt{x}} dx$

(CO1)

3. Evaluate $\int_0^2 x^4 dx$

(CO1)

4. Evaluate $\int_0^1 \frac{1}{1+x^2} dx$

(CO1)

5. Find the differential equation of the family of curves $y = Ae^x + Be^{-x}$ where A and B are arbitrary constants.

(CO2)

6. Define a multigraph and draw a multigraph with 4 vertices

(CO3)

7. Write the adjacency matrix for a graph with $V = \{x, y, z\}$ and $E = \{xy, xz, zx\}$ (CO3)

8. Two students are selected from a group of two boys and two girls. Find the probability that the selected students both are boys?

(CO3)

9. Compute $P(A \cup B)$ when $P(A) = \frac{1}{5}$, $P(B) = \frac{2}{3}$ and $P(A \cap B) = \frac{1}{15}$

(CO3)

10. Find the range of the observations: 32, 41, 28, 54, 35, 26, 23, 33, 38, 40

(CO4)

Part B

Marks: 5 x 10 = 50

Note: Answer any **five** questions and each question carries 10 marks.

11. a) Evaluate $\int \sec^2(2x + 3) dx$

(CO1)

b) Evaluate $\int \frac{1}{(x-2)(x-3)} dx$

(CO1)

12. a) Evaluate $\int \frac{e^{m \tan^{-1} x}}{1+x^2} dx$

(CO1)

b) Evaluate $\int x^2 \cos x dx$

(CO1)

13. Show that $\int_0^{\pi/2} \frac{\sin^{20} x}{\sin^{20} x + \cos^{20} x} dx = \frac{\pi}{4}$.

(CO1)

14. Solve $\frac{dy}{dx} + \frac{2y}{x} = \frac{1}{x^2}$

(CO2)

15. a) Let A and B are two events with $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{4}$, find $P(A/B)$ and $P(B/A)$

(CO3)

b) A fair die is rolled twice. What is the probability that an odd number will follow an even number?

(CO3)

16. Three machines A, B and C produce respectively 50%, 30% and 20% of the total number of items of a factory. The percentages of defective output of these machines are respectively 2%, 3% and 4%. An item is selected at random and is found defective. Find the probability that the item was produced by machine C.

(CO3)

17. Calculate Spearman's rank correlation coefficient from the following data:

(CO4)

18. Calculate the regression coefficient of X on Y and obtain the regression equation for the following data:

(CO4)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-302	Java Programming	4	60	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Object oriented programming concepts and Basics of java, Overloading	10	CO1,CO2
2.	Concepts of inheritance, overriding, Interfaces and Packages	12	CO2
3.	I/O Streams and Collections.	12	CO3
4.	Exception handling and Multi threaded programming.	12	CO4
5.	Applets, AWT and Event Handling	14	CO4,CO5
Total Periods		60	

Course Objectives	<p>i) To know applying object oriented programming paradigm in problem solving on the platform of Sun Micro Systems.</p> <p>ii) Able to design multi tasking application with the knowledge of multi threading.</p> <p>iii) Familiarized to develop graphical user interface with event handling mechanism.</p>
-------------------	---

	At the end of the course the student able to learn following:		
	CO1	AIM-302.1	Know the object oriented programming concepts in problem solving. Use syntaxes and semantics of object oriented paradigm.
	CO2	AIM-302.2	Design optimized definition for an application with reusability features and packages in project development.
Course Outcomes			

	CO3	AIM-302.3	Knows the usage of utilities in real time data structures.
	CO4	AIM-302.4	Demonstrate multithreading concepts to implement multitasking and multi programming applications.
	CO5	AIM-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
AIM-302.1	2	1	1	2	2	2	1	2	2	2
AIM-302.2	1	3	3	3	1	3	1	1	3	1
AIM-302.3	3	2	3	2	2	3	1	1	3	3
AIM-302.4	1	1	3	2	2	3	2	2	3	2
AIM-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.

3.0 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
 - 3.6.1 List
 - 3.6.2 Set
 - 3.6.3 Queue
 - 3.6.4 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.

5.9 List and explain different event classes.

5.10 List 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 Inheritance Overriding Interfaces 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 -- Patrick 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

Model Blue Print:

S.No.	Chapter/ Unit title	No.of periods Allocated	Weightag e Allocatd	Marks Wise Distribution of Weightage			Question wise Distribution of Weightage			CO's Mapped
				R	U	Ap	R	U	Ap	
1	Object oriented programming concepts and Basics of java and over loading	10	13	3	10	-	1	1	-	C01
2	Concepts of inheritance,overriding,Interfaces	12	26	6	10	10	2	1	1	CO2

	and Packages									
3	I/O Streams and Collections.	12	21	6	10	5	2	1	½	CO3
4	Exception handling and Multi threaded programming	12	21	6	10	5	2	1	½	CO4
5	Applets, AWT, Event Handling	14	29	9	10	10	3	1	1	CO5
	Total	60	110	30	50	30	10	5	3	

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 3.7 to 5.14

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
JAVA PROGRAMMING
UNIT TEST-1

SCHEME: C-23
MAX MARKS:40

SUBJ CODE:AIM-302
TIME: 90Minutes

.....
PART-A

16Marks

- Instructions:** 1) Answer all questions
2) First question carries 4marks, and each question of remaining carries 3marks
1. a) is 'this' keyword is refers currently invoked object proprieties (True/False)(CO1)
 - b) -----is fully abstract class. (CO2)
 - c) Which of the following is not a java access specifier [] (CO2)
I) public II) default III) private IV) super
 - d) Which one of the following are java translator [] (CO1)
I) interpreter II) compiler III) assembler IV) I &II
 2. What is the use of constructor and list different types of constructors? (CO1)
 3. Write the differences b/w abstract class and interface (CO2)
 4. List different types of I/O streams. (CO3)
 5. What is the use of super keyword? (CO3)

PART-B

3X8=24Marks

- Instructions:** 1) Answer all questions
2) Each question carries 8 Marks
3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer
6. a) Explain method over loading with an example. (CO1)
Or
b) Explain how to use static members in java with example. (CO1)
 7. a) Explain multilevel inheritance with example program. (CO2)
Or
b) How java implements multiple inheritance with interface? Explain with example. (CO2)
 8. a) Explain how to create and import package. (CO3)
Or
b) Describe how to access primitive data types through keyboard with an example. (CO3)

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL END PAPER
JAVA PROGRAMMING

Part-A

Answer All Questions each carries three marks 10X3=30

1. Define Byte code and JVM (CO1)
2. What is the use of label break?. (CO2)
3. Define overriding and give the syntax. (CO2)
4. What is the use of super keyword? (CO3)
5. List different Access modifiers in java. (CO3)
6. Write any three methods in ArrayList class. (CO3)
7. Write the advantages of exceptions. (CO4)
8. List different methods in thread life cycle. (CO4)
9. What is an event? List different event Listeners. (CO5)
10. Write different constructors in TextField. (CO5)

Part-B

Answer any Five Questions carries eight marks 5X10=50

11. Explain the concept of method overloading with an example program. (CO1)
12. Explain how to implements multi-level inheritance with example. (CO2)
13. Explain how create and import a package with example packages. (CO2)
14. Explain HashSet class methods with simple program. (CO3)
15. (a)Write a java program to read data through command line arguments and write it into file and display file contents . (CO3)
- (b) Explain Multi catch statements (CO4)
16. Explain how to create multi-threading in java with an example program. (CO4)
17. Design an applet program that implements simple calculator with basic arithmetic operations. (CO5)
18. Explain mouse events with an example program. (CO5)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-303	Operating Systems	4	60	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Introduction to Operating system	12	CO1
2.	Process management	12	CO2, CO6
3.	Synchronization & Deadlocks	12	CO3, CO6
4.	Memory management	12	CO4, CO6
5.	Scheduling and File management	12	CO5, CO6
Total Periods		60	

Course Objectives	<ul style="list-style-type: none"> i)To know about the basics of Operating Systems ii)To familiarizewith process management, Scheduling algorithms, Synchronization and deadlock techniques iii)To understand various Memory management techniques iv)To familiarize with File management
-------------------	---

Course Out comes	CO1	AIM-303.1	Explain basic concepts of Operating System
	CO2	AIM-303.2	Explain process scheduling algorithm
	CO3	AIM-303.3	Describe Semaphores, synchronization and Deadlock handling techniques
	CO4	AIM-303.4	Use memory management techniques and page replacement algorithms
	CO5	AIM-303.5	Use Disk scheduling algorithms and File allocation methods with respect to different operating systems

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-303.1	3	2	2	2	3	3	3	3	2	2
AIM-303.2	3	3	3	2	2	3	3	2	2	2
AIM-303.3	3	3	3	2	3	3	3	3	2	3
AIM-303.4	3	3	3	3	3	3	3	3	3	3
AIM-303.5	3	3	2	2	2	3	3	3	3	3
Average	3	3	2.5	2	2.5	3	3	3	2.5	2.5

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

Learning Outcomes:

1.0 Introduction to operating systems

- 1.1 Define an operating system
- 1.2 Discuss history of operating system
- 1.3 Discuss about various types of operating systems
- 1.4 Distinguish spooling and buffering
- 1.5 Explain the concepts multiprogramming and timesharing
- 1.6 Differentiate between distributed and real time systems
- 1.7 Describe multiprocessor systems

- 1.8 Describe the operating system components
- 1.9 Discuss operating system services
- 1.10 Define system call with an example
- 1.11 List and explain different types of system calls
- 1.12 Define single user, multi user operating system structure

2.0 Process management

- 2.1 Define process and process control block
- 2.2 Explain process state diagram
- 2.3 Describe process creation and termination
- 2.4 Discuss the relation between processes
- 2.5 Define Thread and describe multithreading
- 2.6 Explain scheduling concepts
- 2.7 Describe scheduling queues and schedulers
- 2.8 Explain CPU scheduling and scheduling criteria
- 2.9 Explain various scheduling algorithms
 - 2.9.1 FCFS
 - 2.9.2 SJF
 - 2.9.3 Round Robin
 - 2.9.4 Priority
 - 2.9.5 Multilevel Scheduling

3.0 Synchronization & Deadlocks

- 3.1 Describe semaphores
- 3.2 Explain inter process communication
- 3.3 Define Deadlock
- 3.4 State the necessary conditions for arising deadlocks
- 3.5 State various techniques for deadlock prevention
- 3.6 Discuss Deadlock avoidance and detection
- 3.7 Describe the process of recovering from deadlock

4.0 Memory management

- 4.1 Describe briefly address binding, dynamic loading, dynamic linking
- 4.2 Define overlays
- 4.3 Describe briefly on swapping
- 4.4 Explain single partition allocation
- 4.5 Explain multiple partition allocation
- 4.6 Explain the concept of fragmentation
- 4.7 Explain paging concept
- 4.8 Explain how logical address is translated into physical address
- 4.9 Explain segmentation and segmentation with paging
- 4.10 Define virtual memory techniques
- 4.11 Describe demand paging

- 4.12 Describe page replacement
- 4.13 Discuss on page replacement algorithms
 - 4.13.1 FIFO
 - 4.13.2 LRU
 - 4.13.3 Optimal
- 4.14 Explain the concept of thrashing
- 4.15 Explain working set model and page fault frequency

5.0 Disk scheduling and File management

- 5.1 List out various disk performance parameters
- 5.2 Disk scheduling policies
 - 5.2.1 FIFO
 - 5.2.2 SSTF
 - 5.2.3 SCAN
- 5.3 Define file management
- 5.4 List and explain various file operations
- 5.5 List and explain various access methods
- 5.6 List and explain various allocation methods
- 5.6 List and explain directory structure
- 5.7 Explain disk organization and structure

COURSE CONTENT

1.0 Introduction to operating systems

Operating System –Evolution of operating system-Types of Operating Systems - Multi Programming and Time Sharing - Distributed and Real time Systems - spooling and buffering - Multi processor systems-Components of Operating Systems - operating System Services - system Calls - single User and Multi user operating System Structure.

2. Process management

Processes - Sequential Processes - Process State Diagram - Process Control Block - Process Creation and Termination - Relations between Processes - Threads and Multi Threading - Scheduling Concepts - Schedulers - CPU scheduling and Scheduling criteria - scheduling algorithms.

3. Synchronization & Deadlocks

Inter Process Communications - semaphores – monitors

Deadlocks - principal of deadlock - deadlock prevention - deadlock detection - deadlock avoidance.

4. Memory management

Address binding -Dynamic Loading- dynamic linking-overlays-swapping- memory allocation-fragmentation-paging-segmentation- segmentation with paging-

Benefits of virtual memory - virtual memory techniques - demand paging - page replacements - page replacement algorithms – thrashing.

5. Disk scheduling and File management

Disk performance parameters - Disk scheduling policies –

Introduction to file systems - File management-File Operations - Access methods - Directory structure organization - File Protection.

REFERENCE BOOKS

- | | |
|-------------------------------|----------------------------|
| 1. Operating Systems | -- Silberschatz and Galvin |
| 2. Operating Systems | -- William Stallings, PHI |
| 3. Operating Systems | -- Dietel and Dietel |
| 4. Operating Systems | -- Dhamdhare (TMH) |
| 5. Advanced Operating Systems | -- Tanenbaum |

ModelBlue Print:

S.No.	Chapter/ Unit title	No.of periods	Weighta ge	Marks Wise Distribution of Weightage			Question wise Distribution of Weightage			CO's Mapped
				R	U	Ap	R	U	Ap	
1	Introduction to Operating system	12	16	6	10		2	1		CO1
2	Process management	12	16	6	10		2	1		CO2, CO6
3	Synchronization & Deadlocks	12	26	6	10	10	2	1	1	CO3, CO6
4	Memory management	12	26	6	20		2	2		CO4, CO6

5	Disk scheduling and File management	12	26	6	20		2	2		CO5, CO6
	Total	60	80				8	6		

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 5.7

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
OPERATING SYSTEMS
UNIT TEST-1

SCHEME: C-23
MAX MARKS:40

SUBJ CODE:AIM-303
TIME: 90Minutes

.....
... **PART-A** **16Marks**

Instructions: 1) Answer all questions
2) First question carries 4marks, and each question of remaining carries 3marks

1. a) Operating system is a Hardware.(True/False) (CO1)
- b) Operating system is also known as _____ manager. (CO1)
- c) Full form of FCFS is _____ . (CO2)
- d) Which one of the following is not a process state [] (CO2)
 - i) New II) Scheduling III) Suspend IV) Running
- 2) List any three types of Operating Systems. (CO1)
- 3) Define spooling and buffering. (CO1)
- 4) Draw Process state diagram. (CO2)
- 5) Distinguish between process and Thread. (CO2)

PART-B 3X8=24Marks

Instructions: 1) Answer all questions
2) Each question carries 8 Marks
3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

- 6.a) Explain the concept of Multiprogramming and Time sharing. (CO1)
(Or)
- b) Explain various system calls with an examples. (CO1)
- 7.a) Differentiate Distributed and Real-time systems. (CO1)
(Or)
- b) Explain various operating system services. (CO1)
8. a) Explain various CPU scheduling algorithms. (CO2)
(Or)
- b) Describe Inter process communication. (CO2)

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER - END EXAMINATION
OPERATING SYSTEMS

SCHEME: C-23
MAX MARKS:80

SUBJ CODE:AIM-303
TIME: 3HOURS

.....
...

PART-A

10X3=30Marks

Note: Answer all questions

1. Define Operating system. (CO1)
2. List any three types of system calls (CO1)
3. what is program and process? (CO2)
4. State the importance of multithreading (CO2)
5. List necessary conditions for deadlock (CO3)
6. Define Semaphore (CO3)
7. State the importance of address binding (CO4)
8. Define Overlay. (CO4)
9. What is disk scheduling? (CO5)
10. List any three file allocation methods (CO5)

PART-B

5x10=50Marks

Note: Answer any five questions

11. Differentiate multiprogramming and time sharing. (CO1, CO6)
12. Draw and explain process state diagram. (CO2)
13. Explain inter process communication. (CO3)
14. Explain Deadlock avoidance and detection. (CO3)
15. Explain paging concept. (CO4)
16. Explain virtual memory techniques (CO4)
17. Explain Disk scheduling algorithms. (CO5)
18. Explain disk organization and structure (CO5)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-304	Digital Electronics & Computer Organization	5	75	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Number systems, Logic Gates ,Boolean Algebra and basic Combinational circuits	15	CO1,CO3
2.	Flip-Flops &Counters	15	CO1,CO2
3.	Information representation & CPU Organization	15	CO1,CO2,CO3
4.	Memory Organization	15	CO2,CO4
5.	I/O Organization	15	CO3,CO4,CO5
Total Periods		75	

Course Objectives	<p>i) To acquire the basic knowledge of Number systems,digital logic levels and apply of knowledge to understand digital logic circuits.</p> <p>ii) To prepare students to perform the analysis and design of various digital electronics circuits</p> <p>iii)To know about Processor organization, information Representation</p> <p>iv)To understand how memory and i/o is organized in an effective way</p>
-------------------	--

Course Outcomes	At the end of the course the student able to learn following:		
	CO1	AIM-304.1	Describe fundamental Numberingconcepts and techniques used in digital electronics, the switching algebra theorems and logic gates
	CO2	AIM-304.2	Analyse the operation of flip flops and counting circuits
	CO3	AIM-304.3	Explain the Basic computer organization techniques and information representation
	CO4	AIM-304.4	Explain Memory organization
	CO5	AIM-304.5	Describe Handlingof I/O organization

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-304.1	3	2	2		1		2	2	1	3
AIM-304.2	2	2	2	1	1		2	2	1	2
AIM-304.3	2	1			1	1	2	3	1	1
AIM-304.4	2	1	1		1	1	2	3	2	1
AIM-304.5	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 Circuits

1.1 Number systems

- 1.1.1 List the various number systems used in digital Computer.
- 1.1.2 Explain Decimal , Binary, octal, Hexa Decimal number systems
- 1.1.3 Convert decimal number to other base conversion.
 - 1.1.3.1 Decimal to Binary
 - 1.1.3.2 Decimal to Octal
 - 1.1.3.3 Decimal to Hexadecimal
- 1.1.4 Convert binary number to other base conversion.
 - 1.1.4.1 Binary to Decimal
 - 1.1.4.2 Binary to octal
 - 1.1.4.3 Binary to Hexadecimal
- 1.1.5 Convert octal number to other base conversion.
 - 1.1.5.1 Octal to Decimal
 - 1.1.5.2 Octal to Binary
 - 1.1.5.3 Octal to Hexadecimal
- 1.1.6 Convert hexadecimal other base conversion.
 - 1.1.6.1 Hexadecimal to Decimal
 - 1.1.6.2 Hexadecimal to Binary
 - 1.1.6.3 Hexadecimal to Octal
- 1.1.7 Binary numbers representation.
 - 1.1.7.1 Define Binary numbers representation.
 - 1.1.7.2 List the types of Binary numbers representation.
 - 1.1.7.3 Explain Unsigned binary number representation.
 - 1.1.7.4 Explain Signed binary number representation.
- 1.1.8 Binary coded decimal (BCD) coding scheme.
 - 1.1.8.1 Define Binary coded decimal (BCD) coding scheme.
 - 1.1.8.2 List the types of Binary coded decimal (BCD)
 - 1.1.8.3 Draw and explain 8421 code.
 - 1.1.8.4 Draw and explain 2421 code.
 - 1.1.8.5 Draw and explain 8 4-2-1 code.

1.2 Boolean algebra

- 1.2.1 Explain AND, OR, NOT operations with truth tables.
- 1.2.2 Explain the working of EX-OR and EX-NOR operations with truth tables.
- 1.2.3 List the different postulates in Boolean algebra.
- 1.2.4 State De-Morgan's theorems.
- 1.2.5 Prove De-Morgan's theorems using truth tables.
- 1.2.6 Apply De-Morgan's theorems and other postulates of Boolean algebra to simplify the given Boolean expression.
- 1.2.7 Write Boolean expression for given truth table.
 - 1.2.7.1 Using Sum-Of-Products(SOP) method
 - 1.2.7.2 Using Product-Of-Sums(POS) method
- 1.2.8 Use K-map to simplify Boolean expression (up to 4 variables).
 - 1.2.8.1 Using Two variable K-Map
 - 1.2.8.2 Using Three variable K-Map
 - 1.2.8.3 Using Four variable K-Map

1.3 Logic Gates

- 1.3.1 Define Logic gate
- 1.3.2 List basic gates
- 1.3.3 Define OR gate
- 1.3.4 Explain OR gate with logic symbol and truth table.
- 1.3.5 Define AND gate
- 1.3.6 Explain AND gate with logic symbol and truth table.
- 1.3.7 Define NOT gate
- 1.3.8 Explain NOT gate with logic symbol and truth table.
- 1.3.9 What is universal gate? List universal gates
- 1.3.10 Define NOR gate
- 1.3.11 Explain NOR gate with logic symbol and truth table.
- 1.3.12 Define NAND gate
- 1.3.13 Explain NAND gate with logic symbol and truth table.
- 1.3.14 Define EX-OR and EX-NOR gates
- 1.3.15 Explain the working of EX-OR and EX-NOR gates with truth tables.
- 1.3.16 Implement AND, OR, NOT, EX-OR gates using NAND gates only
- 1.3.17 Implement AND, OR, NOT, EX-OR gates using NOR gate only.

1.4 Basic Combinational Circuits

- 1.4.1 Define the Half Adder. Explain the function of Half Adder.
- 1.4.2 Draw Half-Adder circuit using an exclusive OR and an AND gate.
- 1.4.3 Draw a Half-Adder using only NAND gates or only NOR gates.
- 1.4.4 Define the Full Adder. Explain the function of Full Adder.
- 1.4.5 Construct Full Adder using two Half-Adder and an OR gate

2.0 Flip-Flops, Counters

2.1 FLIP-FLOPS

- 2.1.1 List the details of different logic families.
- 2.1.2 Define positive and negative logic levels.
- 2.1.3 Define Flip flop
- 2.1.4 Draw and explain the basic principle of operation of a Flip-flop.
- 2.1.5 Define Latch.
- 2.1.6 Explain the working of a NAND latch circuit with truth table and Timing diagram
- 2.1.7 Explain the working of a NOR latch circuit with truth table and Timing diagram

- 2.1.8 Differentiate between Latch and Flip-flop.
- 2.1.9 Explain with block diagram, waveforms and truth tables the working of RS Flip-flop.
- 2.1.10 Explain with block diagram, waveforms and truth tables the working of RST Flip-flop.
- 2.1.11 Explain with block diagram, waveforms and truth tables the working of D Flip-flop.
- 2.1.12 Explain with block diagram, waveforms and truth tables the working of JK Flip-flop.
- 2.1.13 Explain with block diagram, waveforms and truth tables the working of T Flip-flop.
- 2.1.14 Draw and explain the need for a Master-Slave flip-flop.
- 2.1.15 Explain the working of a Master-Slave flip-flop using suitable circuit diagram and truth table.

2.2 Counters

- 2.2.1 Define Counter
- 2.2.2 List the types of counters.
- 2.2.3 Define Synchronous counter
- 2.2.4 Define Asynchronous counter
- 2.2.5 Distinguish between asynchronous and synchronous counters.
- 2.2.6 Draw and explain module-10 (decade) Asynchronous counter circuit diagram with waveforms and truth tables
- 2.2.7 Draw and explain module-8 synchronous counter circuit diagram with waveforms and truth tables
- 2.2.8 Draw and explain module-16 synchronous counter circuit diagram with waveforms and truth tables
- 2.2.9 List the advantages of synchronous counters
- 2.2.10 Programmable counter
 - 2.2.10.1 Draw and explain the need for a Programmable counter
 - 2.2.10.2 Explain how to design Programmable counter circuit diagram
- 2.2.11 List the applications of counter.

