



GOVERNMENT OF ANDHRA PRADESH

**STATE BOARD OF TECHNICAL EDUCATION AND
TRAINING**

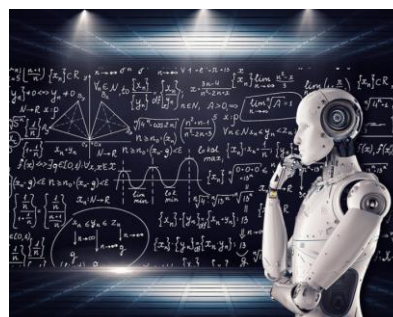
Andhra Pradesh :: AMARAVATI



Globally Competitive

CURRICULUM (FOR NEW COURSE)

**For Polytechnic Diploma Courses
in Andhra Pradesh**



3 YEAR

DIPLOMA IN

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING



CURRICULUM FOR NEW COURSES

3 YEAR DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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CURRICULUM FOR DIPLOMA COURSES IN ANDHRA PRADESH

PREAMBLE

The proposed programme intends to develop a skilled technician to support the industries both nationally or globally. It also helps to kindle the spirit of entrepreneurship with necessary skills and theoretical inputs aligning with the National policy of 'Make in India'. The programme also provides for accomplishing higher education goals for those who wish to enrich their theoretical concepts further.

The State Board of Technical Education and Training, (SBTET) AP, has been offering Diploma programmes to meet the above said aspirations of the stake holders: industries, students, academia, parents and the society at large.

The AICTE has brought The New Education Policy (NEP-2020). NEP-2020 approved by the Union Cabinet is set to bring a slew of major changes. One of the stated aims of the policy is to develop knowledge, skills, values, and dispositions that support responsible commitment to human rights, sustainable development and living, and global well-being.

The NEP-2020 identified the demand for courses on Artificial Intelligence (AI), Internet of Things (IoT), Machine Learning, Block Chain, Robotics, Quantum Computing, Data Sciences, Cyber Security, 3D Printing & Design and other emerging technological areas. Hence to keep the curriculum of SBTET,AP on par with recommendations of NEP-2020 it is decided to introduce new emerging courses.

As per the G.O.RT.No.97 dt.1/10/2021 and G.O.RT.No.98 dt.1/10/2021 of SKILL DEVELOPMENT & TRAINING(TE-I) DEPARTMENT ,AP, it is decided to include the additional diploma programmes in the curriculum of SBTET,AP like Artificial Intelligence And Machine Learning Engineering, Cloud Computing And Big Data Engineering , Communication and Computer Networking Engineering, Artificial Intelligence Engineering, Web Designing etc.,

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

Inclusion of emerging courses is approved by BoG of SBTET for implementation with effect from 2020-21 as part of Curriculum C-20.

Highlights of Curriculum C-20:

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 6 months 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. CISCO course content has been incorporated into the ECE, CME and CME allied programmes for certification from CISCO in lieu of industrial training when students are unable to get Industrial Training placement in any industry.
6. 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.

7. 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.
8. CAD specific to the branch has been given emphasis in the curriculum. Preparing drawings using CAD software has been given more importance.
9. Upon reviewing the existing C-16 curriculum, it is found that the theory content is found to have more weightage than the Practical content. In C-20 curriculum, more emphasis is given to the practical content in Laboratories and Workshops, thus strengthening the practical skills.
10. 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.
11. 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.
12. An exclusive section for assessing Higher order Thinking skills (HOTS) has been introduced in summative evaluation.

Acknowledgements:

It is pertinent to acknowledge the support of the following in the making of Curriculum C-20. A workshop is conducted by NITTTR, AP Extension Centre, Vijayawada involving faculty from Polytechnics, Premier Engineering Colleges & Industries to frame the structure and the contents of various courses of Diploma in Communication and computer Networking Engineering to design C-20 Curriculum under the guidance of Dr C. R. Nagendra Rao, Professor & Head, NITTTR-ECV. The efforts & support extended by NITTTR to bring out final Curriculum C-20 by incorporating needs, aspiration & expectations of all stake holders is highly appreciated and gratefully acknowledged.