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 data transfer.
- 5.5 Explain synchronous and asynchronous data transfer.
- 5.6 Compare synchronous and asynchronous data transfer.
- 5.7 Explain hand shaking procedure of data transfer.
- 5.8 Explain programmed I/O method of data transfer.
- 5.9 Explain interrupted initiated I/O.
- 5.10 Explain DMA controlled transfer.
- 5.11 Explain priority interrupt, polling, and daisy chaining priority.
- 5.12 Write about bus system
- 5.13 List the four bus systems.
- 5.14 Differentiate between i/o bus and memory bus

COURSE CONTENTS

1.Number systems,Boolean algebra and LogicalGates :List the various number systems used in digital Computer, Explain Decimal , Binary,octal,Hexa Decimal number systems,Convert decimal number to other base conversion,Convert binary number to other base conversion,Convert octal number to other base conversion,Convert hexadecimal other base conversion,Binary numbers representation,Signed binary arithmetic,Binary coded decimal (BCD) coding scheme,Character representation,AND, OR, NAND, NOT, NOR & EX-OR gates. Logical definitions – Symbols – truth

tables. Boolean theorems, Boolean simplifications of Boolean expressions, Using De-Morgan's theorems, Formation and implementation of Logic expressions, Karnaugh's mapping, Applications involving developing of combinational logic circuits. Half-Adder, Full-adder.

2.FLIP FLOP: Different logic families, Basic principles of Flip Flop operation (with help of wave form & truth tables) of RS,T,D,JK and Master Slave JK flip flop.**Counters:** Basic Asynchronous, Synchronous.

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 data 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. Digital principles and applications -- Malvino and leach
- 2. Digital Electronics -- Bignell - Thomson
- 3. Modern Digital Electronics -- R.P. Jain
- 4. Computer System Architecture -- Morris Mano.

S. No.	Chapter/Unit title	No. of periods	Weightage All ocat ed	Marks Wise Distribution of Weightage			Question wise Distribution of Weightage			CO's Mapped
				R	U	Ap	R	U	Ap	
1.	Number systems, Logic Gates , Boolean Algebra and basic Combinational circuits	15	16	3	13		1	2		CO1,CO3
2.	Flip-Flops &Counters	15	16	3	13		1	2		CO1,CO2

3	Information representation & CPU Organization	15	26	3	13	10	1	2	1	CO1,CO2,CO3
4.	Memory Organization	15	26	3	13	10	1	2	1	CO2,CO4
5.	I/O Organization	15	26	3	13	10	1	2	1	CO3,CO4,CO5
	TOTAL	75	110	15	65	110	5	10	3	

Model Blue Print:

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 2.3 to 5.14

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
DIGITAL ELECTRONICS & COMPUTER ORGANIZATION
UNIT TEST-1

SCHEME: C-20
MAX MARKS:40

SUBJ CODE: AIM-304
TIME: 90Minutes

PART-A

16Marks

Instructions: 1) Answer all questions

2) First question carries 4marks, and each question of remaining carries 3marks

1. a) K-map is not used to simplify Boolean expression (True/False) (CO1)
- b) -----is the base of octal number system[] (CO1)
- i)10 ii)2 iii) 8 iv) 16
- c)logic gate gives-----number of outputs (CO2)
- d) TTL stands for ----- (CO2)

- 2) Convert 101010_2 into decimal number (CO1)
- 3) State and prove Demorgan's theorems using truth table (CO2)
- 4) Implement OR gate using NAND gate (CO2)
- 5) Define positive and negative logic levels of FLIP FLOP (CO2)

PART-B
3X8=24Marks

Instructions: 1) Answer all questions
2) Each question carries 8 Marks
3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

6. a) Explain full Adder in detail with neat diagram. (CO1)

Or

- b) Explain half-adder in detail with neat diagram. (CO1)

7. a) Explain JK Flip Flop in detail with neat diagram. (CO2)

Or

- b) Explain clocked SR Flip Flop in details with neat diagram (CO2)

8. a) Explain Programmable counter in detail with neat diagram. (CO2)

Or

- b) Explain Asynchronous counter in detail with neat diagram. (CO2)

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER – END EXAMINATION
DIGITAL ELECTRONICS & COMPUTER ORGANIZATION

SCHEME: C-20
MAX MARKS:80

SUBJ CODE:AIM-304
TIME: 3HOURS

.....
...

PART-A

10X3=30Marks

Note: Answer all questions

1. Convert 10101000.00102 into decimal number system (CO1)
2. What is Universal Gate and List them. (CO1)
- 3 Define flip-flop (CO2)
- 4 Write any three difference between Asynchronous and Synchronous counters (CO2)
- 5 What is Accumulator and program counter? (CO3)
- 6 Define opcode,operand. (CO3)
- 7State the need for memory hierarchy in a computer (CO4)
- 8State the principle of locality of reference (CO4)
- 9List modes of data transfer (CO5)
- 10List the four bus systems (CO5)

PART-B

5x8=40Marks

Note: Answer any 5 questions

11. Draw and explain full adder. (CO1)
12. Explain Master JK Flip Flop in detail with neat diagram (CO2)
13. Describe the sequential execution of a program stored in memory by the CPU (CO3)
14. Explain the stored program concept. (CO3)
15. Explain Cache memory organization. (CO4)
16. Explain Associative Memory.(CO4)
17. Explain DMA controlled transfer in detail.(CO5)
18. A) Explain hand shaking procedure of data transfer (CO5)
B) Explain Programmed I/O method of data transfer(CO5)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-305	DBMS	5	75	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Concepts of DBMS & RDBMS	18	CO1
2.	Concepts of SQL	22	CO2
3.	Basics of PL/ SQL	15	CO3
4.	Advance PL/SQL	10	CO4
5.	Concepts of NoSQL & MongoDB.	10	CO5
Total Periods		75	

Course Objectives	i) To know the fundamentals of DBMS ii) To familiarize insert, retrieve, update, delete data in database iii) To familiarize programming skills for insert, retrieve, update, delete data in database
-------------------	---

Course Out comes	CO1	AIM-305.1	Describe fundamentals, types and Overall structure of DBMS
	CO2	AIM-305.2	Apply SQL commands to create, retrieve, update, delete data from the Relational data bases.
	CO3	AIM-305.3	Describe PL/SQL programming constructs, control statements and sub programs.
	CO4	AIM-305.4	Apply cursors, triggers and Exception handling concepts
	CO5	AIM-305.5	Use NOSQL database concepts and MongoDB data base concepts in designing database Schema.

CO-PO/PSO MATRIX

CO NO.	PO1	P O2	PO 3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-305.1	3	2	2	2	2	3	2	2	3	1
AIM-305.2	2	3	3	3	3	3	3	2	1	2
AIM-305.3	3	2	2	2	1	3	2	2	3	1
AIM-305.4	2	1	3	2	2	3	2	3	3	3
AIM-305.5	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 PrimaryKey, 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 of SQL

- 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 longraw 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 (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 Datatypes 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 --- Silberschatz, 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 & Craig Van
7. PL/SQL, Developer Tools & DBA -- Slyke, Dreamtech
8. www.nosql-database.org
9. www.mongodb.org

ModelBluePrint:

S.No.	Chapter/ Unit title	No.of	Weighta ge	Marks Wise Distribution of Weightage			Question wise Distribution of Weightage			CO's Mapped
				R	U	Ap	R	U	Ap	
1	Concepts of DBMS & RDBMS	18	29	9	10	10	3	1	1	CO1
2	Concepts of SQL	22	26	6	20		2	2		CO2
3	Basics of PL/ SQL	15	26	6	20		2	2		CO3
4	Advance PL/SQL	10	16	6	10		2	1		CO4
5	Concepts of NoSQL&MongoD B.	10	13	3	10		1	1		CO5
	Total	75	110	30	70	10	10	7	1	

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 5.2.5

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
DBMS
UNIT TEST-1

SCHEME: C-23
MAX MARKS:40

SUBJ CODE:AIM-305
TIME: 90Minutes

PART-A

16Marks

Instructions:1) Answer all questions
2) First question carries 4marks, and each question of remaining carries 3 marks

1. a) File system is more advantageous than DBMS.(True/False) (CO1)
- b) Entity is defined as (CO1)
- c) Full form of DML is (CO1)
- d) Which one of the following is not a Database Language [] (CO1)
 - i) DML II)DDL III)TCL IV)TLL
- 2) Define Instance & Schema. (CO1)
- 3) List any three data types in SQL. (CO2)
- 4) Write the syntax for CREATE command in SQL. (CO2)
- 5) Differentiate CHAR and VARCHAR data types in SQL. (CO2)

PART-B

3X8=24Marks

Instructions:1) Answer all questions
2)Each question carries 8 Marks
3)Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

6. a) Explain Database System Architecture (CO1)
 (Or)
- b) Explain Generalization, Specialization and Aggregation (CO1)
7. a) Explain ER diagram with an example. (CO1)
 (Or)
- b) Explain TCL commands in SQL in detail. (CO2)
8. a) Explain SELECT statement with syntax and example. (CO3)
 (Or)
- b) Explain Joins in SQL. (CO3)

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER - END EXAMINATION
DBMS

SCHEME: C-23
MAX MARKS: 80

SUBJ CODE: AIM-305
TIME: 3HOURS

.....
PART-A

10x3=30M

Instructions : 1. Answer **all** questions.
2. Each question carries **Three** marks.
3. Answers should be brief and straight to the point and should not exceed five simple sentences.

1. Define Database Management System. (CO1)
2. Define Primary Key. (CO1)
3. List any three integrity constraints. (CO1)
4. Write a SQL Query to retrieve maximum value from sal column of employee table. (CO2)
5. Write syntax for adding rows to the table (CO2)
6. List any three features of PL/SQL. (CO3)
7. List decision making statements in PL/SQL (CO3)
8. Define Cursor. (CO4)
9. List any three advantages of Triggers. (CO4)
10. Compare features of RDBMS with that of NoSQL. (CO5)

PART-B

5x10=50M

Instructions : 1. Answer any **five** questions and each question carries **TEN** marks.
2. Answers should be comprehensive and criteria for valuation is the content but not the length of the answer.

11. Explain Database System Architecture (CO1)
12. Explain Generalization, Specialization and Aggregation (CO1)
13. Explain SELECT statement with syntax and example (CO2)
14. Explain Joins in SQL (CO2)
15. Write a PL/SQL procedure to find biggest of three given numbers. (CO3)
16. Write a PL/SQL program to find factorial of a given number. (CO3)
17. Explain Implicit cursors in PL/SQL (CO4)
18. Explain Column-oriented Databases in NoSQL. (CO5)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-306	Java Programming Lab	6	90	40	60

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Basics, overloading, inheritance, overriding	15	CO1,CO2
2.	Streams, Interfaces and Packages and Collections.	25	CO2,CO3
3.	Exceptions and Multi threaded programming.	25	CO3,CO4
4.	Applets and Event Handling	25	CO5
Total Periods		90	

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

Course Outcomes	CO1	Perform object oriented programming model application design.
	CO2	Design optimized definition for an application with reusability features like inheritance and polymorphism.
	CO3	Analyze modular design for real time applications by using packages concept in projects. Able to design data structures used in applications.
	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
AIM-306.1	2	1	3	2		2	1	2	3	3
AIM-306.2	1	3	3	3	1	3	2	2	3	3
AIM-306.3	1	2	3	2	2	3	1	2	3	3
AIM-306.4	1	1	3	2	2	3	2	2	3	3
AIM-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=strongly mapped, 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	(a) Use command line arguments. (b) Run the program. (c) Understand usage of Files. (c) Observe the output.

		Files.	
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	(a) Use different data types. (b) Use readLine() method. (c) Use println() method.

		<p>write primitive data types.</p> <p>(c) Write programs to handle Files.</p>	<p>(d) use File Streams</p> <p>Observe the output.</p>
12	Exercise programs on Collections.	<p>(a) Write a java program to search a student mark percentage based on pin number using Array list.</p> <p>(b) Write a java program to create linked list to perform delete, insert, and update data in linked list with any application.</p>	<p>(a) Define collection classes</p> <p>(b) use ArrayList, LinkedList</p> <p>(c) apply List and Iterator Interface</p>
13	Exercise on exception handling	<p>(a) Write a program to illustrate exception handling.</p> <p>(b) Write a program to illustrate exception handling using multiple catch statements.</p> <p>(c) Write a program to illustrate exception handling using nested try.</p>	<p>(a) Use try – catch.</p> <p>(b) Use multiple catch blocks.</p> <p>(c) Use finally statement.</p> <p>(d) use Nested try</p>
14	Exercise on multithreading	<p>(a) Write a program to create single a thread by extending the thread class.</p> <p>(b) Write a program to create a single thread by implementing the runnable interface.</p> <p>(c) Write a program to create multiple threads.</p> <p>(d) Write a program to illustrate thread priorities.</p>	<p>(a) Use extends, new.</p> <p>(b) Use run() and start() methods.</p> <p>(c) Observe thread execution.</p> <p>(d) Use implements runnable interface.</p> <p>(e) Use setPriority() and getPriority() methods.</p> <p>(f) use wait(), notify() methods</p>
15	Exercise on applets.	Write a program to create simple applet to display	(a) Use <applet>...</applet> tag.

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

Course Code	Course title	No of periods/week	Total no of periods	Marks for FA	Marks for SA
AIM-307	Computer Networking & Cyber Security Lab	03	45	40	60

S No	Chapter/ Unit Title	No. of Periods	COs Mapped
1.	Computer Hardware	10	CO1,CO2,CO3
2.	Computer Networking	15	CO3.CO4.CO5
3.	CYBER SECURITY	20	CO4,CO5,CO6
	Total	45	

COURSE OBJECTIVES	<ol style="list-style-type: none"> 1. Identify all the components of mother board. 2. Modify AIMOS settings as required 3. Install drives, NIC card, modem 4. Install network devices, design and develop network. 5. Understand ip address classes and subnetting 6. Prepare cross and straight Ethernet cables 7. Install and configure proxy server 8. To learn Different Cipher Techniques 9. To Implement the Symmetric key Algorithms 10. To Implement the Asymmetric key Algorithms 11. To use the network security tools and vulnerability assessment tools
--------------------------	--

Course	CO1	AIM-307.1	Assemble the PC with suitable components.
--------	-----	-----------	---

Outcomes	CO2	AIM-307.2	Install network devices, design and develop network Install any network device and configure
	CO3	AIM-307.3	Develop the cipher techniques for encryption
	CO4	AIM-307.4	Implement symmetric key Algorithms
	CO5	AIM-307.5	Demonstrate Asymmetric key Algorithm

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-307.1	1	0	1	2	1	0	2	3	0	0
AIM-307.2	1	0	2	2	1	0	1	3	1	0
AIM-307.3	1	0	2	1	0	0	1	2	2	1
AIM-307.4	1	0	2	1	0	0	1	2	2	1
AIM-307.5	1	0	2	1	0	0	1	2	2	1
Average	1	0	1.8	1.4	0.4	0	1.2	2.4	1.4	0.6

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

Learning Outcomes:

Computer Hardware

1. Identification of various Hardware components on Motherboard
2. Using various options of CMOS setup
3. Print the summary of your system Hardware and verify for correctness
4. Hard drive, optical drive installation.
5. How to recover lost data on harddrive.

Computer Networking

6. Preparing the Ethernet cable for cross and direct connections using crimping tool and test using LAN tester.

7. Installation of a switch and connecting systems to a network switch.
8. Installation of a modem (internal, external or USB) and connecting to internet.
9. Using FTP for uploading and downloading files.
10. Installation and configuring the proxy server for internet access.
11. Setting of IP address to an existing terminal

CYBERSECURITY CONCEPTS:

SYMMETRIC KEY ENCRYPTION TECHNIQUES

12. perform encryption and decryption by using Caesar Cipher technique
13. Exercise encryption and decryption by using Playfair Cipher technique
14. Exercise encryption and decryption by using Hill Cipher technique
15. perform encryption and decryption by using Vigenere Cipher

ASYMMETRIC KEY ENCRYPTION TECHNIQUES

16. Perform encryption and decryption using RSA public and private key.
17. To perform the validation of the digital document using Digital signature standard encryption and decryption
18. To perform the procedure of installation process of antivirus to detect threats.
19. Learn the procedure to ensure security basic firewalls can be enabled in the system.

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.	<ul style="list-style-type: none"> ❖ 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.	<ul style="list-style-type: none"> ❖ 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	<ul style="list-style-type: none"> ❖ 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 Hard drive, optical drive installation.	Hard drive, optical drive installation.	<p>Hard drive:</p> <ul style="list-style-type: none"> ❖ 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. <p>Optical drive:</p> <ul style="list-style-type: none"> ❖ 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. <p>SSD DRIVES:</p>

			<ul style="list-style-type: none"> ❖ Identify SSD slots ❖ How to install SSD drives
5	Exercise on recovery of lost data on hard drive.	How to recover lost data on hard drive.	<ul style="list-style-type: none"> ❖ 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.
6	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.	<ul style="list-style-type: none"> ❖ 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.
7	Switch	Installation of switch and connect systems	<ul style="list-style-type: none"> ❖ Install switch ❖ Connect the systems ❖ Check the validity of sharing of data in between the systems
8	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.	<p>Internal modem</p> <ul style="list-style-type: none"> ❖ Identify PCI slot for placing Internal modem ❖ Connect internal modem ❖ Install required modem driver ❖ Check for the working condition <p>External modem</p> <ul style="list-style-type: none"> ❖ Connect External modem ❖ Install required modem driver ❖ Check for the working condition <p>USB modem</p> <ul style="list-style-type: none"> ❖ Connect USB modem ❖ Install required modem driver <p>Check for the working condition</p>
9	Exercise on Using FTP for uploading and downloading files.	Using FTP for uploading and downloading files.	<ul style="list-style-type: none"> ❖ Know about FTP protocol ❖ Know how to upload file using FTP ❖ Know how to download file using FTP
10	Exercise on Installation and configuring the proxy server for internet access	Installation and configuring the proxy server for internet access	<ul style="list-style-type: none"> ❖ Know about proxy server. ❖ Know how to install proxy server. ❖ Know how to configure proxy server.
11	Exercise on Setting of particular IP address	Setting of particular IP address to an existing	<ul style="list-style-type: none"> ❖ Know about IP addresses ❖ Know how to set IP addresses to the computer systems in a LAN

	to an existing terminal system	terminal system	
12	To implement Transportation and Substitution using Caesar Cipher Technique	Learn to implement the Caesar Cipher Transportation Technique on information	<ul style="list-style-type: none"> ❖ Compile program ❖ Input key value ❖ Input text to be encrypted ❖ Rectify the syntax errors ❖ We will get Encrypted text as output Check the output for correctness
13	To implement Transportation and Substitution using Playfair Cipher Technique	Learn to implement the Playfair Cipher Transportation Technique on information	<ul style="list-style-type: none"> ❖ Compile program ❖ Input key value ❖ Input text to be encrypted ❖ Rectify the syntax errors ❖ We will get Encrypted text as output ❖ Check the output for correctness
14	To implement Transportation and Substitution using Hill Cipher Technique	Learn to implement the Hill Cipher Transportation Technique on information	<ul style="list-style-type: none"> ❖ Input the plain text and key from the user. ❖ Split the plain text into groups of length three. ❖ Arrange the keyword in a 3*3 matrix. ❖ the two matrices to obtain the cipher text of lengththree. ❖ Combine all these groups to get the complete cipher text.
15	To implement Vigenere Cipher Technique	Learn to implement the Vigenere Cipher Technique on information	<ul style="list-style-type: none"> ❖ Arrange the alphabets in row and column of a 26*26 matrix. ❖ Circulate the alphabets in each row to position left such that the first letter is attached to last. ❖ Repeat this process for all 26 rows and construct the final key matrix. ❖ The keyword and the plain text is read from the user. ❖ The characters in the keyword are repeated sequentially so as to match with that of the plaintext. Pick the first letter of the plain text and that of the keyword as the row indices and column indicesrespectively. ❖ The junction character where these two meet forms the cipher character. ❖ Repeat the above steps to generate the entire cipher text.
16	To implement Encryption and Decryptions using	Learn to implement the RSA Public Key Encryption	<ul style="list-style-type: none"> ❖ By using RSA Public Key & Private key for Encryption and Decryption of the message ❖ By using Public key message will be ciphered

	RSA algorithm	Algorithm	<ul style="list-style-type: none"> ❖ By using Private key message will be deciphered ❖ Both the keys are Asymmetric
17	Implementation of Digital Signature Standard	Learn the Digital signature Implementation and its usage	<ul style="list-style-type: none"> ❖ Read the 256-bit key values. ❖ Divide into five equal-sized blocks named A, B, C, D and E. ❖ The blocks B, C and D are passed to the function F. ❖ The resultant value is permuted with block E. ❖ The block A is shifted right by 's' times and permuted with the result of step-4. ❖ Then it is permuted with a weight value and then with some other key pair and taken as the firstblock. ❖ Block A is taken as the second block and the block B is shifted by 's' times and taken as the thirdblock. ❖ blocks C and D are taken as the block D and E for the final output.
18	Study of any Antivirus Installation & Configurations Study/Demo Study of Standard Vulnerabilities.	Learn to install the Antivirus Software in Computer System and know the configuration Setting	<ul style="list-style-type: none"> ❖ Choose the Appropriate Antivirus Software to install in the Computer System ❖ Do the Appropriate settings to configure the Antivirus software in the System. ❖ Observing System Performance While using the Antivirus software ❖ Observe the Viruses/Threats when attacked to Computer System
19	Setting firewall with Windows OS, its importance and Problems.	Study the implementation of firewall Settings in Computer system and learn how it manage the System	<ul style="list-style-type: none"> ❖ Choose The Appropriate System settings to implement Firewall ❖ Observe the System performance while having firewall

Software requirements	<ul style="list-style-type: none"> ❖ Linux /Windows Operating system ❖ C compiler ❖ Java Compiler
-----------------------	--

Course Code	Course Title	No. of periods/week	Total No. of periods	Marks for FA	Marks for SA
AIM-308	DBMS Lab	4	60	40	60

SNo	UNIT TITLE	NO. OF PERIODS	COS
1	Concepts of DBMS & RDBMS	8	CO1
2	Concepts of SQL	16	CO2
3	Basics of PL/ SQL	12	CO3
4	Advance PL/SQL	16	CO4
5	Concepts of NoSQL & MongoDB.	8	CO5
		60	

COURSE OBJECTIVES	<p>Upon completion of the course the student shall able to learn</p> <p>12. Insert, update, delete and select data into/from Relation Database</p> <p>13. Develop PL/SQL programs</p> <p>14. Insert, update, delete and select data from MongoDB</p>
--------------------------	---

Course Outcomes	CO1	AIM-308.1	Develop SQL Queries to Create, modify and drop tables and Queries to Insert, update, delete data from tables.
	CO2	AIM-308.2	Execute SQL Queries to display data on different conditions from

			different tables
CO3	AIM-308.3	Execute PL/SQL Programs	
CO4	AIM-308.4	Demonstrate the usage of cursors and triggers	
CO5	AIM-308.5	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
AIM-308.1	2		3			2	3	3	2	
AIM-308.2	2	2	1			2			2	
AIM-308.3	2		1					2		2
AIM-308.4	2	2	3	3	3	3		2	2	2
AIM-308.5	2	3				3	3			
AIM-308.6	2			3		3		2	2	
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.

Mini Project : Student has to develop a Mini project applying the skills acquired from the learning outcomes of this course.

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	18
8	Exercise on GROUP BY, HAVING	2
9	Exercise on Number functions, character functions, conversion functions and datefunctions, group functions	3

Sl.No	Name of the Experiment	Periods
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		60

KEY COMPETENCIES

Sl.No	Name of the Experiment	Objectives	Key Competencies
1	Know installation	<p>Perform the following:</p> <ol style="list-style-type: none"> To identify the version of Oracle being installed To understand the RAM and HDD requirements for Oracle installation To comprehend the installation steps correctly Setting up of Oracle Administrative Password Configuring the Oracle database after post-installation steps of Oracle viz configuring administrative rights for performing To login to Oracle as administrator account and Oracle user account 	<ul style="list-style-type: none"> ❖ 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.	<p>Perform the following:</p> <ol style="list-style-type: none"> To login with Oracle user account To give correct syntax for table creation To give correct data type for the required fields with appropriate size To display the structure of the table 	<ul style="list-style-type: none"> ❖ 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	<p>Perform the following:</p> <ol style="list-style-type: none"> Check for the required table present already To insert the records correctly To display the records correctly 	<ul style="list-style-type: none"> ❖ 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	<ul style="list-style-type: none"> ❖ Correct syntax errors for updation of record ❖ Check for updation ❖ 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	<ul style="list-style-type: none"> ❖ 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	<ul style="list-style-type: none"> ❖ 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	<ul style="list-style-type: none"> ❖ 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	<ul style="list-style-type: none"> ❖ 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	<ul style="list-style-type: none"> ❖ 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	<ul style="list-style-type: none"> ❖ 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	<ul style="list-style-type: none"> ❖ 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 are joined iii. To know different types of Join	<ul style="list-style-type: none"> ❖ 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	<ul style="list-style-type: none"> ❖ 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	<ul style="list-style-type: none"> ❖ Check for the syntax errors in usage of all types of Integrity constraints ❖ Check whether different types of Integrity constraints are used

Sl.No	Name of the Experiment	Objectives	Key Competencies
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
16	Exercise on Procedures	Perform the following i. To know the concept 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 ❖ Check for proper calling of procedures
17	Exercise on Functions	Perform the following i. To know the concept 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

SI.No	Name of the Experiment	Objectives	Key Competencies
20	Exercise on Installation of MongoDB	Perform the following i. To download and install MongoDB	<ul style="list-style-type: none"> ❖ Observe MongoDB version being installed ❖ Observe the RAM & HDD requirements ❖ Rectify for any MongoDB installation errors <p>Able to login as Administrator</p>
21	Exercise on Creation and Dropping of Database	Perform the following i. Create the Database ii. Drop the Database	<ul style="list-style-type: none"> ❖ Know the use of create Database() and dropDatabase() ❖ 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	<ul style="list-style-type: none"> ❖ 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	<ul style="list-style-type: none"> ❖ Know the syntax of insert(), update(), find(), remove(), sort() functions. ❖ Correct syntax errors. ❖ Check out for different input values.

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-309	Android Programming Lab	4	60	40	60

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Android Basics Activity Life Cycle	8	CO1,CO2
2.	Android – User Interface	16	CO2,CO3
3.	Android Advanced Concepts	16	CO3,CO4
4.	DataBase connectivity in Android	12	CO5
5.	Publish and Deploy Android applications	8	
Total Periods		60	

Course Objectives	At the end of the course, the student shall be able to	
	i)To know the Basics of Android Application Development ii)To familiarize with the Android Anatomy, Components, Activity Life Cycle, Intents iii)To use various User Interface controls in Android Application Development iv)To reinforce theoretical concepts by creating relevant Android applications.	

Course Outcomes	At the end of the course, the student shall be able to	
	C01	Demonstrate the Basics of Android Programming for developing Android Applications
	C02	Observe the Anatomy, Components, Activity Life Cycle, Intents of Android Applications

	C03	Incorporate the User Interface Controls in Android Programming
	C04	Analyse the Android Advanced Concepts in Android Programming
	C05	Integrate the DataBase with Android Applications, Publish Android applications & Deploy APK files

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-309.1	2	1	3	2	1	2	1	2	3	3
AIM-309.2	1	3	3	3	1	3	2	2	3	3
AIM-309.3	1	2	3	2	2	3	1	2	3	3
AIM-309.4	1	1	3	2	2	3	2	2	3	3
AIM-309.5	1	2	3	3	2	2	2	2	3	3
Average	1.5	2	3	2.6	1.5	2.5	1.6	2	3	3

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

LIST OF EXERCISES:

- 1.Create an Android Application To display “Hello World”
- 2.Create an Android Application To display a Toast Message
- 3.Create an Android app to accept a number in textfield and display the factorial of it in a Toast message on clicking a button

4. Create an Android app to illustrate the use of CheckBox widget.
5. Create an Android app to illustrate the use of Spinner(ComboBox) widget.
6. Create an Android app to illustrate the use of DatePicker widget and TimePicker widget.
7. Create an Android app that uses multiple UI controls like EditText, CheckBox, Spinner and Buttons
8. Create an Android app to shift from one activity to another activity using a button.
9. Create an Android Application Using Image Effects
10. Create an Android Application Using ImageSwitcher
11. Create an Android Application Using AlertDialog
12. Create an Android Application To Integrate Google Maps
13. Create an Android Application To send SMS
14. Create an Android Application To calling a number
15. Create an Android Application To send E-mail
16. Create an Android Application Using Database
17. Publish Android Application
18. Deploy Android Application

Android Programming Lab Objectives and Key Competencies			
Sl.No	Name of the Experiment	Objectives	Key Competencies
1	Create an Android Application To display "Hello World"	Create an Android app to show "Hello World"	<ul style="list-style-type: none"> ❖ Correct syntactical errors ❖ Debug logical errors ❖ Confirm whether the required output generated properly or not
2	Create an Android Application To display Toast Message as "Hello World"	Create an Android app to show Toast Message as "Hello World"	<ul style="list-style-type: none"> ❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the Toast class and its required methods

Android Programming Lab Objectives and Key Competencies			
Sl.No	Name of the Experiment	Objectives	Key Competencies
	World”		❖ Confirm whether “Hello World” is displayed as Toast Message or not
3	Create an Android app to accept a number in textfield and display the factorial of it in a Toast message on clicking a button	an Android app to accept a number in textfield and display the factorial of it in a Toast message on clicking a button	<ul style="list-style-type: none"> ❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the EditText and Button classes and the required methods ❖ Confirm whether the factorial is computed and shown in the Toast or not
4	Exercise on Checkboxcontrol	an Android app to illustrate the use of checkbox control	<ul style="list-style-type: none"> ❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the Checkbox class and its required methods ❖ Confirm whether the selected checkbox value is shown on aToast
5	Exercise on Spinner (ComboBox) Control	Create an Android app to illustrate the use of Spinner(ComboBox) control	<ul style="list-style-type: none"> ❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the Spinner class and its required methods ❖ Confirm whether the selected Spinner value is shown on a Toast
6	Exercise on Datepicker and Timepicker	Create an Android app to illustrate the use of Datepicker widget and Timepicker widget.	<ul style="list-style-type: none"> ❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the Datepicker class and its required methods ❖ Confirm whether the selected date value is shown on a toast
7	Exercise on multiple UI controls	Create an Android app that uses multiple UI controls like textfield, Checkbox, Spinner and Buttons	<ul style="list-style-type: none"> ❖ Correct syntactical errors ❖ Debug logical errors ❖ Confirm whether the required operations are done properly
8	Exercise on Intent	Create an Android app to shift from one activity to another activity using a button.	<ul style="list-style-type: none"> ❖ Correct syntacticalerrors ❖ Debug logical errors ❖ Know how to apply startActivity() method

Android Programming Lab Objectives and Key Competencies

Sl.No	Name of the Experiment	Objectives	Key Competencies
			using intent ❖ Confirm whether the c moves from one activity to another activity.
9	Create an Android Application Using Image Effects	an Android Application Using Image Effects	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the Bitmap class ❖ Study Methods to manipulate Images ❖ Confirm whether the Image Effects are done properly or not
10	Create an Android Application Using ImageSwitcher	an Android Application Using ImageSwitcher	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the ImageSwitcher class ❖ Study ImageSwitcher Methods to manipulate Images ❖ Confirm whether the Image was set using ImageSwitcher methods or not
11	Create an Android Application Using AlertDialog	an Android Application Using AlertDialog	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the AlertDialog class and its methods ❖ Confirm whether the Dialogs are triggered properly or not
12	Create an Android Application To Integrate Google Maps	an Android Application To Integrate Google Maps	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the GoogleMap class and its methods ❖ Confirm whether the Map working properly or not
13	Create an Android Application To send SMS	an Android Application To send SMS	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the SmsManager class and its methods ❖ Confirm whether the messages are sending properly or not

Android Programming Lab Objectives and Key Competencies

Sl.No	Name of the Experiment	Objectives	Key Competencies
14	Create an Android Application To calling a number	Create an Android Application To calling a number	<ul style="list-style-type: none"> ❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the class and its methods ❖ Confirm whether the event performed or not
15	Create an Android Application To send E-mail	an Android Application To send E-mail	<ul style="list-style-type: none"> ❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the E-mail functionality with Intents ❖ Confirm whether the E-mails are sending properly or not
16	Create an Android Application Using Database	an Android Application Using Database	<ul style="list-style-type: none"> ❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the operations of Database ❖ Confirm whether the data is properly inserted or not ❖ Confirm whether the data is properly deleted or not ❖ Confirm whether the data is properly updated or not ❖ Confirm whether the data is properly fetched or not
17	Publish Android Application	an Android Application	<ul style="list-style-type: none"> ❖ Correct syntactical errors ❖ Debug logical errors ❖ Publish an Android Application ❖ Confirm whether an Android Application published or not
18	Deploy Android Application	an Android Application	<ul style="list-style-type: none"> ❖ Correct syntactical errors ❖ Debug logical errors ❖ Deploy an Android Application ❖ Confirm whether an Android Application Deployed or not

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2023
(IV Semester)**

Sub Code	Name of the Subject	Instruction		Total Periods P	Scheme Of Examinations			
		Periods/Week			Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
		Theory	Practicals					
THEORY SUBJECTS								
AIM-401	Web Technologies	5	-	75	3	20	80	100
AIM-402	Python Programming	5	-	75	3	20	80	100
AIM-403	Artificial Intelligence	5	-	75	3	20	80	100
AIM-404	Software Engineering	5	-	75	3	20	80	100
AIM-405	Fundamentals of Machine Learning	5	-	75	3	20	80	100
PRACTICAL SUBJECTS								
AIM-406	Web Technologies Lab	-	4	60	3	40	60	100
AIM-407	Python Programming Lab	-	4	60	3	40	60	100
AIM-408	Communication Skills	-	3	45	3	40	60	100
AIM-409	Artificial Intelligence Lab using PROLOG	-	3	45	3	40	60	100
	ACTIVITIES		3	45				
	Total	25	17	630	-	260	640	900

WEB TECHNOLOGIES

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-401	Web Technologies	5	75	20	80

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

Course Objectives	<ul style="list-style-type: none"> 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
-------------------	---

	CO1	Implement interactive web page(s) using HTML and CSS
	CO2	Know how to format and validate Web page elements using

Course Outcomes		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 , <i>, <u>, <strike>, <sub>, <sup>, <big>, <small>, <tt>
- 1.2.8 Discuss the Logical formatting tags <q>, , <cite>, <ins>, ,
- 1.2.9 Discuss the <marquee> with attributes.
- 1.2.10 List Character entities.
- 1.2.11 Explain the List tags like , , , <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>, 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 Understand the 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.
- 3.2.5 Understand 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 getElementById method
 - 3.2.5.4 Describe the global functions provided by JavaScript.
- 3.2.6 Form Handling in Java Script
- 3.2.7 Illustrate Arrays
 - 3.2.7.1 Understand single and multi dimensional arrays.
 - 3.2.7.2 Design small programs using arrays.
- 3.2.8 Understand 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
- 3.2.9 Describe events in java script.

4. JQuery

- 4.1 Define JQuery
- 4.2 List the features of JQuery
- 4.3 List JQuery plugins
- 4.4 Explain the steps for to include JQuery in Web Pages
- 4.5 Explain JQuery Syntax with example program
- 4.6 Describe the jQuery Selectors-Accessing HTML elements by using
- 4.7 Element Selectors
- 4.8 ID, Class Selectors
- 4.9 Explain the JQuery Document Ready Event
- 4.10 Describe the JQuery Event handling methods(Mouse Events, Keyboard Events, Form Events, DoAJment/Window events)
- 4.11 Explain effects of JQuery(likehide, show, fadeIn, fadeout, fadeToggle,fadeTo, slideDown, SlideUp, SlideToggle)
- 4.12 Explain 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 the Fundamentals 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 List various 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 Explain types 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 access Mysql 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 AIM-401	Course Title: Web Technologies Number of course outcomes:04			No. of periods:75	
POs	Mapped with CO No.	CO Addressing PO in column1		Level (1,2,3)	Remarks
		No	%		
PO1	CO1	25	30	2	>40% Level3
PO2	CO2,CO3,CO4	60	70	3	Highly addressed
PO3	CO1,CO2,CO3,CO4	60	70	3	
PO4					25% to 40% Level 2
PO5	CO1,CO2,CO3,CO4	50	60	3	Moderately Addressed
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, Colors, 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

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

Model Blue Print:

S.No.	Chapter/ Unit title	No.of periods	Weightag e Allocatd	Marks Wise Distribution of Weightage			Question wise Distribution of Weightage			CO's Mapped
				R	U	Ap	R	U	Ap	
1	Principles of Web Designing and HTML Introduction.	11	21	6	10	5	2	1	1/2	CO1
2	Understand various HTML tags and usage of style sheets.	14	21	6	5	10	2	1/2	1	CO2
3	Understand XML and Client side scripting using Java Script.	18	26	6	10	10	2	1	1	CO2
4	JQuery	10	13	3	10	-	1	1		CO3
5	Web servers and Server side scripting using PHP	22	29	9	10	10	3	1	1	CO4
	Total	75	110	30	45	35	10	4.5	3.5	

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 4.1 to 5.29

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
Web Technologies
UNIT TEST-1

SCHEME: C-23
MAX MARKS:40

SUBJ CODE:AIM-401
TIME: 90 MINUTES

PART-A

16Marks

Instructions:1) Answer all questions
2) First question carries 4marks, and remaining carries 3marks each.

1. a) the external Java script file must contains <script> tag (True/False) (CO3)
b) -----is used to choose the client-side java script object. (CO2)
c) Which selector selects the element that is the target of a referring URI [] (CO1)
i) :target ii) :selection iii) :: selection iv) :URI
d) Which one of the following does not belongs to table tag [] (CO1)
i) <tr> ii)<td> iii) <tbody> iv) <th>
2. Write different steps involved in launching a website. (CO1)
3. Write any four formatting tags. (CO2)
4. List the application of XML. (CO2)
5. What is the significance of Namespace? (CO2)

PART-B

3X8=24Marks

Instructions:1) Answer all questions
2) Each question carries 8 Marks
3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

6. a) Explain List tags with an example. (CO1)
Or
b) Write about any five table tags with example. (CO2)
7. a) Explain different Form tags with example. (CO2)
Or
b) Explain any five Box properties with sample code. (CO3)
8. a) Explain Math , String and Date objects in Java scripts (CO3)
Or
b) Describe how to define and call functions in java scripts. (CO2)

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER – YEAR END EXAMINATION
WEB TECHNOLOGIES

SCHEME: C-20
MAX MARKS:80

SUBJ CODE:AIM-401
TIME: 3HOURS

PART-A

3×10=30

Instructions: 1) Answer all questions

2) Each question carries three marks.

3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Write the steps to launch a web site. (CO1)
2. Describe the following tags. (CO1)
a) (b)<cite> (c) <ins>
3. Write any 3 attributes of <a>. (CO1)
4. What is the purpose of CSS? (CO1)
5. List the various applications of XML. (CO2)
6. Write a JavaScript program to print the message. (CO2)
7. Write any three plugins . (CO3)
8. List any 3 features of JQuery.(CO3)
9. What is the difference between GET and POST methods(CO4)
10. Define Cookie. (CO4)

PART-B

5×10=50

Instructions: 1) Answer ANY FIVE questions

2) Each question carries TEN marks.

3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. Explain various formatting tags in HTML. (CO1)
12. (a)Explain various Table tags with attributes. (CO1)
(b)Explain different types of CSS. (CO2)
13. Design a student registration form using form elements. (CO2)
14. Explain the rules for designing XML document. Write an Example XML document. (CO2)
15. Explain Properties and methods of XMLHttpRequest Object. (CO2)
16. Explain jQuery Selectors with example. (CO3)
17. Explain any 5 String function in PHP with syntax and example. (CO4)
18. Explain how to pass data from one web page to other web page using query string. (CO4)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-402	Python Programming	5	75	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Introduction	10	CO1
2.	Control Flow and Loops	15	CO2
3.	Functions and Arrays	15	CO3
4.	Data Structures	15	CO4
5.	Object Oriented Programming in Python and File Handling and Exception Handling	20	CO5
Total Periods		75	

Course Objectives	i)To know the fundamentals of Python programming ii)To understand fundamental syntactic information about 'Python' iii) To develop various python programs
-------------------	--

Course Outcomes	CO1	AIM-402.1	Explain Basic constructs like operators, expressions and components of python programming as well as Editing and Debugging
	CO2	AIM-402.2	Write Python programs using Control statements, Loops
	CO3	AIM-402.3	Write python programs using Functions and arrays
	CO4	AIM-402.4	Develop Python programs using Data structures
	CO5	AIM-402.5	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
AIM-402.1	3	1	2	1	1	1		2	1	
AIM-402.2	3	2	2	1	1	1	1	2	2	2
AIM-402.3	3	2	2	1	1	1		2	2	2
AIM-402.4	3	1	2	1	1	1	1	2	2	2
AIM-402.5	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:

6.0 Introduction

- 6.1. History of Python.
- 6.2. List Python features
- 6.3. Explain Applications of Python
- 6.4. Describe Python Integrated Development and Learning Environment (IDLE)
- 6.5. Give the process of Running Python Scripts.
- 6.6. Explain Identifiers, Keywords, Indentation, Variables
- 6.7. Explain various datatypes (Int, float, Boolean, string, and list)
- 6.8. Explain declaration, initialization of variables.
- 6.9. Explain Input and Output statements.
- 6.10. Explain formatted input output.
- 6.11. State the usage of comments
- 6.12. Explain various Operators.
- 6.13. Explain Boolean values.
- 6.14. Explain Operator precedence rules.
- 6.15. State the purpose of modules.
- 6.16. Define functions.
- 6.17. List types of functions.(Built-in, User defined)
- 6.18. Explain Built-in Functions.
- 6.19. Give the Steps in Develop a simple python program and execution.

7.0 Control Flow and Loops

- 7.1. Explain various Control Flow constructs.
 - 7.1.1.If
 - 7.1.2.If-Else
 - 7.1.3.if-elif-else
- 7.2. Explain various Loop Statements.
 - 7.2.1.for Loop
 - 7.2.2.while loop
 - 7.2.3.break
 - 7.2.4.continue
 - 7.2.5.pass

8.0 Functions and Arrays

- 8.1. Introduction
- 8.2. Function Arguments: Default arguments, Variable Length arguments
- 8.3. Anonymous Functions
- 8.4. Return Statement
- 8.5. Scope of variables: Local Variables and Global Variables
- 8.6. Explain creation of modules.
- 8.7. Explain importing of modules.
- 8.8. Python Variable: Namespace and scoping
- 8.9. Python Packages
- 8.10. Explain Strings: String slices, immutability
- 8.11. Explain String functions and methods.
- 8.12. Explain about String module.
- 8.13. Explain about Python Arrays.
- 8.14. Explain accessing of elements in an Array.
- 8.15. Explain Array methods.

9.0 Data Structures

- 9.1. Explain Python Lists.
- 9.2. Describe Basic List Operations.
- 9.3. Explain List Slices.
- 9.4. Explain List methods.
- 9.5. Explain List loop
- 9.6. Explain mutability.
- 9.7. Explain aliasing.
- 9.8. Explain Cloning lists.
- 9.9. Explain List parameters.
- 9.10. Explain List comprehension.
- 9.11. Tuples.
 - 9.11.1. Explain Tuple assignment.
 - 9.11.2. Explain Tuple as return value.
 - 9.11.3. Explain Tuple Comprehension
- 9.12. Dictionaries
 - 9.12.1. Explain creation of dictionary/assignment.
 - 9.12.2. Explain Operations and methods.
 - 9.12.3. Explain Dictionary Comprehension.
- 9.13. Explain Sets.

10.0 Object Oriented Programming in Python and File Handling and Exception Handling

- 10.1. Creating Classes
- 10.2. Creating Objects
- 10.3. Method Overloading and Overriding
- 10.4. Data Hiding
- 10.5. Data Abstraction
- 10.6. Opening files in different modes
- 10.7. Processing files
- 10.8. Closing a file
- 10.9. 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 Programming 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

Model Blue Print:

S.No.	Chapter/Unit title	No. of periods	Weightage Allocated	Marks Wise Distribution of Weightage				Question wise Distribution of Weightage				CO's Mapped
				R	U	Ap	An	R	U	Ap	An	
1	Python Programming Introduction	10	26	6	20			2	2			CO1
2	Standard Data Types and Control Flow	15	13	3		10		1		1		CO2
3	Data	15	26	6		20		2		2		CO3
4	Functions	15	26	6		20		2		2		CO4
5	Object Oriented Programming in Python and File Handling and Exception Handling	20	19	9		10		3		1		CO5
	Total	75	90	30	20	60		10	2	6		

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

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER

Python Programming

UNIT TEST-1

SCHEME: C-23
MAX MARKS:40

SUBJ CODE: AIM-402
TIME: 90Minutes

PART-A

16Marks

Instructions:1) Answer all questions

2) First question carries 4marks, and each question of remaining carries 3marks

1. a) Mathematical operations can be performed on a string.(True/False) (CO1)
- b) _____ operator is the highest precedence in the expression. (CO1)
- c)~4 evaluate to _____ (CO1,CO2)
- d) What is the output when we execute list("hello")?
 - i) ['h', 'e', 'l', 'l', 'o']
 - ii) ['hello']
 - iii) ['llo']
 - iv) ['olleh'] (CO3)
2. List features of Python. (CO1)
3. Write the rules for choosing names of variables. (CO1)
- 4) What are the different operations that can be performed on a list? (CO3)
- 5)write about if statement with an example. (CO2)

PART-B

3X8=24Marks

Instructions:1) Answer all questions

2) Each question carries 8 Marks

3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

6. a) Explain about the need for learning python programming and its importance. (CO1)

Or

- b) Explain the basics for executing a python program using REPL(Shell) with an example.(CO1)

7. a) What are the different loop control statements available in python? Explain with suitable examples. (CO2)

Or

b) Write in brief about Tuple in python. Write operations with suitable examples. (CO3)

8. a) Write a python program that prints the intersection of two lists. (without using list comprehensions/sets). (CO3)

Or

b) List and explain different arithmetic operators supported by Python. Discuss about their precedence and associativity. (CO1)

BOARD DIPLOMA EXAMINATION
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER – END EXAMINATION
Python Programming

SCHEME: C-23
MAX MARKS:80

SUBJ CODE:AIM-402
TIME: 3HOURS

PART-A

10X3=30Marks

Note: Answer all questions

- | | |
|--|-----|
| 1. Write in brief about the applications of Python. | CO1 |
| 2. List data types used in Python. | CO1 |
| 3. Demonstrate the use of continue in loop statement. | CO2 |
| 4. List different methods used in Python lists. | CO3 |
| 5. Write in brief about sets in Python. | CO3 |
| 6. List different types of arguments in Python. | CO4 |
| 7. Can a Python function return multiple values? If yes, how it works? | CO4 |
| 8. List Object oriented features supported by Python. | CO5 |
| 9. List different modes in File opening. | CO5 |
| 10. Define Exception. | CO5 |

PART-B

5x8=40Marks

Note: Answer all questions

- | | |
|--|-----|
| 11. Explain about Python IDLE. | CO1 |
| 12. Explain about running Python scripts. | CO1 |
| 13. Explain different conditional control flow statements in Python with examples. | CO2 |
| 14. Explain in detail about dictionaries in Python. | CO3 |

15. Write in brief about Sequence operations with suitable examples in python . CO3
16. Explain how to create a user defined exceptions. CO4
17. What are the two ways of importing a module? Which one is more beneficial? Explain.
CO4
18. Explain how to implement inheritance in Python. CO5

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-403	ARTIFICIAL INTELLIGENCE	5	75	20	80

S. No.	Chapter/Unit Title	No. of Periods	CO's Mapped
1.	Introduction to PROLOG	15	CO1
2.	Problems and Search Methods in AI	20	CO1, CO2
3.	Knowledge Representation	20	CO1, CO3
4.	Game Theory	10	CO4
5.	Fuzzy Logic	10	CO5
Total Periods		75	

Course Objectives	<ul style="list-style-type: none"> i) To understand PROLOG ii) To know the Searching techniques of AI iii) To knowledge representation using predicate logic iv) To familiarize Game playing strategies and Fuzzy logic
-------------------	---

Course Outcomes	At the end of the course the student able to learn following:		
	CO1	AIM-403.1	Describe concepts of PROLOG language
	CO2	AIM-403.2	Analyze various searching techniques
	CO3	AIM-403.3	Illustrate various knowledge representation techniques
	CO4	AIM-403.4	Explain various game paying techniques
	CO5	AIM-403.5	Explain fuzzy logic concepts

CO-PO/PSO Matrix:

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

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

Learning Outcomes:

1.0 Introduction to PROLOG

- 1.1 State the need of PROLOG.
- 1.2 List the Key features of prolog
- 1.3 List the facts and rules of PROLOG
- 1.4 Describe how to install Prolog in Linux
- 1.5 List Advantages and Disadvantages of Prolog
- 1.6 State the Goals and terminology.
- 1.7 Explain Variables.
- 1.8 Explain Control Structures
- 1.9 Illustrate the usage of Arithmetic operators
- 1.10 State the importance of Matching in PROLOG
- 1.11 Explain Backtracking
- 1.12 List and explain the types offcuts
- 1.13 Explain Recursion
- 1.14 Define List
- 1.15 Explain Lists with examples
- 1.16 Describe Dynamic databases
- 1.17 List and explain various Input/output operations
- 1.18 List and explain various Input and Output Streams

2.0 Problems and Search Methods in AI

- 2.1 Define Artificial Intelligence
- 2.2 List the AI Problems.
- 2.3 Explain Underlying Assumption.
- 2.4 List AI Techniques
- 2.5 Explain the level of model.
- 2.6 State the Criteria for success.
- 2.7 Define the problem as a state space search.
- 2.8 List the Problem Characteristics.
- 2.9 Define the production system.
- 2.10 Explain the Production systems.