The Members of the working group are grateful to Dr. Pola Bhaskar, I.A.S., Commissioner of Technical Education, Chairman of SBTET, AP and Smt. G. Jaya Lakshmi, I.A.S. Principal Secretary, Department of Skill Development and Training, for their guidance and valuable inputs during process of framing and developing the Curriculum C-20.

The Members acknowledge with thanks the guidance & inspiration provided by Sri K Vijaya Bhaskar, Secretary, SBTET, Andhra Pradesh and other officials of Directorate of Technical Education and the State Board of Technical Education, Andhra Pradesh, experts from industry, academia from the universities and higher learning institutions and all teaching fraternity from the Polytechnics who are directly or indirectly involved in preparation of the curricula.

RULES AND REGULATIONS OF C-20 CURRICULUM

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.

2 PROCEDURE FOR ADMISSION INTO THE DIPLOMA COURSES:

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

- a) Candidates who wish to seek admission in any of the Diploma courses will have to appear for the Common Entrance Test for admissions into Polytechnics (POLYCET) conducted by the State Board of Technical Education and Training, Andhra Pradesh, Vijayawada.

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

- 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

3 MEDIUM OF INSTRUCTION

The medium of instruction and examination shall be English.

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.

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 / 1st year and not paid the condonation fee in time are not eligible to take their end examination of that class and their admissions shall stand cancelled. They may seek re-admission for that semester / 1st year when offered in the next subsequent academic semester/year.
- 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.

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.

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.

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 sessional

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

b) III, IV, V, VI and VII Semesters:

THEORY Courses: 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 sessional.

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

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

The average of marks of all the tests, reduced to 20 shall be taken as final sessional in any case.

- 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.
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All Drawing exercises are to be filed in **serial order** and secured for further scrutiny by a competent authority

(ii) Laboratory Courses:

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

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 tasks 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 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 and	Learning outcomes as given in the scheme of assessment ,for Industrial Training	120
2	20-22 weeks	2. Training Mentor of the industry		120

3.Final summative Evaluation	23 week	1.The faculty member concerned,	1.Demonstration of any one of the skills listed in learning outcomes	30
		2.HoD concerned and	2.Training Report	20
		3.An external examiner	3.Viva Voce	10
TOTAL				300

10 MINIMUM PASS MARKS

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.

PRACTICAL EXAMINATION:

For passing a practical Course, a candidate has to secure a minimum of 50% in end examination and a combined minimum of 50% of both sessional and practical end examination marks put together. In case of D.C.C.P., the pass mark for typewriting and short hand is 45% in the end examination. There are no sessional marks for typewriting and Shorthand Courses of D.C.C.P course.

INDUSTRIAL ASSESSMENT:

Pass marks is 50% in assessment at Industry (I and II assessments put together) and also 50% in final summative assessment at institution level

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.

- Improvement is allowed in any 4 (Four) Courses of the Diploma.
- 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.
- No improvement is allowed in Practical / Lab Courses or Project work or Industrial Training assessment. However, improvement in drawing Course(s) is allowed.
- If improvement is not achieved, the marks obtained in previous Examinations hold good.
- Improvement is not allowed in respect of the candidates who are punished under Mal-practice in any Examination.
- Examination fee for improvement shall be paid as per the notification issued by State Board of Technical Education and Training from time to time.
- 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.

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

13. STUDENTS PERFORMANCE EVALUATION

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

- a) First Class with Distinction shall be awarded to the candidates who secure an overall aggregate of 75% marks and above.
- b) First Class shall be awarded to candidates who secure overall aggregate of 60% marks and above and below 75% marks.
- c) Second Class shall be awarded to candidates who secure a pass with an overall aggregate of below 60%.
 - i. The Weightage of marks for various year/Semesters which are taken for computing overall aggregate shall be 25% of I year marks + 100% of 3rd and subsequent Semesters.
 - ii. In respect IVC & ITI Lateral Entry candidates who are admitted directly into diploma course at the 3rd semester (i.e., second year) level the aggregate of (100%) marks secured at the 3rd and subsequent semesters of study shall be taken into consideration for determining the overall percentage of marks secured by the candidates for award of class/division.
- d) Second Class shall be awarded to all students, who fail to complete the Diploma in the regular 3 years/ 3 ½ years and four subsequent examinations, from the year of first admission.

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 marks 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', 'B' and 'C