- 2.11 List the Features of Production system.
- 2.12 Explain about Searching problems, solutions
- 2.13 Define Un-informed Searching strategy.
- 2.14 Define Informed Searching strategy
- 2.15 Explain Un-informed searching methods
 - 2.15.1 BFS
 - 2.15.2 DFS
 - 2.15.3 greedy search
 - 2.15.4 brute force search
- 2.16 Explain Informed searching methods
 - 2.16.1 DFS
 - 2.16.2 branch and bound
 - 2.16.3 Hill climbing
 - 2.16.4 constraint satisfaction searching
 - 2.16.5 A*

3.0 Knowledge Representation

- 3.1 Define Knowledge representation
- 3.2 List and explain the types of Knowledge
- 3.3 Knowledge representation issues:
 - 3.3.1 List and Explain issues in knowledge representation
 - 3.3.2 Explain representation on mappings
 - 3.3.3 List the approaches to knowledge representation
- 3.4 Predicate logic:
 - 3.4.1 Define predicate logic
 - 3.4.2 Illustrate simple facts in logic
 - 3.4.3 Illustrate instance and ISA relationships
 - 3.4.4 Describe Computable functions and predicates
 - 3.4.5 Quote Resolutions
- 3.5 Representing knowledge as rules
 - 3.5.1 Define procedural knowledge
 - 3.5.2 Define Declarative knowledge
 - 3.5.3 Distinguish Procedural vs Declarative knowledge
 - 3.5.4 Define Logic Programming
 - 3.5.5 Explain Logic programming
 - 3.5.6 Explain forward reasoning
 - 3.5.7 Explain Backward reasoning
 - 3.5.8 Distinguish Forward vs. Backward reasoning

4.0 GAME THEORY

- 4.1 Describe Games as Search Problems
- 4.2 Explain components of Search problem
- 4.3 Describe **Minimax** search procedures
- 4.4 Explain Additional refinements
- 4.5 Define pruning the search tree
- 4.6 Describe Alpha-Beta Pruning.
- 4.7 State the purpose of Chance Node

- 4.8 State the importance of Expected Value
- 4.9 Illustrate Games that Include an Element of Chance

5.0 FUZZY LOGIC

- 5.1 Define Fuzzy logic
- 5.2 Explain basics of fuzzy logic
- 5.3 State the importance of sets
- 5.4 Explain Fuzzy sets
- 5.5 State importance of crisp sets
- 5.6 Explain Crisp sets
- 5.7 State importance of fuzzy logic control
- 5.8 Explain Fuzzy logic control
- 5.9 State importance of fuzzy inference
- 5.10 Explain Fuzzy inference
- 5.11 State fuzzy hedges
- 5.12 Explain Fuzzy hedges
- 5.13 State the importance of Alpha cut threshold
- 5.14 Explain Alpha cut threshold
- 5.15 State the importance of Neuro fuzzy systems
- 5.16 Explain Neuro fuzzy systems
- 5.17 State the importance of fuzzy Bayesian networks
- 5.18 Explain Fuzzy Bayesian networks

COURSE CONTENTS:

UNIT1:

Introduction to PROLOG

Introduction PROLOG--facts--rules--goals--variables--control--structures--operators--matching--backtracking--cuts--recursion--lists--dynamic database--simple input/output streams

UNIT2:

PROBLEMS AND SEARCH METHODS in AI

Introduction to artificial intelligence--Problems--Problem Spaces--Search Strategies--Uninformed--Informed Search Methods.

UNIT3:

KNOWLEDGE REPRESENTATION

Knowledge representation issues--predicate logic--representing knowledge using rules

UNIT4:

GAME THEORY

Minimax algorithm--alpha-beta pruning--additional refinements--State-of-the-Art Game Programs

UNIT5:

FUZZY LOGIC

Introduction–fuzzy sets–crisp sets–fuzzy logic control–fuzzy inference–fuzzy hedges–alpha cut threshold–neuro fuzzy systems–fuzzy Bayesian networks.

Text/References:

1. Artificial Intelligence: Elaine Rich, Kevin Knight, Mc-Graw Hill.
2. Introduction to AI & Expert System: Dan Watterson, PHI.
3. Artificial Intelligence by Luger (Pearson Education)
4. Russel & Norvig, Artificial Intelligence: A Modern Approach, Pearson Education
5. <http://www.nptel.iitm.ac.in/video.php?subjectId=106105077>
6. Website for search strategy implementation in python <http://code.google.com/p/aima-python/>
7. <http://www.journals.elsevier.com/artificial-intelligence/>
8. <https://www.technologyreview.com/s/534871/our-fear-of-artificial-intelligence/>
9. <http://www.sanfoundry.com/artificial-intelligence-mcqs-inductive-logicunification-lifting-1/>

Blue print

S.No.	Chapter/Unit title	No.of periods	Weightage Allocated	Marks Wise Distribution of Weightage			Question wise Distribution of Weightage			CO's Mapped
				R	U	Ap	R	U	Ap	
1	Introduction to PROLOG	15	16	3	13		1	2		CO1
2	Problems and Search Methods in AI	20	26	3	13	10	1	2	1	CO1,CO2
3	Knowledge Representation	20	26	3	13	10	1	2	1	CO1,CO3
4	Game Theory	10	26	3	13	10	1	2	1	CO4
5	Fuzzy Logic	10	16	3	13		1	2		CO5
	Total	75	110	15	65	30	5	10	3	

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 3.1
Unit test-2	From 3.2 to 5.9

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
ARTIFICIAL INTELLEGENCE
UNIT TEST-1

SCHEME: C-20
 MAX MARKS:40

SUBJ CODE: AIM-403
 TIME: 90Minutes

PART-A

16Marks

Instructions: 1) Answer all questions

2) First question carries 4marks, and each question of remaining carries 3marks

- 1) a) Is Hill climbing informed search method (True/False) (CO2)
- b) Predicate Logic is (CO3)
- c) PROLOG stands for (CO1)

- d) Which of the given language is not commonly used for AI? (CO1)
 - 1. Python 2. Perl 3. LISP 4. PROLOG
- 2). List the AI Problems. (CO2)
- 3).List the approaches to knowledge representation (CO3)
- 4). what is the principle of fuzzy logic? (CO5)

PART-B

3X8=24Marks

Instructions: 1) Answer all questions

2)Each question carries 8 Marks

3)Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

- 5. a) Explain logic variables in PROLOG with an examples (CO1)
 Or
- b) Explain lists in PROLOG with an examples (CO1)
- 6. a) Explain about searching problems and solutions (CO2)
 Or
- b) Explain about Breadth first search algorithm (CO2)
- 7. a) Explain knowledge representation mappings (CO3)
 Or
- b) Explain about predicate logic facts . (CO3)

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER – YEAR END EXAMINATION
ARTIFICIAL INTELLIGENCE

SCHEME: C-20
MAX MARKS:80

SUB-CODE: AIM-403
TIME: 3HOURS

.....
PART-A

Note: Answer all questions. Each question carries 3 marks

10 X 3=30M

- | | | |
|----|---|-----|
| 1. | List the facts in PROLOG | CO1 |
| 2. | Write any 2 features of PROLOG | CO1 |
| 3. | Define state space search? | CO2 |
| 4. | List the searching strategies in AI | CO2 |
| 5. | Write the issues in knowledge representation | CO3 |
| 6 | List the rules of knowledge representation | CO3 |
| 7 | What is minimax search technique? | CO4 |
| 8 | What is fuzzy set? | CO5 |
| 9 | Write the significance of Alpha cut threshold | CO5 |
| 10 | List the additional refinements. | CO4 |

PART-B

Note: 1. Answer any 5 Questions.

2. Each question carries 10 marks

5 X 10=50M

- | | | |
|-----|---|-----|
| 11. | Explain control structures with an example in PROLOG | CO1 |
| 12. | Explain different levels in Artificial Intelligence | CO2 |
| 13. | Explain uninformed search methods | CO2 |
| 14. | Describe Computable functions and predicates | CO3 |
| 15. | Explain logic programming in predicate logic | CO3 |
| 16. | Explain Alpha-Beta Pruning method | CO4 |
| 17. | Explain about additional refinements in Game theory | CO4 |
| 18. | Explain Fuzzy logic control with a neat architecture. | CO5 |

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-404	Software Engineering	5	75	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Basics of Software Engineering Designs & Life Cycle Models	10	CO1
2.	Software Project Management	18	CO2
3.	Requirement Analysis & Specifications	10	CO3
4.	Software Design, Coding	22	CO4
5.	Software testing, Debugging, Reliability, Quality Management & Maintenance	15	CO5
Total Periods		75	

Course Objectives	<p>i)To know the fundamentals of software engineering & life cycle modes</p> <p>ii)To familiarize project managements</p> <p>iii)To design software projects with the help of software engineering principles and UML models</p>
-------------------	--

Course Outcomes	At the end of the course the student able to learn following:		
	CO1	AIM-404.1	Explain Software life cycle models and basics of software engineering.
	CO2	AIM-404.2	Describe Software Project Management
	CO3	AIM-404.3	Prepare SRS document
	CO4	AIM-404.4	Apply Design ,coding techniques.

	CO5	AIM-404.5	Apply Testing Techniques ,Quality and reliability metrics
--	-----	-----------	---

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-404.1	3	2	3	2	2	1	1	2	2	2
AIM-404.2	3	3	3	3	1	3	2	2	2	3
AIM-404.3	3	3	1		3		1	2	2	3
AIM-404.4	3	3	3	3	2	2	2	2	3	3
AIM-404.5	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 UMLnotation
 - 4.5.5 Classify and list standard UML diagrams
 - 4.5.6 Know the purpose of Classdiagram and draw simple class diagrams
 - 4.5.7 Use case diagram
 - 4.5.7.1 Define the term Usecase
 - 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

Model Blue Print:

S.No.	Chapter/ Unit title	No.of periods	Weighta ge Allocated	Marks Wise Distribution of Weightage			Question wise Distribution of Weightage			CO's Mapped
				R	U	Ap	R	U	Ap	
1	Basics of Software Engineering Designs & Life Cycle Models	10	16	6	10		2	1		CO1
2	Software Project Management	18	16	6		10	2		1	CO2
3	Requirement Analysis & Specifications	10	13	3	10		1	1		CO3
4	Software Design, Coding	22	39	9	30		3	3		CO4
5	Software testing, Debugging, Reliability, Quality Management & Maintenance	15	26	6	20		2	2		CO5

	Total	75	80	30	70	10	10	7	1	

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

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
SOFTWARE ENGINEERING
UNIT TEST-1**

SCHEME: C-23
MAX MARKS:40

SUBJ CODE:AIM-404
TIME: 90Minutes

PART-A

16 Marks

Instructions: 1) Answer all questions

2) First question carries 4marks, and each question of remaining carries 3marks

- 1) a) Water fall model is not a software life cycle model (True/False) (CO1)
- b) Set of instructions is (CO1)
- c) SPMP stands for ----- (CO2)
- d) Which one the following is not an external interface requirement [] (CO3)
- i) User Interface II) Hardware Interface III) personal interface IV) Software interface
- 2) What is software crisis and how do you solve it? (CO1)
- 3) List any three job responsibilities of software project manager. (CO2)
- 4) Describe Lines of code? (CO2)
- 5) What is the purpose of Requirements Traceability? (CO3)

PART-B

3 X 8=24Marks

Instructions: 1) Answer all questions

2)Each question carries 8 Marks

3)Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

- 6. a) Explain Classical water fall model in detail. (CO1)
- Or
- b) Explain spiral model in detail (CO1)
- 7. a) Explain the two different works of Staffing Level Estimations. (CO2)
- Or
- b) Explain Risk Management. (CO2)
- 8. a) Explain functional requirements in detail. (CO3)
- Or
- b) Explain Requirement gathering and analysis (CO3)

BOARD DIPLOMA EXAMINATION
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER-END EXAMINATION
SOFTWARE ENGINEERING

SCHEME: C-23
MAX MARKS:80

SUBJ CODE:AIM-404
TIME: 3HOURS

PART-A

10X3=30Marks

Note: Answer all questions

1. Define software and software engineering. (CO1)
2. Describe the Solution to the Software Crisis . (CO1)
3. List any three Responsibilities of a Software Project Manager. (CO2)
4. State the Metrics for Project Size Estimation. (CO2)
5. What is Requirement analysis? (CO3)
6. Define the terms Cohesion and Coupling (CO4)
7. List any three Characteristics of a good User Interface (CO4)
8. State the importance of Code Review (CO4)
9. Define Software Quality (CO5)
10. List any three Reliability Metrics (CO5)

PART-B

5x10=50Marks

Note: Answer any five questions and each question carry 10 marks

11. Explain the Software Life Cycle Models? (CO1)
12. Explain the three Project Estimation Techniques? (CO2)
13. Explain Organization of the SRS Document? (CO3)
14. Explain the two approaches of Software Design? (CO4)
15. List and explain Building blocks of UML (CO4)
16. Explain any two Types of User Interface (CO4)
17. Explain the concept of Debugging? (CO5)
18. Explain in detail about Software Quality Management System? (CO5)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-405	Fundamentals of Machine Learning	5	75	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Introduction to Machine Learning	10	CO1
2.	Process of machine learning	15	CO2
3.	Probability and Bayesian Learning	10	CO3
4.	Supervised learning	20	CO4
5.	Unsupervised Learning	20	CO5
Total Periods		75	

Course Objectives	Upon completion of the course the student shall be able
	i)To know about the basics of machine learning ii)To Familiarize Data modelling, mathematics behind machine learning,. iii)To Analyze various supervised learning algorithms iv)To Analyze with unsupervised learning algorithms

Course Out comes	Upon completion of the course the student shall be able		
	CO1	AIM-405.1	Explain basic concepts of Machine learning
	CO2	AIM-405.2	Describe the data modelling for machine learning
	CO3	AIM-405.3	Explain the basic mathematics for machine learning
	CO4	AIM-405.4	Analyze various supervised learning algorithms of machine learning
	CO5	AIM-405.5	Analyze various unsupervised learning algorithms of machine learning

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-405.1	3							1	1	1
AIM-405.2	3	3	3	2	2		2	2	1	2
AIM-405.3	2	3	3	2	1		1	3	2	3
AIM-405.4	3	3	3	3	2	3	2	2	2	2
AIM-405.5	3	3	3	3	2	3	2	2	3	2
Average	2.8	3	3	2.25	1.75	3	1.75	2.3	2	2.2

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

Learning Outcomes:

At the end of course student should be able to learn

1.0 Introduction to Machine Learning

- 1.1 Define types of Human Learning
- 1.2 Define machine learning
- 1.3 State the need of machine learning
- 1.4 Explain types of machine learning
 - 1.4.1 Supervised learning
 - 1.4.2 Unsupervised learning
 - 1.4.3 Reinforcement learning
- 1.5 Compare supervised, unsupervised and reinforcement learning
- 1.6 List the problems not to be solved using machine learning
- 1.7 Explain the applications of machine learning towards real-life
- 1.8 List the tools used for machine learning
- 1.9 List the advantages and disadvantages of machine learning

2.0 Process of Machine Learning

- 2.1 Discuss the data modeling
 - 2.1.1 Types of data
 - 2.1.2 Structure of the data
 - 2.1.3 Data quality and remediation
- 2.2 Explain the data Pre-processing
 - 2.2.1 Dimensionality reduction
 - 2.2.2 Feature subset selection

- 2.3 Describe learning of the data model
 - 2.3.1 Selecting a model
 - 2.3.2 Training a model
 - 2.3.3 Model representation and interpretability
- 2.4 Analyze Performance Evaluation of a model
 - 2.4.1 Classification
 - 2.4.2 Regression
 - 2.4.3 Clustering
- 2.5 Discuss the performance improvement of a model.
- 3.0 Probability and Bayesian learning**
 - 3.1 Explain the basic concepts of probability
 - 3.1.1 Importance of statistical tools in machine learning
 - 3.1.2 Concept of probability
 - 3.1.3 Random Variable (Discrete and continuous)
 - 3.1.4 Discrete distributions
 - 3.1.5 Continuous distributions
 - 3.1.6 Sampling Distributions
 - 3.2 Explain hypothesis testing
 - 3.3 Explain Baye's theorem
 - 3.3.1 Prior
 - 3.3.2 Posterior
 - 3.3.3 Likelihood
 - 3.3 Explain the Bayes Classifiers
 - 3.3.1 Bayes Optimal Classifier
 - 3.3.2 Naïve Bayes Classifier
 - 3.4 List applications of Naïve Bayes Classifier.

4.0 SUPERVISED LEARNING

- 4.1 Discuss Classification Model
- 4.2 Describe the Classification learning Steps
- 4.3 Analyze the Classification Algorithms
 - 4.3.1 k-Nearest neighbor
 - 4.3.1.1 Working of k-NN
 - 4.3.1.2 k-NN Algorithm
 - 4.3.1.3 Strength and Weaknesses of the k-NN
 - 4.3.1.4 Applications of k-NN
 - 4.3.2 Decision tree
 - 4.3.2.1 Building a Decision tree
 - 4.3.2.2 Searching a Decision tree
 - 4.3.2.3 Entropy and Information gain of a decision tree
 - 4.3.2.4 Algorithm of a Decision tree
 - 4.3.2.5 Strength and Weaknesses of decision tree
 - 4.3.2.6 Applications of Decision tree
 - 4.3.3 Random Forest
 - 4.3.3.1 Working of random forest
 - 4.3.3.2 Out of bag error in Random forest
 - 4.3.3.3 Strength and Weaknesses of random forest
 - 4.3.3.4 Applications of random forest.
 - 4.3.4 Support vector Machines
 - 4.3.4.1 Classification using hyper planes
 - 4.3.4.2 Identifying correct hyper plane in SVM
 - 4.3.4.3 Maximum margin hyper plane
 - 4.3.4.4 Kernel -trick
 - 4.3.4.5 Strength and Weaknesses of SVM

- 4.3.4.6 Applications of SVM
- 4.4 Discuss Regression
- 4.5 Analyze Regression Algorithms
 - 4.5.1 Simple linear regression
 - 4.5.1.1 Slope of the Simple Linear Regression Model
 - 4.5.1.2 Simple Linear Regression Algorithm
 - 4.5.1.3 Example of simple Linear Regression
 - 4.5.2 Multiple linear Regression
- 4.6 Discuss Main Problems in Regression Analysis
- 4.7 List the applications of supervised learning

5.0 Unsupervised Learning

- 5.1 Compare Supervised and Unsupervised learning
- 5.2 Explain different types of clustering techniques
 - 5.2.1 Partitioning Methods
 - 5.2.2 Hierarchical Methods
 - 5.2.3 Density based Methods
- 5.3 Analyze Clustering Algorithms
 - 5.3.1 K-Means algorithm
 - 5.3.1.1 Elbow Method
 - 5.3.1.2 Strength and Weaknesses' of k-Means algorithm
 - 5.3.2 k-Medoids Algorithm
 - 5.3.3 Hierarchical clustering Algorithm
 - 5.3.3.1 Agglomerative clustering
 - 5.3.3.2 Divisive Clustering
- 5.4 Analyze Association Algorithm
 - 5.4.1 Common terms for association rule (pattern, itemset, support, count)
 - 5.4.2 Association rule
 - 5.4.3 Apriori algorithm
 - 5.4.4 Strengths and Weaknesses of Apriori algorithm
- 5.5 List the applications of Un-supervised learning

COURSE CONTENT

Introduction to machine learning

Basics of machine learning - Human Learning - Define machine learning - Types of machine learning –compare supervised, unsupervised and reinforcement learning -Problems not to be solved using machine learning -Applications of machine learning-List the Tools used for machine learning-Advantages and disadvantages of machine learning

2. Process of machine learning

Preparing to model the data - Data Preprocessing -Learning of the data model-Performance Evaluation of a model- Improving performance of a model.

3. Probability and Bayesian learning

Probability - hypothesis testing – baye's theorem- Bayes Classifiers

4. Supervised Learning

Classification Model-Classification learning Steps - Classification Algorithms - Introduction to Regression - Regression Algorithms - Applications of supervised learning

5. Unsupervised learning

Compare Supervised Vs Unsupervised learning - Different types of clustering techniques – clustering Algorithms - Partitioning Algorithms- Hierarchical clustering algorithms - Association Algorithm - Apriori algorithm - Applications of Unsupervised learning

REFERENCE BOOKS

1. Machine learning, pearson -- Saikat Dutt, Subramanian chandramouli, Amitkumar Das
2. Introduction to Machine Learning with Python: A Guide for Data Scientists Oreily - Andreas . Muller
3. Mathematics for Machine Learning Marc Peter Deisenroth , -- [A. Aldo Faisal](#), [Cheng Soon Ong](#)
4. Understanding Machine Learning: From Theory to Algorithms -- Shai Shalev Shwartz , Shai Ben-David
5. Machine Learning: The New AI (The MIT Press Essential Knowledge series) -- Ethem Alpaydin

Model Blue Print:

S.No.	Chapter/Unit title	No.of periods	Weightage Allocatd	Marks Wise Distribution of Weightage				Question wise Distribution of Weightage				CO's Mapped
				R	U	Ap	An	R	U	A P	An	
1	Introduction to machine learning	10	16	3	13			1	2			CO1
2	Process of machine learning	15	26	3	13	10		1	2	1		CO1,CO 2
3	Probability and Bayesian learning	10	16	3	13			1	2			CO3
4	Supervised learning	20	26	3	13	10		1	2	1		CO2,CO 4
5	Unsupervised learning	20	26	3	13	10		1	2	1		CO2, CO5
	Total	75	110	15	65	30		5	10	3		

Note: Part-C: 10 marks single analytical question may be chosen from chapters marked with *.

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 4.1 to 5.5

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
FUNDAMENTALS OF MACHINE LEARNING
UNIT TEST-1**

**SCHEME: C-20
MAX MARKS:40**

**SUBJ CODE: AIM-405
TIME: 90Minutes**

PART-A

16Marks

Instructions: 1) Answer all questions

2) First question carries 4marks, and each question of remaining carries 3marks

1. a) Machine Learning is a field of Artificial Intelligence (True/False) (CO1)
- b) Two common types of data issues are _____ and _____ (CO2)
- c) For unsupervised learning we have _____ Model (CO2)
I)Interactive II)Predictive III)Descriptive IV)Prescriptive
- d) _____ probability is defined as $P(A|B)=p(A,B)/p(B)$ if $p(B)>0$ (CO3)
- 2) List the tools of machine learning. (CO1)
- 3)What are the basic datatypes in machine learning. (CO2)
- 4) Differentiate dimensionality reduction and feature selection (CO2)
- 5) Write any two features of Bayesian learning methods (CO3)

PART-B

3X8=24Marks

Instructions: 1) Answer all questions

2)Each question carries 8 Marks

3)Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

- 6.a) Explain the supervised machine learning (CO1)
(Or)
- b) Explain the real life applications of machine learning (CO1)
- 7.a) Draw and explain the process of machine learning. (CO1)
(Or)
- b) prepare a simple dataset along with some sample records. Have atleast one attribute of different data types used in machine learning (CO2)
8. a) There is a box containing 40 white shirts and 60 black shirts. If we chose 10 shirts (without replacement) at random ,then find the probability mass function of X and Y where X is the no of white shirts and Y is the number of black shirts. (CO3)
(Or)
- b)Explain the concept of prior, posterior and likelihood with an example. (CO3)

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER - END EXAMINATION
FUNDAMENTALS OF MACHINE LEARNING

SCHEME: C-20
MAX MARKS:80

SUBJ CODE: AIM-405
TIME: 3HOURS

PART-A

10X3=30Marks

Note: Answer all questions

1. What is machine learning. List any two applications of machine learning. (CO1)
2. Write short note on Histogram. (CO2)
3. Define the terms overfitting and under fitting. (CO2)
4. What is conditional probability? Give an example. (CO3)
5. what is supervised learning? (CO4)
6. Define slope in a linear regression (CO4)
7. Give an example of supervised learning in a hospital industry (CO4)
8. Define supportCount. (CO5)
9. List out disadvantages of unsupervised learning (CO5)
10. List the tools used for machine learning (CO1)

PART-B

5x8=40Marks

Note: Answer all questions

11. Explain the different types of machine learnings with an example (CO1)
12. Explain quantitative and qualitative data in detail. (CO2)
13. Explain the process of K-Fold cross validation. (CO2)
14. Explain Hypothesis testing. (CO3)
15. Explain SVM model in detail. (CO4)
16. Explain multiple linear regression with an example. (CO4)
17. Explain how the market –basket analysis uses the concepts of association analysis .(CO5)
18. Explain K-Means clustering algorithm (CO5)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM- 406	Web Technologies Lab	4	60	40	60

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Excercises on HTML, CSS&XML	15	CO1
2.	Excercises on Java Script, JQuery	20	CO2,CO3
3.	Excercises on PHP web applications and Database Applications	25	CO3,CO4
Total Periods		60	

Course Objectives	<p>i) Understand the principles of creating an effective web page</p> <p>ii) To Know the working with HTML, CSS</p> <p>iii) To acquire knowledge and skills for creation of web site considering both client and server side</p> <p>iv) To familiarize the various Technologies like Java Script, JQuery, PHP.</p> <p>V)To understand Database connectivity Using PHP</p>
-------------------	---

Course Outcomes	CO1	AIM-406.1	Implement interactive web page(s) using HTML, CSS and JavaScript.
	CO2	AIM-406.2	To know the Usage of JQuery
	CO3	AIM-406.3	Build Dynamic web site using server side PHP Programming
	CO4	AIM-406.4	To know database connectivity using PHP.
	CO5	AIM-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
AIM-406.1	2	2	3	2		2	1	2	3	2
AIM-406.2	1	3	3	3	1	3	1	3	3	3
AIM-406.3		2	3	2	1	3	1	2	3	3
AIM-406.4	1	1	3	2	2	3	2	2	3	3
AIM-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 ResponsiveSlidesJquery 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.	<ol style="list-style-type: none"> 1) Identify the editor required for writing HTML 2) Add the tags with relevant content 3) Save the file 4) Open the file in a browser 5) Test the results
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.	<ol style="list-style-type: none"> 1) Identify the tags for creating the table 2) Add header, body and footer to the table. 3) Put some content in each section of table 4) Save the file 5) Open the file in a browser 6) Test the results
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.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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

Exp. No.	Name of the experiment	Objectives	Key Competencies
6	Exercise on designing a XML document	Create a XML Document on Student data	<ol style="list-style-type: none"> 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
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.	<ol style="list-style-type: none"> 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 <p>Resolve the errors if any through debugging</p>
8	Exercise on JavaScript arrays	Write JavaScript code to implement sorting like reading an array of 'n' numbers and sorting them in ascending order.	<ol style="list-style-type: none"> 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 <p>Resolve the errors if any through debugging</p>
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, dblclick	<ol style="list-style-type: none"> 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 mouse over the div tag. 7) Resolve the errors if any through debugging

Exp. No.	Name of the experiment	Objectives	Key Competencies
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	<ol style="list-style-type: none"> 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
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.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • Apache Web server • MySQL • PHP and configure it to work with Apache Web server and MySQL. 	Install a web server which supports PHP	<ol style="list-style-type: none"> 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

Exp. No.	Name of the experiment	Objectives	Key Competencies
14	Exercise on PHP arrays	Write PHP program to implement searching like reading an array of 'n' numbers and finding smallest among them.	<ol style="list-style-type: none"> 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
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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1) Understand the significance of cookies. 2) Create a PHP file. 3) Write the logic to create and set a cookie 4) Save and Run the page. 5) Test the result.

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-407	Python Programming Lab	4	60	40	60

COURSE OBJECTIVES	Upon completion of the course the student shall able to learn 15. Basics of Python programming 16. Decision Making and Functions in Python 17. Object Oriented Programming using Python.		
CO No.	COURSE OUTCOMES		
CO 1	AIM-407.1	Execute Simple python programs	
CO 2	AIM-407.2	Execute Python programs using expressions, operators	
CO 3	AIM-407.3	Execute python programming using Functions, packages	
CO 4	AIM-407.4	Demonstrate Python programs using Lists	
CO 5	AIM-407.5	Develop Python programs using OOP Concepts and exceptions	
CO 6	AIM-407.6	Demonstrate Debugging of Python Programs	

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-407.1	2	2	2	1	2			3		2
AIM-407.2	2	3	2					2		2
AIM-407.3	3	3	2	3		2	2	2		
AIM-407.4	2	2	2		2	3	1	2	3	
AIM-407.5	3	3	2		2	2	2	2	2	
AIM-407.6	2	1		3			3	1		
Average	2.3	2.3	2	2.3	2	2.3	2	2	2.5	2

3=strongly mapped, 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: i) Find factorial of a given number. ii) Generate multiplication table up to 10 for numbers 1 to 5 using functions.
9. Write a program to: i) Find factorial of a given number using recursion. ii) Generate Fibonacci sequence up to 100 using recursion.
10. Write a program to: Create a list, add element to list, delete element from the lists.
11. Write a program to: Sort the list, reverse the list and counting elements in a list.
12. Write a program to: Create dictionary, add element to dictionary, delete element from the dictionary.
13. Write a program to: To calculate average, mean, median, and standard deviation of numbers in a list.
14. Write a program to: To print Factors of a given Number.
15. 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.
16. 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'.
17. Write a Program to: Add two complex number using classes and objects.
18. Write a Program to: Subtract two complex number using classes and objects.
19. Write a Program to: Create a package and accessing a package.

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	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 <p style="text-align: center;">Check the output for its correctness</p>
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.	Write a Python program to identify arithmetic operators and data type conversion	<ol style="list-style-type: none"> 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 <p style="text-align: center;">Check the output for its correctness</p>
5.	Write simple programs to calculate the area and perimeter of the square, and the volume & perimeter of the cone.	Write a Python program to identify arithmetic operators and data type conversion	<ol style="list-style-type: none"> 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 <p style="text-align: center;">Check the output for its correctness</p>

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.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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 make use of function.	<ol style="list-style-type: none"> 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 program to: i) Find factorial of a given number using recursion. ii) Generate Fibonacci sequence up to 100 using recursion.	Write a Python program to make use of recursion.	<ol style="list-style-type: none"> 1. Build the application using recursion. 2. Build the terminating condition for recursion. 3. Rectify the syntax errors 4. Debug logical errors
10.	Write a program to : To print Factors of a given Number.	Write a Python program to identify loops statements in Python.	<ol style="list-style-type: none"> 1. Build the termination condition for looping 5. Use while statement with correct syntax 6. Check whether correct number of iterations are performed by the while loop 7. Rectify the syntax errors <ol style="list-style-type: none"> 1. Debug logical errors

11.	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.	<ol style="list-style-type: none"> 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
12.	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.	<ol style="list-style-type: none"> 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
13.	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.	<ol style="list-style-type: none"> 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
14	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.	<ol style="list-style-type: none"> 1. Create a list 2. add elements to list 3. perform statistical functions on that list
15.	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.	<ol style="list-style-type: none"> 1. Create a Python file 2. Add contents to file

16	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.	<ol style="list-style-type: none"> 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
17.	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.	<ol style="list-style-type: none"> 1. Create a class using Python 2. Create an object in Python 3. Debug the python program Check the correctness
18	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.	<ol style="list-style-type: none"> 1. Create a class using Python 2. Create an object in Python 3. Debug the python program Check the correctness
19	Write a Program to: Create a package and accessing a package.	Write a Python program to practice in creating packages and accessing packages	<ol style="list-style-type: none"> 1. Create a package using Python 2. Access the package in Python 3. Debug the python program Check the correctness

Course Code	Course Title	No. of Periods/Week	Total No. of Periods	Marks for FA	Marks for SA
AIM-408	Communication Skills	3	45	40	60

Course Objectives: The students shall

- 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

Course Outcomes: The students shall

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: “**Communication Skills**”

byState Board of Technical Education and Training, AP

SINo	Unit	Teaching Hours
1	Listening Skills	6
2	Work place Etiquette	3
3	Introduce 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
<i>Total</i>		<i>45</i>

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: Work place 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 Communication Skills					1,2,3,4	1,2,3,4

CO –PO Mapping

CO	Course Outcome	Cos / Unit Mapped	POs mapping	Cognitive levels as per Bloom's Taxonomy R/U/A/An (Remembering / Understanding / Applying/ Analysing)
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	3,4,5,7,8	6,7	R/U/A/An
CO3	Acquire employability skills: job hunting, resume writing, attending interviews	6,7	6,7	R/U/A/An
CO4	Practise appropriate body language and professional etiquette	2, 3,4,5,7,8	6,7	R/U/A

ASSESSMENT

C23-Common-408: English Communication Skills Lab

- The assessment for C23-Common 408 : 'English Communication Skills' is on par with all other practical subjects comprising 40 marks for Internal assessment and 60 marks for External examination attaining the final total of 100 Marks.

- The Internal Assessment can be conducted in the form of Assignments in all the 8 Units. One or Two assignments can be conducted in each Unit, awarding 10 marks for each assignment and the total marks can be averaged to 40 marks as suggested below.
- These assignments should focus mostly on LISTENING and SPEAKING skills rather than writing. However, for the practice sake, students can write down their assignments in a separate note book to enable them speak/present in the end exam fluently. The students should submit these assignment note books to the teacher.
- Questioning styles vary from Unit to Unit as different skills are assessed in each Unit with specific parameters as given in the workbook.
- Listening skills can be tested by playing different Audio/ Video clips (appropriate in content and language, preferably without subtitles) and test their skill of listening comprehension . Follow pre-while-post stages of listening activity and students should answer general, specific, inferential, vocabulary questions.
- Personal profile, describing a place/a thing/ a person/ an event / a picture, JAM, presentations, Direct interaction with the teacher/ examiner are the topics for individual speaking skills.
- Role plays, GD and Interview skills should be made as group activities and the teacher assesses various skills of the students as given in the workbook.
- Teacher should maintain a record of the following Assessment sheet (one for each student) to award Internal marks.

Calculating Internal marks through Assignments :				
Name of the Student:		PIN:Branch: Academic Year:		
S. No.	Title of the Unit	Assignment 1: 10 Marks	Assignment 2: 10 Marks	Total Marks in each Unit (Average for 10 Marks)
1	Listening Skills			
2	Workplace etiquette			
3	Introducing Oneself			
4	Short Presentations (JAM)			
5	Group Discussion			
6	Resume & Cover Letter			
7	Interview Skills			
8	Presentation Skills			

	Marks Scored		Ex: 65
	Total No. of Units		8
	Internal Assessment : Average for 40 Marks	(65/8) X4 = 32.5	33 (for 40 Marks)

End Exam Model paper: C23-Common-408 : Communication Skills Lab

Guidelines to prepare the question paper of the Lab End exam for 60 marks:

I. Listening Skills:

Students listen to the audio / watch the video clip (without subtitles) and answer the questions supplied to them in advance; observe the three stages of the Listening activity. : 10 Marks

II. Individual Speaking skills:

- a) Speak for a minute (JAM) on the given topic, can be allotted through chits/lots: 10 M.
- b) Individual speaking skills on any given topicdescriptions / role play etc: 10 Marks
- c) Direct Interaction/ dialogue with the examiner to test his/her speaking skills : 10M.

III. Pair / Group Speaking Activities. : 20 Marks

- a) Role Plays / dialogue making
- b) Group Discussion
- c) Interview skills

Note: If the students are more in number and the time is not sufficient to conduct the Viva for all the students in a single spell, the examiner can also adapt the blended mode of exam. A few significant questions can be tested orally and one or two questions can be answered in writing.(Ex: Resume, cover letter, FAQs in Interview skills etc.) along with the answers of Listening Test.

Aspects to be evaluated to test speaking skills			
S.No	Language Aspects	Organising Aspects	Body Language aspects
1	Content: Quality, clarity and relevance of ideas	Coherence, cohesion of	Postures

		relevant ideas	
2	Fluency	Proper beginning, topic sentence, expansion/details, conclusion	Gestures,
3	Vocabulary	Using proper Linkers	Eye contact
4	Pronunciation	Avoid repetitions, clichés, fillers	Audibility, pitch, Permissible pauses
5	Grammar (Syntax, semantics)		Other Permissible body movements

Course Code	Course title	No of periods/week	Total no of periods	Marks for FA	Marks for SA
AIM-409	Artificial Intelligence Lab using prolog	03	45	40	60

S No	Chapter/ Unit Title	No. of Periods	COs Mapped
1.	Installation and study of Prolog environment	10	CO1, CO2, CO3
2.	Study and write programs on Input/CO2, CO types, rules	20	CO1, CO2, CO3
3.	Study and write Programs on Goal finding, backtracking, objects, strings, set operations	15	CO1, CO4
4.	Programs on various applications	15	CO1, CO5
	Total	60	

COURSE OBJECTIVES	<p>Upon completion of the course the student shall be able to</p> <ol style="list-style-type: none"> 1. Installation & Study of prolog. 2. Use Edit, compile and execution of prolog programs 3. Usage of prolog environment 4. To Write AI program using various prolog constructs like facts, objects, predicates and variables, Goal finding, backtracking, objects, strings, set operations 5. Write AI programs on various applications using prolog
--------------------------	---

CO No	COURSE OUTCOMES
CO1	AIM-409.1 Demonstrate Installation of prolog and edit, compile and execution of simple prolog programs using statements, keywords, user defined identifiers
CO2	AIM-409.2 Practice programs using facts, objects, predicates, variables and arithmetic operators
CO3	AIM-409.3 Execute prolog program on recursion, Lists, dynamic database
CO4	AIM-409.4 Prepare Programs on Goal finding, backtracking, objects, strings, set operations
CO5	AIM-409.5 Use prolog programs on various applications

Learning outcomes:

1. Installation of GNU-Prolog, Study of Prolog (GNU-Prolog)
2. Write a prolog program of facts, objects, predicates and variables in PROLOG.
3. Write a prolog program of Rules and Unification in PROLOG.
4. Write a prolog program of “cut” and “fail” predicate in PROLOG.
5. Write a prolog program of arithmetic operators, simple input/output and compound goals in PROLOG.
6. Write a prolog program of recursion in PROLOG.
7. Write a prolog program of Lists in PROLOG.
8. Exercise on dynamic database in PROLOG.
9. Implement string operations like substring, string position, palindrome etc.
10. Write a prolog program to implement all set operations (Union, intersection, complement etc.)
11. Write a prolog program to maintain family tree.
12. Write a prolog program to solve “Water Jug Problem”.
13. Write program to solve 4-queens problem.
14. Write a program for Tic-Tac-Toe problem.

KEY COMPETENCIES

Exp. No.	Name of the experiment	Objectives	Key Competencies
1	Installation of gnu-prolog	(a) Study of Prolog (gnu-prolog) (b) Installation of prolog	a) identify the errors during the installation b) observe the installation completion
2	Exercise on facts, objects, predicates and variables in PROLOG.	(a) Write a program for facts using prolog (b) Write a program objects using prolog (c) Write a program for predicates using prolog (d) Write a program for variables using prolog	(a) Compile the program and rectify the errors. (b) Execute the program (c) Observe the output.
3	Exercise on Rules and Unification in PROLOG.	(a) Write a program on Rules in prolog (b) Write program on	(a) Provide the terms as input. (b) use parent method for matching terms

		Unification in prolog	(c) Observe the output.
4	Exercise on “cut” and “fail” predicate in PROLOG	(a) Write a program on cut in prolog (b) Write a program on fail in prolog	(a) use different methods for cut and fails predicates (b) observe the errors (c) observe the output
5	Exercise on arithmetic operators, simple input/output and compound goals in PROLOG.	Write a program on (a) arithmetic operators (b) input /output (c) goals in prolog	(a) use different terms as input (b) call the different methods (c) observe the errors (d) observe the output
6	Exercise on recursion in PROLOG	(a) Write a program using recursion in prolog	(a) Use the structures and objects (b) Understand the matching (c) Observe the errors (d) Observe the result
7	Exercise on Lists in PROLOG.	(a) Write a program on lists	(a) Use different operations like membership, length, concatenation, append, insertion (b) Check the errors (c) Observe the output
8	Exercise on dynamic database in PROLOG	(a) Write a program on database in prolog	(a) Create database (b) Use different manipulations (c) Check the errors (d) Observe the result
9	Exercise on string operations in prolog	Write a program on (a) String comparison (b) String copy (c) String reverse (d) Substring (e) Position of the string	(a) Use different string operations (b) Check the errors (c) Observe the output
10	Exercise on all set operations (Union, intersection, complement,	(a) Write a program on set operations in prolog	(a) Use different operations like union Intersection, difference (b) Observe the errors (c) Observe the output

	difference) in prolog		
11	Exercise on maintain family tree in prolog	(a) Write a program on creation of family tree in prolog	(a) Create the family tree (b) Check the errors (c) Observe the output
12	Exercise on “Water Jug Problem” in prolog	(a) Write a program to implement water-Jug problem.	(a) use water jug concept (b) observe the errors (c) check the output
13	Exercise on 4-queens problem in prolog	(a) Write a program to implement the 4-queens problem in prolog	(a) Use 4-queens instead of N (b) Observe the errors (c) Observe the output
14	Exercise on Tic-Tac-Toe	(a) Write a program on Tic-Tac-Toe	(a) Create the Tic-Tac-Toe (b) Check the errors (c) Observe the output

Course Code	Course title	No of periods/week	Total no of periods	Marks for FA	Marks for SA
AIM-409	Artificial Intelligence Lab using prolog	03	45	40	60

S No	Chapter/ Unit Title	No. of Periods	COs Mapped
1.	Installation and study of Prolog environment	6	CO1, CO2, CO3
2.	Study and write programs on Input/CO2, COtypes, rules	15	CO1, CO2, CO3
3.	Study and write Programs on Goal finding, backtracking, objects, strings, set operations	12	CO1, CO4
4.	Programs on various applications	12	CO1, CO5
	Total	45	

COURSE OBJECTIVES	<p>Upon completion of the course the student shall be able to</p> <ol style="list-style-type: none"> 1. Installation & Study of prolog. 2. Use Edit, compile and execution of prolog programs 3. Usage of prolog environment 4. To Write AI program using various prolog constructs like facts, objects, predicates and variables, Goal finding, backtracking, objects, strings, set operations 5. Write AI programs on various applications using prolog
--------------------------	---

CO No		COURSE OUTCOMES
CO1	AIM-409.1	Demonstrate Installation of prolog and edit, compile and execution of simple prolog programs using statements, keywords, user defined identifiers
CO2	AIM-409.2	Practice programs using facts, objects, predicates, variables and arithmetic operators
CO3	AIM-409.3	Execute prolog program on recursion, Lists, dynamic database
CO4	AIM-409.4	Prepare Programs on Goal finding, backtracking, objects, strings, set operations

CO5	AIM-409.5	Use prolog programs on various applications
-----	-----------	---

Learning outcomes:

1. Installation of GNU-Prolog, Study of Prolog (GNU-Prolog)
2. Write a prolog program of facts, objects, predicates and variables in PROLOG.
3. Write a prolog program of Rules and Unification in PROLOG.
4. Write a prolog program of “cut” and “fail” predicate in PROLOG.
5. Write a prolog program of arithmetic operators, simple input/output and compound goals in PROLOG.
6. Write a prolog program of recursion in PROLOG.
7. Write a prolog program of Lists in PROLOG.
8. Exercise on dynamic database in PROLOG.
9. Implement string operations like substring, string position, palindrome etc.
10. Write a prolog program to implement all set operations (Union, intersection, complement etc.)
11. Write a prolog program to maintain family tree.
12. Write a prolog program to solve “Water Jug Problem”.
13. Write program to solve 4-queens problem.
14. Write a program for Tic-Tac-Toe problem.

KEY COMPETENCIES

Exp. No.	Name of the experiment	Objectives	Key Competencies
1	Installation of gnu-prolog	(a) Study of Prolog (gnu-prolog) (b) Installation of prolog	a) identify the errors during the installation b) observe the installation completion
2	Exercise on facts, objects, predicates and variables in PROLOG.	(a) Write a program for facts using prolog (b) Write a program objects using prolog (c) Write a program for predicates using prolog (d) Write a program for variables using prolog	(a) Compile the program and rectify the errors. (b) Execute the program (c) Observe the output.

3	Exercise on Rules and Unification in PROLOG.	(a) Write a program on Rules in prolog (b) Write program on Unification in prolog	(a) Provide the terms as input. (b) use parent method for matching terms (c) Observe the output.
4	Exercise on “cut” and “fail” predicate in PROLOG	(a) Write a program on cut in prolog (b) Write a program on fail in prolog	(d) use different methods for cut and fails predicates (e) observe the errors (f) observe the output
5	Exercise on arithmetic operators, simple input/output and compound goals in PROLOG.	Write a program on (d) arithmetic operators (e) input /output (f) goals in prolog	(e) use different terms as input (f) call the different methods (g) observe the errors (h) observe the output
6	Exercise on recursion in PROLOG	(b) Write a program using recursion in prolog	(e) Use the structures and objects (f) Understand the matching (g) Observe the errors (h) Observe the result
7	Exercise on Lists in PROLOG.	(b) Write a program on lists	(d) Use different operations like membership, length, concatenation, append, insertion (e) Check the errors (f) Observe the output
8	Exercise on dynamic database in PROLOG	(b) Write a program on database in prolog	(e) Create database (f) Use different manipulations (g) Check the errors (h) Observe the result
9	Exercise on string operations in prolog	Write a program on (f) String comparison (g) String copy (h) String reverse (i) Substring (j) Position of the string	(d) Use different string operations (e) Check the errors (f) Observe the output

10	Exercise on all set operations (Union, intersection, complement, difference) in prolog	(b) Write a program on set operations in prolog	(d) Use different operations like union Intersection, difference (e) Observe the errors (f) Observe the output
11	Exercise on maintain family tree in prolog	(b) Write a program on creation of family tree in prolog	(d) Create the family tree (e) Check the errors (f) Observe the output
12	Exercise on “Water Jug Problem” in prolog	(b) Write a program to implement water-Jug problem.	(d) use water jug concept (e) observe the errors (f) check the output
13	Exercise on 4-queens problem in prolog	(b) Write a program to implement the 4-queens problem in prolog	(d) Use 4-queens instead of N (e) Observe the errors (f) Observe the output
14	Exercise on Tic-Tac-Toe	(b) Write a program on Tic-Tac-Toe	(d) Create the Tic-Tac-Toe (e) Check the errors (f) Observe the output

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
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	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-501	Industrial Management and Entrepreneurship	5	-	75	3	20	80	100
AIM-502	Big Data and Cloud Computing	5	-	75	3	20	80	100
AIM-503	Natural Language Processing	5	-	75	3	20	80	100
AIM-504	Internet Of Things	5	-	75	3	20	80	100
AIM-505	Artificial Neural Networks and Deep Learning	3	-	45	3	20	80	100
PRACTICAL SUBJECTS								
AIM-506	Natural Language Processing Laboratory using Python	-	4	60	3	40	60	100
AIM-507	Machine Learning Lab	-	6	90	3	40	60	100
AIM-508	Life Skills	-	3	45	3	40	60	100
AIM-509	Project work	-	3	45	3	40	60	100
	ACTIVITIES		3	45				
	Total	23	19	630	-	260	640	900

Course code	Course Title	No. of Periods/ Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-501	Industrial Management and Entrepreneurship	5	75	20	80

Sl. No.	Chapter/ Unit Title	Periods	Weightage of Marks	CO's Mapped
1.	Principles of Management.	08	16	CO1
2	Organization Structure & Organizational Behaviour.	15	26	CO2
3.	Production Management.	14	26	CO3
4.	Engineering Ethics & Safety and Labour Codes.	15	26	CO4
5.	Entrepreneurship & Start-ups.	08	16	CO5
Total		60	110	

Course Objectives and Course Outcomes

COURSE OBJECTIVES	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	AIM-501.1	Understand the principles of management as applied to industry.
	C02	AIM-501.2	Explain types of the industrial organization structures and the behaviour of an individual in an organization, motivational and leadership styles.
	C03	AIM-501.3	Explain the different aspects of production management.
	CO4	AIM-501.4	Explain Engineering Ethics, Industrial Safety and industrial Labour Codes.
	CO5	AIM-501.5	Explain Entrepreneurial development programmes and Start-ups.

CO and PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
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.

MODEL BLUE PRINT OF THE QUESTION PAPER

Sl. No	Chapter Name	Periods Allocated	Weightage Allocated	Question Wise Distribution of Weightage			Marks Wise Distribution of Weightage		
				R	U	Ap	R	U	Ap
1	Principles of Management.	08	16	1	1	1	3	3	10
2	Organization Structure & Organizational Behaviour.	15	26	1	1	2	3	3	20
3	Production Management.	14	26	1	1	2	3	3	20
4	Engineering Ethics & Safety and Labour Codes.	15	26	1	1	2	3	3	20
5	Entrepreneurship & Start-ups.	08	16	1	1	1	3	3	10
TOTAL		60	110	5	5	08	15	15	80

Note: R-Remembering; U-Understanding; Ap-Applying;

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 Behaviour

- 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 List Different 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.

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
AIM-501 :: Industrial Management & Entrepreneurship start-ups**

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

Unit Test - 1

Q.No	Question from the Chapter	Bloom's category	Marks allocated	CO addressed
Part - A (16 marks)				
1	Principles of Management, Organization Structure & Organizational Behaviour and Production Management	R,U	4	CO1,CO2, CO3
2	Principles of Management	U	3	CO1
3	Organization Structure & Organizational Behaviour	U	3	CO2
4,5	Production Management	U	6	CO3
Part - B (24 marks)				
6	Principles of Management	U	8	CO1
7	Organization Structure & Organizational Behaviour	U	8	CO2
8	Production Management	U	8	CO3

Unit Test - 2

Q.No	Question from the topic	Bloom's category	Marks allocated	CO addressed
Part - A (16 marks)				
1	Engineering Ethics and Human Values and Entrepreneurship & Start-ups	R,U	4	CO4, CO5
2	Engineering Ethics and Human Values	U	1	CO4
3	Entrepreneurship & Start-ups	U	3	CO5
Part - B (24 marks)				
6	Engineering Ethics and Human Values	U	8	CO4
7	Entrepreneurship & Start-ups	U	8	CO5
8	Engineering Ethics and Human Values and Entrepreneurship & Start-ups	U	8	CO4, CO5

R-Remembering; U-Understanding; Ap-Applying; An- Analysing

BOARD DIPLOMA EXAMINATION,

Unit Test - 1

AIM-501 Industrial Management and Entrepreneurship

Time : 90 Minutes

Total Marks: **40**

PART – A

Instructions: *1st Question having 4 one-mark questions, and remaining 4 Questions carry 3 marks each*

1. (a) The highest skill required for top level management is -----
(b) Who stated the Needs of hierarchy theory?
(c) PERT is event oriented approach (Yes/No)
(d) Choose the correct answer
Bin card are used in (planning department/stores/marketing department/finance department)
2. Differentiate Management and Administration.
3. Explain Trait theory of leadership
4. Define Routing, Scheduling and Production control.
5. State the purpose of bin card

PART – B

Instructions: *Part B consists of 3 Units. Answer any one full question from each unit. Each question carries 8 marks and may have sub questions.*

6. (a) Explain Staff organisation with the aid of sketch and state advantages and disadvantages.

(OR)

(b) Explain Maslow's Hierarchy of needs

7. (a) Explain ABC Analysis of inventory.

(OR)

(b) For the following data of a project, draw the network. Find out critical path and project duration

Activity.	1--2	1--3	1--4	2--5	3--5	3--6	4--6	5--7	6--7
Days.	5	4	7	6	10	7	8	5	6

- 8(a) Explain the principles of management.

(OR)

(b) Explain functions of Management.

BOARD DIPLOMA EXAMINATION,

Unit Test - 2

AIM-501 Industrial Management and Entrepreneurship

Time : 90 Minutes

Total Marks: **40**

PART – A

Instructions: *1st Question having 4 one-mark questions, and remaining 4 Questions carry 3 marks each*

1. (a) Write the full form of TQM
(b) Write the full form of MSME
(c) Choose the correct answer
ISO means Indian organisation for standardisation (Yes/No)
(d) EDP means -----
2. List out causes for accidents in the industry
3. What are the expectations of entrepreneur?
4. What are the pillars of TQM?
5. List out Beneficiaries of ISO9000 certification

PART – B

Instructions: *Part B consists of 3 Units. Answer any one full question from each unit. Each question carries 8 marks and may have sub questions.*

6. (a) Explain various industrial hazards .

(OR)

(b) Explain Industrial Relations Code, 2020

7. (a) Explain any four self-employment schemes

(OR)

(b) Explain the Entrepreneurial Development schemes existing in our country

- 8 (a) what are the advantages and disadvantages of ISO 9000 series of standards

(OR)

(b) Explain Occupational Safety, Health and Working Conditions Code, 2020

**BOARD DIPLOMA EXAMINATION,
AIM – V SEMESTER EXAMINATION
INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP**

Time : 3 Hours

Total Marks: **80****PART – A**

Answer all questions

10 x 3=30

2. With line diagram, show the managerial skills needed at various levels of management
3. Differentiate administration, organisation and management
4. List out various types selection tests
5. Explain Trait theory of leadership
6. What is meant by inventory control
7. List out various types of productions and explain any one of them
8. Write the classification of Engineering ethics
9. List out causes of industrial accidents
10. What are the pillars of TQM
11. Lit out Beneficiaries of ISO9000 certification

PART B

Answer all questions

5 x 8=40

12. Explain principles of management stated by Henry Foyal
- 12 Explain Maslow's needs of hierarchy motivation theory
- 13 Explain Line and Staff organisation structure
- 14 Explain different types of productions
- 15 For the following data of a project, Draw the network, Find out critical path and project

Duration.

Activity.	1--2	1--6	2--3	2-4	3--5	4--5	6--7	5--8	7-8
Optimistic time days	2	2	5	1	5	2	3	2	7
Most likely time days	5	5	11	4	11	5	9	2	13
Pessimistic time days	14	8	29	7	17	14	27	8	31

- 16 Explain causes of industrial accidents and cost of industrial accidents

- 17 Explain the salient features of Industrial Relations Code, 2020
- 18 Explain break even analysis with a line diagram.

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-502	BigData & CloudComputing	5	75	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Over View of Data Mining	20	CO1
2.	OVER VIEW OF DATA WARE HOUSING	10	CO2
3.	Introduction to Big Data	10	CO3
4.	Big Data Analytics	20	CO3,CO4
5.	CLOUD COMPUTING	15	CO3,CO5
Total Periods		75	

Course Objectives	i)To know the fundamentals of Data Mining ii)To know the fundamentals of Data WareHousing iii)To familiarize with Big Data and Big Data Analytics iv)To Know Big data Technologies
-------------------	---

Course Outcomes	At the end of the course the student able to learn following:		
	CO1	AIM-502.1	Describe Data Mining
	CO2	AIM-502.2	Explain DATA WARE HOUSING
	CO3	AIM-502.3	Describe Big Data
	CO4	AIM-502.4	Analyse functioning of various Big data Analytical techniques
	CO5	AIM-502.5	Explain Cloud computing

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-502.1	1	1	1	1	0	0	2	0	1	1
AIM-502.2	1	0	1	2	1	0	2	2	2	0
AIM-502.3	3	0	0	1	0	0	2	2	1	0
AIM-502.4	2	2	1	1	0	0	1	2	1	3
AIM-502.5	2	0	1	1	1	0	2	2	3	0
Average	1.8	0.6	0.8	1.2	0.5	0	1.8	1.6	1.6	0.8

3=Strongly mapped , 2=moderately mapped, 1=slightly mapped
Learning Outcomes:

1. OVER VIEW DATA MINING

- 1.1. Define Data Mining
- 1.2. List type of Data Mining
- 1.3. List Advantages of Data Mining
- 1.4. List Disadvantages of Data Mining
- 1.5. List Applications of Data Mining
- 1.6. Challenges of Implementation in Data mining
- 1.7. Evolution of Data Mining
- 1.8. List and explain Data Mining Techniques
- 1.9. Explain Data Mining Implementation Process
- 1.10. Explaining Data Mining Architecture
- 1.11. Explain KDD- Knowledge Discovery in Databases of Data Mining
- 1.12. List and explain Data Mining tools
- 1.13. List Major Difference between Data mining and Machine learning
- 1.14. State the importance of Data Analytics
- 1.15. List and explain phases of Data Analytics
- 1.16. Difference between Data Mining and Data Analytics
- 1.17. List and explain types of Datamining techniques
- 1.18. Explain Text data mining
- 1.19. Differentiate between classification and clustering in data mining

UNIT2

2. OVER VIEW OF DATA WARE HOUSING

- 2.1. What is data ware housing
- 2.2. State the importance of Data Ware Housing
- 2.3. Difference between Database and Data Warehouse
- 2.4. Explain Data Warehouse Architecture
- 2.5. Explain Three-Tier Data Warehouse Architecture
- 2.6. What is Operational Data Stores?

- 2.7. Define ETL and ELT
- 2.8. List Types of Data Warehouses
- 2.9. Explain Data Warehousing Model
- 2.10. Explain Data Warehouse Design approaches
- 2.11. State terms Meta Data, Data Mart
- 2.12. What is OLAP
- 2.13. List characteristics of OLAP
- 2.14. Differentiate between OLTP and OLAP
- 2.15. List Types of OLAP
- 2.16. Data Mining Vs Data Warehousing

3. Introduction to Big Data

- 3.1. Define bigdata
- 3.2. Evolution of data/bigdata
- 3.3. Challenges of Traditional system
- 3.4. The three V's of bigdata
- 3.5. Describe Storing Big Data
- 3.6. Selecting Big Data
- 3.7. Explain Processing of Big Data
- 3.8. Classify the structures of Big Data
- 3.9. Need of Big Data
- 3.10. List the sources of big data
- 3.11. Define Big Data Analytics
- 3.12. List the types of tools used in Big Data
- 3.13. List and explain the applications of big data
- 3.14. List the risks of Big Data
- 3.15. State the importance of Intelligent data analysis
- 3.16. Traditional vs. Big Data approach

4. BIG DATA ANALYTICS

- 4.1. State the importance of big data analytics
- 4.2. Explain Big Data Life Cycle
- 4.3. State the Methodology in Big data Analytics
- 4.4. List Core Deliverables
- 4.5. List Key Stakeholders
- 4.6. List the responsibilities of Data Analyst
- 4.7. List the basic skills necessary for data analyst
- 4.8. State the importance of Data Scientist
- 4.9. Big Data Analytic Project
 - 4.9.1. Explain How to deal with Bigdata Analytic Project
 - 4.9.2. State Problem Definition
 - 4.9.3. Data collection
 - 4.9.4. Cleansing data
 - 4.9.5. Summarizing
 - 4.9.6. Data exploration
 - 4.9.7. Data Visualization
- 4.10. Big data Analytic methods
 - 4.10.1. Importance of SQL in Data Analytics
 - 4.10.2. Importance of Charts&Graphs
 - 4.10.3. Data Analysis Tools: R Programming, Python for data analysis, Julia, SPSS, MATLAB, Octave
- 4.11. ADVANCED METHODS
 - 4.11.1. Role of Machine Learning for Data Analysis
 - 4.11.2. List association rules
 - 4.11.3. State importance of Decision trees

- 4.11.4. State importance of Text Analytics
- 4.12. BIG DATA TECHNOLOGIES
 - 4.12.1. State the importance of NOSQL
 - 4.12.2. List advantages of NOSQL
 - 4.12.3. State the importance of NEWSQL
 - 4.12.4. List advantages of NEWSQL
 - 4.12.5. HADOOP
 - List advantages
 - List Features
 - List versions
 - Explain Hadoop components
 - Explain HADOOP Architecture

UNIT5

- 5. CLOUD COMPUTING
 - 5.1. What is cloud computing
 - 5.2. Advantages and disadvantages of cloud computing
 - 5.3. Evolution of cloud computing
 - 5.4. Draw and explain NIST Visual Model of Cloud Computing
 - 5.5. List features of Cloud computing
 - 5.6. List and explain components of cloud computing
 - 5.7. List and explain Cloud computing technologies
 - 5.8. List and explain different service models in cloud computing
 - 5.9. Compare different service models
 - 5.10. List and explain different deployment models or types of clouds
 - 5.11. Differentiate between private cloud and public cloud
 - 5.12. Compare traditional data centre and Cloud storage
 - 5.13. Describe how data is managed in cloud(DBaaS)
 - 5.14. Explain security concepts in cloud
 - 5.15. What is cloud simulator and List different types

COURSE CONTENT

TEXT BOOKS

1. H.Dunham,"DataMining:Introductory and Advanced Topics" Pearson Education.
2. Sam Anahory, Dennis Murray, "Data Warehousing in the Real World : A Practical Guide for Building Decision Support Systems, Pearson Education.

REFERENCE BOOKS

1. Jiawei Han, Micheline Kamber, "Data Mining Concepts & Techniques" Elsevier.
2. Mallach,"Data Warehousing System",McGraw –Hill.

Reference Websites:

<https://www.javatpoint.com/aggregation-in-data-mining>

<https://www.javatpoint.com/data-warehouse>

<https://www.javatpoint.com/cloud-computing-technologies>

Model Blue Print:

S. No.	Chapter Name	Periods allocated	Weightage allotted	Mark wise Distribution of Weightage		Question wise Distribution of Weightage		Cos Mapped
				R	U	R	U	
1.	Over View of Data Mining	20	26	6	20	3	2	CO1
2.	OVER VIEW OF DATA WARE HOUSING	10	13	3	10	1	1	CO2
3.	Introduction to Big Data	10	16	6	10	2	1	CO3
4.	Big Data Analytics	20	26	6	20	2	2	CO3,CO4
5.	CLOUD COMPUTING	15	26	6	20	2	2	CO3,CO5
	Total	75	110	30	80	10	8	

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

Unit Test	Learning outcomes to be covered
Unit test-1	1.1 to 3.8
Unit test-2	3.9 to 5.6.9

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
BigData&CloudComputing
UNIT TEST-1

SCHEME: C-23
MAX MARKS:40

SUBJ CODE:AIM-502
TIME: 90Minutes

.....
PART-A

16 Marks

Instructions: 1) Answer all questions

2) First question carries 4marks, and each question of remaining carries 3marks

1. a) Data mining is the process of sorting through large data sets to identify patterns and relationships (True/False) (CO1)
- b) ----- is type of data mining (CO1)
- c) Data ware housing means ----- (CO2)
- d) OLAP means [] (CO3)
- i) Online analytical processing II) Online additional processing III) Online asset processing IV)NONE
- 2)List any three Advantages of Data Mining (CO1)
- 3) List any three Difference between Database and Data Warehouse (CO2)
- 4) What are The three V's of bigdata (CO3)
- 5) What is the necessity of Big data. (CO3)

PART-B

3 X 8=24Marks

Instructions: 1) Answer all questions

2)Each question carries 8 Marks

3)Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

6. a) Explain Text data mining in detail. (CO1)
Or
b) Explaining Data Mining Architecture in detail. (CO1)
7. a) Explain Three-Tier Data Warehouse Architecture (CO2)
Or
b) Explain Data Warehouse Design approaches in detail (CO2)
8. a) Explain Processing Big Data in detail. (CO3)
Or
b) Explain the procedure for Storing Big Data (CO3)

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER – YEAR END EXAMINATION
BigData&CloudComputing

SCHEME: C-23
MAX MARKS:80

SUBJ CODE:AIM-502
TIME: 3HOURS

PART-A
10X3=30Marks

Note: Answer all questions

1. Define Data Mining. (CO1)
2. State the importance of Data Analytics (CO1)
3. List any three Data Mining tools (CO1)
4. State the importance of Data Ware Housing (CO2)
5. Define bigdata (CO3)
- 6 .List any three tools used in big data (CO3)
7. List any three Key Stakeholders in Big data (CO4)
8. Sate the importance of NEWSQL (CO4)
9. What is cloud computing (CO5)
10. List any three Differences between private cloud and public cloud (CO5)

PART-B

5x10=50Marks

Note: Answer any five questions

- 11.Explain Data Mining Implementation Process. (CO1)
12. Explain any two Datamining techniques (CO1)
13. Explain Three-Tier Data Warehouse Architecture (CO2)
14. Explain Processing of Big Data (CO3)
- 15.Explain Big Data Life Cycle (CO4)
- 16.Explain components of HADOOP (CO4)
- 17.Draw and explain NIST Visual Model of Cloud Computing (CO5)
- 18.Explain security concepts in cloud (CO5)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-503	Natural Language Processing	5	75	20	80

S.No	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Introduction to Natural Language Processing	15	CO1
2.	Word Level Analysis	14	CO2
3.	Syntactic analysis	14	CO3
4.	semantics and pragmatics	19	CO4
5.	discourse analysis and lexical resources	13	CO5
Total Periods		75	

Course Objectives	<ul style="list-style-type: none"> i. Acquire the fundamentals of natural language processing ii. To familiarize word level analysis iii. Analyze CFG and PCFG in NLP iv. Apply the semantics of sentences and pragmatics v. Apply the NLP techniques
--------------------------	--

Course Outcomes	At the end of the course the student able to learn following:		
	CO1	AIM-503.1	Describe a given text with basic Language features
	CO2	AIM-503.2	Explain an innovative application using NLP components
	CO3	AIM-503.3	Apply a rule based system to tackle morphology/syntax of a language.
	CO4	AIM-503.4	Explain a tag set to be used for statistical processing for real-time applications.
	CO5	AIM-503.5	Compare and contrast the use of different statistical approaches for different types of NLP applications

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-503.1	3	1	1	1	1	1	1	2	3	2
AIM-503.2	1	3	2	2	1	2	1	1	3	2
AIM-503.3	1	3	3	2	2	2	2	1	2	3
AIM-503.4	1	3	3	2	2	2	2	1	2	2
AIM-503.5	2	2	2	3	2	2	2	2	2	1
Average	1.6	2.4	2.2	2	1.6	1.8	1.6	1.4	2.4	2

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

LEARNING OUTCOMES:**1.0 INTRODUCTION TO NATURAL LANGUAGE PROCESSING.**

- 1.1 Describe the Origins and challenges of NLP
- 1.2 Classification of Language Modeling
 - 1.2.1 Explain Grammar-based LM
 - 1.2.2 Explain Statistical LM
- 1.3 Describe the role of Regular Expressions
- 1.4 Define Finite-State Automata
- 1.5 State the importance of English Morphology
- 1.6 Explain Transducers for lexicon and rules
- 1.7 State the importance of Tokenization
- 1.8 Explain Detecting and Correcting Spelling Errors
- 1.9 Describe Minimum Edit Distance

2.0 WORD LEVEL ANALYSIS

- 2.1 Explain the usage of Unsmoothed and Smoothed N-grams
- 2.2 Analyze N-grams
- 2.3 Describe Interpolation and Backoff- Word Classes
- 2.4 Explain Part-of-Speech Tagging
- 2.5 Differentiate Rule-based Stochastic and Transformation-based tagging
- 2.6 Identify the Issues in PoS tagging
- 2.7 Compare Hidden Markov and Maximum Entropy models.

3.0 SYNTACTIC ANALYSIS

- 3.1 Define Context-Free Grammar
- 3.2 Define Grammar rules for English
- 3.3 Classify Treebanks
- 3.4 Explain Normal Forms for grammar
- 3.5 State the importance of Dependency Grammar
- 3.6 Describe the process of Syntactic Parsing
- 3.7 Explain the problem of Ambiguity
- 3.8 Explain Dynamic Programming parsing
 - 3.8.1 Shallow parsing
 - 3.8.2 Probabilistic CFG
- 3.9 Explain Probabilistic CYK algorithm
- 3.10 Describe Probabilistic Lexicalized CFGs
- 3.11 Describe the Unification of feature structures.

4.0 SEMANTICS AND PRAGMATICS

- 4.1 Identify the Requirements for representation
- 4.2 Explain the First-Order Logic
- 4.3 Classify Description Logics
- 4.4 Describe Syntax-Driven Semantic analysis approach
- 4.5 State the need of Semantic attachments
- 4.6 Define Word Senses
- 4.7 Explain the Relations between Words and Senses
- 4.8 Describe Thematic Roles
- 4.9 Define Selectional restrictions
- 4.10 Explain the process of Word Sense Disambiguation using Supervised
- 4.11 Identify the importance of Dictionary & Thesaurus

5.0 DISCOURSE ANALYSIS AND LEXICAL RESOURCES

- 5.1 Describe the procedure of Discourse segmentation
- 5.2 Define Coherence
- 5.3 Explain Anaphora Resolution using Hobbs and Centering Algorithm
- 5.4 State the importance of Coreference Resolution
- 5.5 Explain Porter Stemmer algorithm
- 5.6 Describe Lemmatizer
- 5.7 Explain the corpus
 - 5.7.1 WordNet
 - 5.7.2 PropBank
 - 5.7.3 FrameNet
 - 5.7.4 Brown Corpus
 - 5.7.5 British National Corpus (BNC).

COURSE CONTENTS

UNIT I:INTRODUCTION

Origins and challenges of NLP – Language Modelling: Grammar-based LM, Statistical LM - Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance

UNIT II:WORD LEVEL ANALYSIS

Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff – Word Classes, Part-of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging – Hidden Markov and Maximum Entropy models.

UNIT III:SYNTACTIC ANALYSIS

Context-Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing – Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs - Feature structures, Unification of feature structures.

UNIT IV: SEMANTICS AND PRAGMATICS

Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, Selectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus

UNIT V: DISCOURSE ANALYSIS AND LEXICAL RESOURCES

Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm – Coreference Resolution – Resources: Porter Stemmer, Lemmatizer, WordNet, PropBank, FrameNet, Brown Corpus, British National Corpus (BNC).

TEXT BOOKS:

1. Daniel Jurafsky, James H. Martin—Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, Pearson Publication, 2014.
2. Steven Bird, Ewan Klein and Edward Loper, —Natural Language Processing with Pythonl, First Edition, O_Reilly Media, 2009.

REFERENCE BOOKS:

1. Breck Baldwin, —Language Processing with Java and LingPipe Cookbook, Atlantic Publisher, 2015. 2. Richard M Reese, —Natural Language Processing with Javal, O_Reilly Media, 2015.
2. Nitin Indurkhya and Fred J. Damerau, —Handbook of Natural Language Processing, Second Edition, Chapman and Hall/CRC Press, 2010.
3. Tanveer Siddiqui, U.S. Tiwary, —Natural Language Processing and Information Retrievall, Oxford University Press, 2008.

Blue Print:

S.No.	Chapter/Unit title	No. of periods	Weightage Allocated	Marks Wise Distribution of Weightage			Question wise Distribution of Weightage			CO's Mapped
				R	U	AP	R	U	AP	
1	Introduction to Natural Language Processing	15	16	3	13		1	1		CO1
2	Word Level Analysis	14	26	3	13	10	1	2	1	CO2
3	Syntactic analysis	14	16	3	13		1	2		CO3
4	Semantics and pragmatics	19	26	3	13	10	1	2	1	CO4
5	Discourse analysis and lexical resources	13	26	3	13	10	1	2	1	CO5
	Total	75	110	15	65	30	5	9	3	

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 3.7 to 5.7

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
ENGINEERING
MODEL PAPER
NATURAL LANGUAGE PROCESSING
UNIT TEST-1**

**SCHEME: C-20
MAX MARKS: 40**

**SUBJ CODE: AIM-503
TIME: 90Minutes**

PART-A

16Marks

Instructions: 1) Answer all questions
2) First question carries 4 Marks and each of the remaining questions carries 3 Marks

1. a) Regular expression is the simplest machine to recognize patterns. (True/False)(CO1)
b) _____ are the building blocks of Natural Language. (CO1)
c) The following areas where NLP is useful [] (CO1)
 I. Automatic Text Summarization
 II. Information Retrieval
 III. Automatic Question-Answering Systems
 IV. All of the Above
- d) Which of the text parsing techniques can be used for noun phrase detection, verb phrase detection, subject detection, and object detection in NLP? [] (CO2)
 I. Part of speech tagging
 II. Skip Gram and N-Gram extraction
 III. Continuous Bag of Words
 IV. Dependency Parsing and Constituency Parsing
2. State the importance of Tokenization? (CO1)
3. Write the usage of Unsmoothed and Smoothed N-grams (CO2)
4. Write the differences between Hidden Markov and Maximum Entropy models. (CO2)
5. Define Context-Free Grammar? (CO3)

PART-B

3X8=24Marks

Instructions: 1) Answer all questions
2) Each question carries 8 Marks
3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

6. a) Explain statistical Language Modelling. (CO1)
 OR
 b) Explain Transducers for lexicon and rules (CO1)
7. a) Explain Interpolation and Backoff- Word Classes (CO2)
 OR
 b) Differentiate Rule-based Stochastic and Transformation-based tagging with example(CO2)
8. a) Explain Normal Forms for grammar (CO3)
 OR
 b) Explain Probabilistic CYK algorithm. (CO3)

Board Diploma Examination
Model Question Paper-End Exam
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
NATURAL LANGUAGE PROCESSING-AIM-503

Part-A

10 X 3 = 30 Marks

- Instructions:**
- 1) Answer all questions
 - 2) Each question carries 3 Marks

- | | |
|--|-----|
| 1. Define Natural Language Processing | CO1 |
| 2. State the importance of English Morphology | CO1 |
| 3. Define N-grams | CO2 |
| 4. Write about Part-of-Speech Tagging | CO2 |
| 5. State the importance of Dependency Grammar. | CO3 |
| 6. Define Ambiguity. | CO3 |
| 7. Write about the First-Order Logic. | CO4 |
| 8. Define Word Senses. | CO4 |
| 9. Write about Selection restrictions | CO4 |
| 10. Define Coherence | CO5 |

Part-B

5 X 8 = 40 Marks

- Instructions:**
- 1) Answer any five questions
 - 2) Each question carries 8 Marks

- | | |
|---|-----|
| 11. Explain the grammar based Language Modelling | CO1 |
| 12. Explain the usage of Unsmoothed and Smoothed N-grams | CO2 |
| 13. Explain about Hidden Markov and Maximum Entropy models | CO2 |
| 14. Explain about Dynamic Programming parsing. | CO3 |
| 15. Describe syntax-Driven semantic analysis approach. | CO4 |
| 16. Explain process of Word Sense Disambiguation using Supervised | CO4 |
| 17. Explain Anaphora Resolution using Hobbs and Centering Algorithm | CO5 |
| 18. Explain Porter Stemmer algorithm | CO5 |

Course code	Course Title	No. of Periods/W eeks	Total No. of periods	Marks for FA	Marks for SA
AIM-504	Internet of Things	5	75	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Introduction of IOT	12	CO1
2.	Data Protocols	17	CO1,CO2
3.	Communication Technologies	17	CO1,CO3
4.	Wireless Sensor Networks	17	CO4
5.	Role Of IOT	12	CO5
Total Periods		75	

Course Objectives	<p>i)To assess the vision of IoT.</p> <p>ii)To classify Real World IoT applications in various Domains.</p> <p>iii)To understand design methodology for IoT platforms.</p>
-------------------	--

Course Outcomes	At the end of course student able to learn the following :		
	AIM-504.1	CO1	Understand the basic concepts like usage of sensors ,components and frequently used technologies of IoT from a global context
	AIM-504.2	CO2	Illustrate the application of Data protocols of IoT
	AIM-504.3	CO3	Understand various communication technologies of IOT
	AIM-504.4	CO4	Illustrate the use of sensor networks in applications of various domains
AIM-504.5	CO5	Illustrate applications of IOT	

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-504.1	3	1	1	2	2		3	2	2	2
AIM-504.2	2	1	3	2	2	1	3	2	3	3
AIM-504.3	3	1	1	2	2		3	2	3	3
AIM-504.4	3	3	3	3	3	3	3	2	3	3
AIM-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 and list its Features
- 1.1.2. List the components of IoT : hardware, software, technology and protocols
- 1.1.3. List Applications ,various Technologies of IOT
- 1.1.4. List advantages and disadvantages of IoT
- 1.1.5. Describe various connecting technologies
- 1.1.6. Sensors
 - 1.1.6.1. Need of sensor
 - 1.1.6.2. Features of Sensors
 - 1.1.6.3. Classify Sensors based on output, on data types
- 1.1.7. Define actuator and list its types
- 1.1.8. List and explain functional Components of IOT
- 1.1.9. Explain service oriented architecture of IOT
- 1.1.10. List IOT challenges

1.2 Various Connectivity Technologies in IOT:

- 1.2.1 6LoWPANs Technologies
 - 1.2.1.1 Features
 - 1.2.1.2 Addressing
 - 1.2.1.3 List and explain different packet formats
 - 1.2.1.4 Explain 6LoWPAN protocol stack architecture
- 1.2.2 List and Explain Routing protocols(LOADng, RPL)
- 1.2.3 RFID Technologies
 - 1.2.3.1 What is RFID
 - 1.2.3.2 List the features
 - 1.2.3.3 Explain Working principle
 - 1.2.3.4 Applications

2. DATA PROTOCOLS

2.1. Message Queue Telemetry Transport(MQTT)

- 2.1.1. Define and explain MQTT
- 2.1.2. List components, Methods, Applications
- 2.1.3. Define and explain Secure MQTT

2.2. Constrained Application Protocol (CoAP)

- 2.2.1. Define and explain CoAP
- 2.2.2. List and explain CoAP message types

2.3. Extensible Messaging and Presence Protocol(XMPP)

- 2.3.1. List Features of XMPP
- 2.3.2. Explain XMPP
- 2.3.3. Describe core XMPP Technologies
- 2.3.4. 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. Explain IEEE 802.15.4
- 3.1.3. List IEEE 802.15.4 Variants
- 3.1.4. List and explain IEEE 802.15.4 Types

3.2. ZIGBEE

- 3.2.1. What is ZIGBEE
- 3.2.2. List features, components, different topologies, types, applications of ZIGBEE
- 3.2.3. Explain different topologies of ZIGBEE
- 3.2.4. Explain ZIGBEE types

3.3. Near field communication(NFC)

- 3.3.1. What is NFC
- 3.3.2. List types and applications of NFC
- 3.3.3. Explain working principle of NFC
- 3.3.4. Describe modes of operation of NFC

3.4. Bluetooth

- 3.4.1. What is the purpose of Bluetooth
- 3.4.2. List features, functions, applications of Bluetooth
- 3.4.3. Explain Bluetooth technology in detail
- 3.4.4. Describe Pico Net

4. Wireless Sensor Networks
 - 4.1. What is Wireless Sensor Network and list its Application
 - 4.2. List and types of Sensor networks: Single Source Single Object Detection, Single Source Multiple Object Detection, Multiple Source Single Object Detection, Multiple Source Multiple Object Detection
 - 4.3. What are the Challenges in Wireless Sensor Networks
 - 4.4. Explain node Behaviour in WSNs
 - 4.5. Explain Information theoretic self-management in WSN
 - 4.6. Applications of WSN
 - 4.7. Explain Wireless Multimedia Sensor Networks(WMSN)
 - 4.8. Explain Stationary Wireless Sensor Networks
 - 4.9. Explain Mobile Wireless Sensor Networks
 - 4.10. What is Machine to Machine Communications(M 2 M)
 - 4.11. Lists applications ,features of M2M
 - 4.12. 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. Health care applications
 - 5.1.8. Smart Home
 - 5.1.9. Smart Cities
 - 5.1.10. Smart class rooms
 - 5.1.11. Smart Energy
 - 5.1.12. Smart Transportation and Mobility
 - 5.1.13. Smart Factory

COURSE CONTENT

UNIT1 Introduction 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 Madiseti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach", Orient Blackswan Pvt., Ltd., New Delhi, 2015.

3) Walteneus 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 Madiseti , 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

S. No.	Chapter Name	Periods allocated	Weightage allotted	Mark wise Distribution of Weightage		Question wise Distribution of Weightage		Cos Mapped
				R	U	R	U	
1.	Introduction of IOT	12	16	6	10	2	1	CO1
2.	Data Protocols	17	26	6	20	2	2	CO1,CO2
3.	Communication Technologies	17	26	6	20	2	2	CO1,CO3
4.	Wireless Sensor Networks	17	29	9	20	3	2	CO4
5.	Role Of IOT	12	13	3	10	1	1	CO5
	Total	60	110	30	80	10	8	

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 to3.2
Unit test-2	From 3.3 to 5.13

DIPLOMA IN COMPUTER ENGINEERING
MODEL PAPER
Internet of Things
UNIT TEST-1

SCHEME: C-20
MAX MARKS:40

SUBJ CODE:CM-504
TIME: 90Minutes

PART-A

16Marks

Instructions:1) Answer all questions

2) First question carries 4marks, and each question of remaining carries 3marks

1. a) Sensors are not used in IOT (True/False) (CO1)
- b) IOT technology used in Fast Tag is----- (CO1)
- c) -----,-----are two of CoAp message types (CO2)
- d) Which one of the following is Communication Technology of IOT (CO1)
i) ZIGBEE II) XMPP III) AMQP IV) HTML
- 2) List any three IOT challenges (CO1)
- 3) List any three features of XMPP. (CO2)
- 4) Define Secure MQTT (CO2)
- 5)What is IEEE 802.15.4 (CO3)

PART-B

3X8=24Marks

Instructions: 1) Answer all questions

2)Each question carries 8 Marks

3)Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

6. a) Explain service oriented architecture of IOT (CO1)
Or
b) List and explain Routing protocols. (CO1)
7. a) Explain XMPP in detail (CO2)
Or
b) Explain AMQP in detail (CO2)
8. a) List and Explain IEEE 802.15.4 types in detail (CO3)
Or
b) Explain different topologies of ZIGBEE. (CO3)

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN COMPUTER ENGINEERING
MODEL PAPER –END EXAMINATION
Internet of Things

SCHEME: C-20
MAX MARKS:80

SUBJ CODE:CM-504
TIME: 3HOURS

PART-A

10X3=30Marks

Note: Answer all questions

1. What is the need of Sensor. (CO1)
2. List any three applications of RFID (CO1)
3. Define MQTT (CO2)
4. List any three features of XMPP (CO2)
5. List IEEE 802.15.4 types (CO3)
6. List applications of Bluetooth (CO3)
7. What is Wireless Sensor Network (CO4)
8. List M2M features (CO4)
9. List any three Applications of WSN (CO4)
10. List automation applications of IOT (CO5)

PART-B 5x10=50Marks

Note: Answer any five questions

11. List and explain functional Components of IOT (CO1)
12. List and explain CoAP message types (CO2)
13. Explain core XMPP Technologies (CO2)
14. List and explain ZIGBEE types (CO3)
15. Explain working principle of NFC (CO3)
16. Explain Information theoretic self-management in WSN (CO4)
17. Explain Wireless Multimedia Sensor Networks (CO4)
18. Smart class rooms (CO5)

Course code	Course Title	No. of Periods/Week	Total No. of periods	Marks for FA	Marks for SA
AIM-505	ARTIFICIAL NEURAL NETWORKS AND DEEP LEARNING	3	45	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	INTRODUCTIONTOARTIFICIALNEURALNETWORKS	9	CO1
2.	FEED FORWARDNEURALNETWORKS	9	CO2
3.	OTHERARTIFICIAL NEURAL NETWORKARCHITECTURES	9	CO3
4.	DEEPLARNING	9	CO4
5.	RECUURENT NEURALNETWORK	9	CO5
Total Periods		45	

Course Objectives	Upon completion of the course the student shall be able
	<ul style="list-style-type: none"> I. To introduce the fundamental techniques and principles of Neural Networks II. To study the different models in ARTIFICIAL NEURAL NETWORK and their applications III. To familiarize deep learning concepts with Convolutional and Recurrent Neural Network

;

Course Out comes	Upon completion of the course the student shall be able		
	CO1	AIM-505.1	Explain the basic concepts in Neural Networks and applications
	CO2	AIM-505.2	Analyze feed forward networks and their training issues
	CO3	AIM-505.3	Distinguish different types of ARTIFICIAL NEURAL NETWORK architectures
	CO4	AIM-505.4	Analyze the deep learning concepts using Back

			Propagation Network
	CO5	AIM-505.5	Explain Recurrent neural Network models and Applications

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-505.1	3							3	3	
AIM-505.2	2	3	2	2	1	2	1	3	3	2
AIM-505.3	3	1	1	2	2			3	2	1
AIM-505.4	2	3	2	2				2	2	2
AIM-505.5	2	2	3					3	2	2
Average	2.4	2.25	2	2	1.5	2	1	2.8	2.4	1.75

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

Learning Outcomes:

At the end of course student should be able to learn

1.0 Introduction to ARTIFICIAL NEURAL NETWORK

- 1.1 Define Neural Networks
 - 1.1.1 Understanding the biological neuron
- 1.2 Explain Model of Artificial neural network
- 1.3 Describe Types of activation Functions
 - 1.3.1 Identity function
 - 1.3.2 Threshold /step function
 - 1.3.3 Rectified linear unit function
 - 1.3.4 Sigmoid function
 - 1.3.5 Hyperbolic tangent function
- 1.4 Explain Architectures of Neural Network
 - 1.4.1 Single layer feed forward network
 - 1.4.2 Multi layer feed forward network

- 1.4.3 Recurrent network
- 1.5 Explain Learning process in Artificial neural network
- 1.6 Understand Taxonomy of neural networks
- 1.7 Discuss real life applications of Neural networks
- 2.0 Feed Forward Neural networks**
 - 2.1 Explain perceptron
 - 2.1.1 perceptron
 - 2.1.2 perceptron Learning rule
 - 2.1.3 Perceptron Function
 - 2.1.4 Inputs of a percptron
 - 2.1.5 Activation functions of a perceptron
 - 2.1.6 output of Perceptron
 - 2.1.7 perceptron decision function
 - 2.2 Analyze Training Algorithms
 - 2.2.1 Discrete
 - 2.2.2 Continuous
 - 2.3 List Limitations of Perceptron Model
 - 2.4 Explain Credit Assignment problem
 - 2.5 Analyze Back propogation Algorithm
 - 2.5.1 Generalized Delta Rule
 - 2.5.2 Derivation of Back propogation
 - 2.5.3 Summarization of back propogation
- 3.0 Other ARTIFICIAL NEURAL NETWORK Architectures**
 - 3.1 Explain Associative Memory
 - 3.1.1 Introduction
 - 3.1.2 Hopfield Network
 - 3.1.3 BiDirectional Associative memory
 - 3.2 List the Applications of Associative memory
 - 3.3 Explain Adaptive Resonance Theory(ART)
 - 3.2.1.1 ART1
 - 3.2.1.2 ART2
 - 3.2.1.3 Applications of ART
 - 3.3 Explain Competition based Artificial neural network
 - 3.3.1 Kohonen self organizing maps
 - 3.3.2 Counter propagation network
- 4.0 DEEP LEARNING**
 - 4.1 Define Deep learning
 - 4.2 List the Applications of Deep learning
 - 4.3 Discuss Issues in Feed forward Networks
 - 4.3.1 Temporal/ sequential Relationships
 - 4.3.2 Spatial relationships
 - 4.3.3 Vanishing gradient
 - 4.3.4 Overfitting
 - 4.3 Describe Deep learning networks
 - 4.3.1 Convolution neural networks
 - 4.3.2 Recurrent neural networks
 - 4.3.3 Long short term memory networks

- 4.3.4 Support vector Machines
- 4.4 Explain Convolution Neural network
 - 4.4.1 Convolution neural network design
 - 4.4.2 Training Convolution neural network
 - 4.4.3 Limitations of Convolution neural network

5.0 Recurrent Neural Networks

- 5.1 Define Recurrent neural networks
- 5.2 Distinguish Feed forward neural networks and Recurrent neural networks
- 5.3 List the Applications of Recurrent neural networks
- 5.3 Explain the Structure of RECURRENT NEURAL NETWORK
 - 5.3.1 Hopfield network
 - 5.3.2 Elman network
 - 5.3.3 Jordan network
- 5.4 Explain Limitations of RECURRENT NEURAL NETWORK
- 5.5 Describe Long short-term Memory

COURSE CONTENT

UNIT I INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS Fundamentals Of Neural Networks – Model of Artificial Neuron – Activation functions - Neural Network Architectures – Learning process in ARTIFICIAL NEURAL NETWORK – Taxonomy Of Neural Network Architectures – Applications	9
UNIT II FEED FORWARD NEURAL NETWORKS Introduction to perceptron – Training Algorithms- Perceptron – Limitations of the Perceptron – Model- Credit Assignment Problem – Back propagation (BP) Algorithm	9
UNIT III OTHER ARTIFICIAL NEURAL NETWORK ARCHITECTURES Associative Memory – Exponential BAM – Adaptive Resonance Theory - ART 1 – ART2 – Applications – Neural Networks Based On Competition.	9
UNIT IV DEEP LEARNING Overview-Applications of deep learning- issues in feed forward networks- Deep learning networks- Convolutional Neural Network- Applications of CNN.	
UNIT V RECURRENT NEURAL NETWORKS Introduction-Feed forward neural networks Vs Recurrent neural networks-Applications of Recurrent neural networks, Structures of Recurrent Neural Network- Limitations of RECURRENT NEURAL NETWORK	

REFERENCE BOOKS

1. Machine learning, Pearson -- Saikat Dutt, Subramanian Chandramouli, Amitkumar Das
2. Machine Intelligence, Notion Press -- Suresh Samudrala
3. Fundamentals of Neural Networks --- Laurene Fausett

4. CharuC.Aggarwal “Neural Networks and Deep learning” Springer International Publishing, 2018
5. Satish Kumar, “Neural Networks, A Classroom Approach”, Tata McGraw -Hill, 2007
6. Simon Haykin, “Neural Networks, A Comprehensive Foundation”, 2nd Edition, Addison Wesley Longman, 2001.

Model Blue Print:

S.No.	Chapter/Unit title	No. of periods	Weightage Allocated	Marks Wise Distribution of Weightage			Question wise Distribution of Weightage			CO's Mapped
				R	U	Ap	R	U	Ap	
1	INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS	9	16	3	13		1	2		CO1
2	FEED FORWARD NEURAL NETWORKS	9	16	3	13		1	2		CO2
3	OTHER ARTIFICIAL NEURAL NETWORK ARCHITECTURES	9	26	3	13	10	1	2	1	CO3
4	DEEP LEARNING	9	26	3	13	10	1	2	1	CO2, CO4
5	RECURRENT NEURAL NETWORKS	9	26	3	13	10	1	2	1	CO2, CO5
	Total	45	110	15	65	30	5	9	3	

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 3.1
Unit test-2	From 3.2 to 5.5

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
ARTIFICIAL NEURAL NETWORKS AND DEEP LEARNING
UNIT TEST-1

SCHEME: C-20
MAX MARKS:40

SUBJ CODE:AIM-505
TIME: 90Minutes

PART-A

16Marks

Instructions: 1) Answer all questions

2) First question carries 4marks, and each question of remaining carries 3marks

1. a) A perceptron is also called an artificial neuron. (True/False) (CO1)
- b) A binary sigmoid function has range of _____ (CO1)
- c) In a backpropagation algorithm multiple iterations are known as _____. (CO2)
- d) Recurrent networks -----] (CO2)
- I) similar to multilayer feed forward networks II) May have self loops III) Have feed back loops
- IV) All of the above (CO5)
- 2) List Advantages of ARTIFICIAL NEURAL NETWORK. (CO1)
- 3) What is the difference between forward and backward propagation in neural networks? (CO2)
- 4) Define Associative in artificial neural network (CO3)
- 5) What are the disadvantages of convolution neural network? (CO4)

PART-B

3X8=24Marks

Instructions: 1) Answer all questions

2) Each question carries 8 Marks

3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

6. a) Explain the single layer feed forward architecture of ARTIFICIAL NEURAL NETWORK. (CO1)
(Or)
- b) Explain the structure of artificial neuron. How is it similar to the biological neuron. (CO1)
7. a) Explain the back propagation algorithm (CO2)
(Or)
- b) Explain credit assignment problem in detail. (CO2)
8. a) Explain Bi-Directional associative memory (CO3)
(Or)
- b) Explain the training algorithms of perceptron (CO2)

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER - END EXAMINATION
ARTIFICIAL NEURAL NETWORKS AND DEEP LEARNING

SCHEME: C-20
MAX MARKS:80

SUBJ CODE: AIM-505
TIME: 3HOURS

PART-A

10X3=30Marks

Note: Answer all questions

1. Define Artificial Neural networks. (CO1)
2. state the need of activation function in ARTIFICIAL NEURAL NETWORK. (CO1)
- 3 Differentiate perceptron and biological neuron. (CO2)
- 4 What are the limitations of perceptron model? (CO2)
- 5 List out the applications of associative memory . (CO3)
- 6 List advantages of ART . (CO3)
- 7 Define deep learning (CO4)
- 8 Define overfitting issue in Feed forward neural networks. (CO4)
- 9 List limitations of Recurrent neural networks. (CO5)
- 10 State the need of LSTM. (CO5)

PART-B

5x8=40Marks

Note: Answer all questions

11. Explain multi layer feed forward artificial neural network. (CO1)
12. Explain the Back propagation algorithm? (CO2)
13. Explain Bidirectional Associative memory in ARTIFICIAL NEURAL NETWORK(CO3)
- 14 Explain kohonen self organizing maps in Artificial neural networks. (CO3)
15. Explain various issues in Feed forward networks. (CO4)
16. Explain basic structure of convolutional neural networks (CO4)
17. Explain Hopfield network (CO5)
18. Explain Vanishing gradient problem in RECURRENT NEURAL NETWORK? (CO5)

Course Code	Course title	No of periods/ week	Total no of periods	Marks for FA	Marks for SA
AIM-506	Natural Language Processing Laboratory using Python	04	60	40	60

S No	Chapter/ Unit Title	No. of Periods	COs Mapped
1.	Introduction to Natural Language Processing	10	CO1
2.	Word Level Analysis	10	CO1,CO2
3.	Syntactic Analysis	10	CO2,CO3
4	Semantics and Pragmatics	15	CO3,CO4
5	Discourse Analysis and Lexical Resources	15	CO4,CO5
	Total	60	

COURSE OBJECTIVES	<p>Upon On completion of the course the student shall be able to</p> <ol style="list-style-type: none"> 1. Familiarize with the fundamentals of Natural Language Processing (NLP). 2. Make use of word level analysis. 3. To know Context Free Grammar and Probabilistic Context Free Grammar in NLP. 4. Make use of the Semantics of sentences and pragmatics. 5. To know NLP techniques in Information Retrieval applications.
--------------------------	--

CO No		COURSE OUTCOMES
CO 1	AIM-506.1	Practice Natural Language Processing in Python Environment.
CO 2	AIM-506.2	Perform Word Level Analysis in Python.
CO 3	AIM-506.3	Perform Syntactic Analysis in Python.
CO 4	AIM-506.4	Practice Semantics and Pragmatics in Python.
CO 5	AIM-506.5	Observe Discourse Analysis and Lexical Resources in Python.

Exercises:**Suggestion:**

- Use Anaconda IDE for Python Programming.
- Use common Datasets (like Student Marks for 6 different Subjects with Grades) for easy understanding.

1. Practice Installation of NLTK in python.
2. Execute Tokenise by word using NLTK in python.
3. Execute Tokenise by Sentence using NLTK in python.
4. Exercise to find Minimum number of edits (operations) required to convert 'str1' into 'str2' using python.
5. Practice Part of Speech Tagging with Stop words using NLTK in python.
6. Exercise on Binning method (sequential data) for data smoothing using python.
7. Practice basic tree bank structure implementation in python.
8. Exercise on Creating Shallow Tree using python.
9. Practice Fibonacci numbers using dynamic programming python.
10. Execute Correct() function using NLTK in python.
11. Exercise on Chunking using NLTK in python.
12. Exercise on Chinking using NLTK in python.
13. Practice Lemmatizing using NLTK in python.
14. Practice Stemming using NLTK in python.
15. Exercise on Making a Frequency Distribution using NLTK in python.

KEY COMPETENCIES:

Exp. No.	Name of the experiment	Objectives	Key Competencies
1	Installation of NLTK in python	Learns Installation of Anaconda. Learns Installation of NLTK.	<ul style="list-style-type: none"> • Know the Installation of Anaconda IDE. • Open your terminal, run pip install NLTK . • Write python in the command prompt so python Interactive Shell is ready to execute your code/Script. import NLTK
2	Tokenize by	of word_tokenize() method to split a sentence	<ul style="list-style-type: none"> • import word_tokenize from NLTK

	word	into tokens or words.	<ul style="list-style-type: none"> • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
3	Tokenize by Sentence	Usage of sent_tokenize() method to split a document or paragraph into sentences.	<ul style="list-style-type: none"> • import sent_tokenize from NLTK . • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
4	Finding minimum number of edits(operations) required to convert 'str1' into 'str2'	Perform minimum number of edits (operations) required to convert 'str1' into 'str2'.	<ul style="list-style-type: none"> • Save str1 and str2. • Compare the strings. • Count the no of edits required. • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
5	Part of Speech Tagging with Stop words	Stop words can be filtered from the text to be processed.	<ul style="list-style-type: none"> • import word_tokenize from NLTK • import stopwords from NLTK • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
6	Binning method for data smoothing	<p>Learns data smoothing by using binning methods.</p> <ul style="list-style-type: none"> • Know smoothing by bin means • Know smoothing by bin median • Know smoothing by bin boundary 	<ul style="list-style-type: none"> • import numpy. • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
7	Basic tree bank structure implementation	Learns to search for a given key in moderate time (quicker than Linked List and slower than arrays).	<ul style="list-style-type: none"> • import treebank from NLTK • import Tree from NLTK • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
8	Creating Shallow Tree	Learns to keep the highest level subtrees	<ul style="list-style-type: none"> • import shallow_tree from transforms. • import treebank from NLTK • import Tree from NLTK

			<ul style="list-style-type: none"> • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
9	Fibonacci numbers using dynamic programming	Learns to perform recursion $F_n = F_{n-1} + F_{n-2}$	<ul style="list-style-type: none"> • import math • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
10	Correct() function	Learns to get the corrected words if any sentence have spelling mistakes	<ul style="list-style-type: none"> • importTextBlob from textblob. • Use correct() method. • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
11	Chunking Process	Learns on the process of taking individual pieces of information and grouping them into larger units	<ul style="list-style-type: none"> • import word_tokenize from NLTK • Use RegexpParser method of NLTK . • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
12	Chinking Process	Learns to remove a chunk from a chunk.	<ul style="list-style-type: none"> • import word_tokenize from NLTK • Use RegexpParser method of NLTK . • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
13	Lemmatizing Process	Learns the process of grouping together the inflected forms of a word so they can be analysed as a single item.	<ul style="list-style-type: none"> • Import WordNetLemmatizer from NLTK . • Use lemmatize method. • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
14	Stemming	Learns the process of producing morphological	<ul style="list-style-type: none"> • import word_tokenize from NLTK . • import PorterStemmer from NLTK .

	Process	<p>variants of a root/base word.</p> <p>There are mainly two errors in stemming</p> <ul style="list-style-type: none"> • over-stemming • under-stemming 	<ul style="list-style-type: none"> • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
15	Making a Frequency Distribution	Learns how frequencies are distributed over the values	<ul style="list-style-type: none"> • <code>Import</code> FreqDist from NLTK . • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.

Course Code	Course title	No of periods/week	Total no of periods	Marks for FA	Marks for SA
AIM-507	Machine Learning Lab	06	90	40	60

S No	Chapter/ Unit Title	No. of Periods	COs Mapped
1.	Installing python and various SciPy Packages using Anaconda, PIP etc	12	CO1
2.	Implementation of Data modelling Functions	30	CO2
3.	Implementation of various Supervised and unsupervised learning Algorithms	30	CO3, CO4
4	Implementation of single layer and multilayer neural networks	18	CO5
	Total	90	

COURSE OBJECTIVES	<p>Upon On completion of the course the student shall be able to</p> <ol style="list-style-type: none"> 1. Install the Python, SciPy packages on windows using Anaconda 2. Make use of Data sets in implementing the machine learning algorithms 3. Implementing the Algorithms on Supervised and Un-Supervised Learning 4. Implementing the single layer and multilayer neural networks
--------------------------	---

CO No	COURSE OUTCOMES
CO 1	AIM-507.1 Understand the implementation procedures for the machine learning algorithms
CO 2	AIM-507.2 Apply appropriate data sets to the Machine Learning algorithms.
CO 3	AIM-507.3 Design python programs for supervised and unsupervised learning algorithms
CO 4	AIM-507.4 Design python programs for single layer and multilayer feed forward neural networks
CO 5	AIM-507.5 Identify and apply machine learning algorithms to solve real world problems.

Exercises:

1. Exercise on installing python, scipy packages(Includes numpy, pandas, matplotlib, sklearn)
2. Exercise on basic mathematical operations on datatypes(vectors , matrices using numpy)
3. Exercise on creating, loading and saving .CSV file.
4. Exercise on Calculation of mean, median, variance, standard deviation ,quartiles, inter quartile range.
5. Exercise on basic plots using matplotlib for an example dataset
6. Exercise on data preprocessing operations on a data set.
7. Exercise on model training (Holdout, Kfold cross validation, Boot strap sampling) using SK Learn.
8. Exercise on Feature construction and feature extraction for a sample data set.
9. Exercise on Feature Subset selection for a model data set.
10. Exercise on implementing the **naive Bayesian classifier** for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier.
11. Exercise on implementing *k*-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions.
12. Demonstrate Decision Tree algorithm for finding the most specific hypothesis based on a given set of training data samples.
13. Apply decision tree based ID3 algorithm on a appropriate data set for building the decision tree and to classify a new sample.
14. Write a program to implement K-Means Clustering to classify the data set. Use an appropriate data set for building the K-Means Clustering and apply this knowledge to classify a new sample.
15. Write a program to implement the SVM **classifier** for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier.
16. Write a program to implement the simple linear regression algorithmfor a sample training data set stored as a .CSV file. Compute the accuracy of the classifier.
17. Write a program to implement single layer feed forward neural networks.
18. Write a program to implement multi layer feed forward neural networks.

KEY COMPETENCIES

Exp. No.	Name of the experiment	Objectives	Key Competencies
1	Exercise on installing python, scipy packages	(a) Installation of python (b)Installing scipy packages using Anaconda	a) observe the installation of the packages

2	Exercise on basic mathematical operations on datatypes	(a) Write a program for implementing vectors and matrices	(a) Compile the program and rectify the errors (b) Use numpy package (b) Execute the program (c) Observe the output for different data values
3	Exercise on creating, loading and saving .CSV file	(a) Create a data file in Excel (b) Save the file with .CSV extension (c) Load the .CSV file	(a) Create and save the .CSV file (b) loading of .CSV file (c) Compiling and executing the program (d) Observe the output
4	Exercise on Calculation of mean, median, variance, standard deviation, quartiles, inter quartile range.	(c) Write a program to implement statistical calculations (d) Apply the program on appropriate data values	(i) Identify the appropriate data values (j) Use Numpy package (k) Observe the errors (l) Correct the program and re execute.
5	Exercise on basic plots using matplotlib lib for an example dataset	(a) Write a program for implementing basic plots. (b) Apply the program on sample data set.	(i) Use Matplotlib package of python to generate basic plots (j) Execute the program on sample dataset (k) Observe the output
6	Exercise on data preprocessing operations on a data set.	Write a program to handle outliers and missing values in the dataset	(g) Identifying and removing outliers/missing values (h) Test the program for a given dataset
7	Exercise on model training using Sklearn.	Write a program to train a model .	(a) Use SKlearn package (b) Differentiating test dataset and training dataset using hold out method (c) Stabilizing the dataset using K-fold cross validation (d) Generating samples of given size from training data by boot strap sampling (e) Training the model (f) Observe the output
8	Exercise on Feature	Write a program to implement	(a) Use Pandas package (b) Dummy coding the categorical

	construction and feature extraction for a sample data set.	feature construction Write a program to implement feature extraction using PCA	variables(nominal) (c) Encoding categorical(ordinal) variables (d) Transforming numeric features to categorical features (e) Using PCA for feature extraction in a dataset. (f) Observe the output
9.	Exercise on Feature Subset selection for a model data set.	Write a program to implement feature subset selection	a) Selecting a subset of features in a dataset to improve the performance b)Observe the output
10	Write a program to implement the naïve Bayesian classifier for a dataset	Write a program to implement naïve Bayesian classifier algorithm.	a) Use SKLearn package b) Importing a dataset c) Applying naïve bayesian classifier to classify the dataset d) Calculating the accuracy of the classifier e) Analyzing the output
11	Write a program to implement <i>k</i> -Nearest Neighbour algorithm	Write a program to implement KNN algorithm for supervised learning	a) Use SKLearn package b) Importing a dataset c) Applying KNN classifier to classify the dataset d) Calculating the accuracy of the classifier e) Analyzing the output
12	Implement decision tree algorithm to classify a dataset	Write a program to implement decision tree algorithm	a) Importing a dataset b) Applying decision tree classifier to classify the dataset c) Calculating the accuracy of the classifier d) Analyzing the output
13	Program to demonstrate the working of the decision tree based ID3 algorithm.	Write a program to implement ID3 algorithm	a) Importing a dataset b) Applying ID3 algorithm to classify the dataset c) Calculating the accuracy of the classifier d) Analyzing the output
14	program to implement K-	Write a program for K-Means	a) Use SKlearn package

	Means Clustering algorithm for a sample data set	clustering algorithm	<ul style="list-style-type: none"> b) Importing a dataset c) Applying K-Means algorithm to cluster the dataset d) Calculating the accuracy of the classifier e) Analyzing the output
15	program to implement the SVM classifier for a sample training data set	Write a program to implement the SVM classifier for a sample data set	<ul style="list-style-type: none"> a) Importing a dataset b) Applying SVM algorithm to classify the dataset c) Calculating the accuracy of the classifier d) Analyzing the output
16	program to implement the simple linear regression algorithm	a) Write a program to implement the linear regression algorithms	<ul style="list-style-type: none"> a) Importing a dataset b) Applying linear regression algorithm to classify the dataset c) Calculating the accuracy of the classifier d) Analyzing the output
17	program to implement single layer feed forward neural networks.	a) Write a program to implement single layer feed forward neural networks	<ul style="list-style-type: none"> a) Installing neurolab package b) Executing the program c) Observe the output
18	program to implement Multi layer feed forward neural networks.	a) Write a program to implement multilayer feed forward network	<ul style="list-style-type: none"> a) Installing neurolab package b) Executing the program c) Observe the output

Reference:

1. Machine learning Pearson ---Saikat Dutt,Subramanian Chandramouli, Amit Kumar
2. <https://deepakdvallur.weebly.com/machine-learning-laboratory.html>
3. <https://github.com/DaNGLiN/ML-LAB-PROGRAM-vtu--15cs176>
4. <http://vtu.babivenu.in/wp-content/uploads/2019/08/CSE-7th-Sem-MACHINE-LEARNING-LABORATORY-csml1819.pdf>
5. https://www.tutorialspoint.com/machine_learning_with_python/machine_learning_with_python_tutorial.pdf
6. WWW.Kaggle.com for Data sets in .CSV format

Course Code	Course Title	No. of Periods/Week	Total No. of Periods	Marks for FA	Marks for SA
AIM-508	Life Skills	3	45	40	60

Course Objectives: The students shall

- 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:The students shall

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-teamgame - read the story and answer the questions- fill in the grid.

UNIT 10 : Leadership... *themaking 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 Course Outcomes with Program Outcomes

P	1	2	3	4	5	6	7
O							
C	POs 1 to 5 are applications of Engineering Principles, can't directly be mapped to Life Skills					1,2,3,4	1,2,3,4
O							

Cos- POsMapping :

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 Lessons (1 to 11)	6,7	U/Ap/ An
CO2	To set appropriate goals and achieve them	3,4,5	6,7	U/Ap/An

	through proper planning, time management and self-motivation			
CO3	To solve diverse real-life and professional problems with critical thinking and creativity for a stress-free life	6,7,8,11	6,7	U/Ap/An/ Ev/ Cr.
CO4	To be an ideal team player and manifest as a leader	9,10	6,7	U/Ap/An/ Ev

ASSESSMENT

C23-Common-508: Life Skills

- The assessment for C23-Common 508 is on par with all other practical subjects comprising 40 marks for Internal Assessment and 60 marks for External examination attaining the final total of 100 Marks.
- The Internal Assessment can be conducted in the form of Assignments in all the 11 Units together, taking the average for 40 marks as suggested below.
- The Assessment sheet provided after each lesson in the workbook can be evaluated as an assignment (A) for 10 marks. In addition to that, another assignment (B) can be conducted for 10 marks in each Unit, awarding total average of 10 marks for each Lesson. Finally the grand total can be averaged for 40 marks as Internal marks.
- The students can present these assignments (B) to the teacher orally and they should also write down their assignments (B) in a separate note book for practice as they are going to speak/present in the external examination and submit the same to the teacher.
- The questions for Assignment styles vary from Lesson to Lesson as different skills are assessed in each Lesson with specific parameters. We can also consider the questions of assignments given after each lesson in the workbook.
- The assignment questions can also be given based on case studies, personal experiences, observations, making inferences/ analysis/ forming opinions, solving puzzles, questions on logical thinking, reasoning, evaluating and writing reviews..etc.

Calculating Internal marks through Assignments					
Name of the student:		PIN:	Branch:	Academic Year:	
S. No.	Title of the Unit / Lesson	Assignment A: 10Marks (assessment sheets after each lesson)	Assignment B: 10 Marks	Total Marks in each Unit/ Lesson (Average for 10 Marks)	
1	Attitude				
2	Adaptability				
3	Goal setting				
4	Motivation				
5	Time Management				
6	Critical Thinking				
7	Creativity				
8	Problem Solving				
9	Team work				
10	Leadership				
11	Stress Management				
	Marks scored	Example:		90	
		:			
	Total Number of Assignments			11	
	Internal Assessment: Average for 40 Marks	Example: $(90/11) \times 4 = 32.7$		33	

End Exam Model paper: C23-Common-508 : Life Skills Lab

Guidelines to prepare the question paper of the Lab End exam for 60 marks:

I. Define any three of the following terms of Life skills: (Oral) – 10 Marks

(From Lessons 1 to 11)

II. Recollect and narrate an incident either from your personal experience or observation where you have exhibited/ learned about any one of the following life skills. (oral) – 15 Marks.

(From Lessons 1 to 4: Attitude/ Adaptability/Motivation/Goal setting/

III. Recollect and narrate an incident either from your personal experience or observation where you have exhibited/ learned about any one of the following life skills. (oral) – 15Marks.

(From Lessons 5, 9,10,11 : Time Management, Team Work, Leadership, Stress Management)

IV. A question on problem solving skill, using creativity and critical thinking.

(A case study/a problematic situation should be provided by the examiner and the students should answer it in writing.)

Ex: Analyse the following problematic situation and write down the possible solutions and choose the best among them using your creativity and critical thinking / How do you solve the following problem?– (written) 20 Marks

(From Lessons 6,7,8: Creativity/ Critical Thinking/ Problem Solving)

Note: The questions I to III can be evaluated through Viva Voce and Q.No. IV should be answered by the students in writing. The examiner can adapt the blended mode of evaluation (oral& written) in view of the more number of students and time constraint.

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-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	AIM509.1	Identify the hardware, software problems and their feasibility
	CO2	AIM509.2	Prepare SRS document based on gathered and analysed requirements
	CO3	AIM509.3	Design the plan document based on SRS
	CO4	AIM509.4	Code and test the software based on the design document
	CO5	AIM509.5	Practice software maintenance skills and maintaining quality and reliability
	CO6	AIM509.6	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
AIM509.1	3	2	1	3	1			2	3	
AIM509.2	3	2	3	1	2	1		2	3	2
AIM509.3	3	2	3	1	2	1		2	3	2
AIM509.4	3	2	3	3	3	1		2	3	2
AIM509.5	3		2	2	3	3	3	2	3	2
AIM509.6	3	2		2	1	3	3	2	3	2

Average	3	2	2.4	2	2.2	1.8	3	2	3	2
----------------	----------	----------	------------	----------	------------	------------	----------	----------	----------	----------

3=strongly mapped, 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 survey and 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. ARTIFICIAL INTELLIGENCE PROJECTS
 - a. E-commerce
 - b. Chat bots
 - c. Robotics
 - d. Speech recognition
 - e. Machine vision
 - f. Gaming

- g. Healthcare
- h. Fitness Applications
- i. Home Automation or any relevant

3. MACHINE LEARNING PROJECTS

- a. Traffic Alerts
- b. Social Media
- c. Transportation
- d. Products Recommendations
- e. Dynamic Pricing
- f. Google Translate
- g. Online Video Streaming
- h. Fraud Detection
- i. Loan Prediction or any relevant

- 4. To develop above projects and deploy in cloud platform
- 5. To develop IOT based applications
- 6. 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)

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2023
(VI Semester)
AIM-601 Industrial Training**

Course Code	Course title	No of periods/week	Duration	Marks for FA	Marks for SA
AIM-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 Acquisition.	2 months	CO2
3	Participate in product development.	2 months	CO3
4	Perform onsite service.	1 month	CO4
	Total	6 months	

Course Objectives	<ol style="list-style-type: none"> 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.
--------------------------	--

Course Outcomes	At the end of course student able to:		
	CO1	AIM601.1	Apply knowledge and skill already learnt in the institution.
	CO2	AIM601.2	Acquire the required skills of analysis, design and development, testing, verification and validation, deployment and distribution of the product.
	CO3	AIM601.3	Involve in product design, development, quality testing and maintenance production by exhibiting the strength, teamwork spirit and self-confidence
	CO4	AIM601.4	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
AIM601.1	3					3		3	3	
AIM601.2	3			2	3	3	3	3	3	
AIM601.3	3	3	3	3	3	3	3	3	3	3
AIM601.4	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 – SCHEME OF EVALUATION (Two Online Certificate courses):

TRAINING MODULE NO.	TOPIC	LEARNING OUTCOMES (In-house training)	MARKS
First 3 Months/12 weeks- First certificate	1) Registration at Nptel/ Swayam/ Moocs/course era/lectera/caltech/oxford/hckerrank/udem y... etc.,	i) Learning ii) Mini Application development iii) Report -1 preparation for First certificate	120

		iv)1 st Assessment	
Next 3 Months/12 Weeks- Second Certificate	1) Registration at Nptel/Swayam/Moocs/course era/lectera/caltech/oxford/hckerrank/udemy... etc.,	i) Learning ii) Mini Application development iii) Report preparation iv) 2 nd Assessment	120
External Evaluation	Seminar on two reports/viva	Evaluation by GUIDE/Co - Examiner, HOD and External Examiner	60
		TOTAL	300

Online Certificate courses –

1. First 3 Months/12 weeks- Registration at either of Nptel/ Swayam/ Moocs/ course era / lectera / caltech / oxford / hckerrank / udemy for First Certificate Course
2. Next 3 Months/12 Weeks- Registration at either of Nptel/ Swayam/ Moocs/ course era / lectera / caltech / oxford / hckerrank / udemy for Second Certificate Course.

Scheme of evaluation(Training at Industry)

Sl. 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

The 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, verification and validation , deployment and distribution of the product.	70	30
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 PROGRAMME

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/ ***TWO Online Certificate courses***

- i. First 3 Months/12 weeks- - Registration and training at either of Nptel/ Swayam/ Moocs/course era / lectera / caltech / oxford / hckerrank / udemy for First Certificate Course*
- ii. Next 3 Months/12 Weeks- - Registration and training at either of Nptel/ Swayam/ Moocs/course era / lectera / caltech / oxford / hckerrank / udemy for Second Certificate Course.*

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 including
1. 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.

**DEPARTMENT OF TECHNICAL EDUCATION
NAME OF THE INSTITUTION
INDUSTRIAL TRAINING FIRST ASSESSMENT**

PIN:

NAME OF THE STUDENT:

Name of the Industry:

<i>Skill Set Sl.No</i>	<i>SKILL SET</i>	<i>Max Marks Allotted For each parameter</i>	<i>Marks obtained</i>
1	Apply knowledge and skill already learnt in the institution.	50	
2	Acquire the required skills of analysis, design and development , testing, verification and validation.	40	
3	Acquire the required skills of deployment and distribution of the product.	30	
	<i>Total</i>	<i>120</i>	

(Marks in words:)

Signature of the Training In-charge (Mentor)
(Guide)

Name:

Designation:

Signature of the visiting staff

Name:

Designation:

**DEPARTMENT OF TECHNICAL EDUCATION
NAME OF THE INSTITUTION
INDUSTRIAL TRAINING SECOND ASSESSMENT**

PIN:

NAME OF THE STUDENT:

Name of the Industry:

<i>Skill Set Sl.No</i>	<i>SKILL SET</i>	<i>Max Marks Allotted For each parameter</i>	<i>Marks obtained</i>
1	Apply knowledge and skill already learnt in the institution.	10	
2	Acquire the required skills of analysis, design and development, testing, verification and validation.	20	
3	Acquire the required skills of deployment and distribution of the product.	10	
4	Involve in product design, development, quality testing and maintenance production by exhibiting the strength, teamwork spirit and self-confidence	25	
5	Prepare product documents like user manual and installation guide and operational manuals.	15	
6	Perform the activities of deploying product at customer site and training the end user.	25	
7	Maintaining the system at user site (Post product services)	15	
		120	

(Marks in words:)

Signature of the Training In-charge (Mentor)
(Guide)

Name:

Designation:

Signature of the visiting staff

Name:

Designation:

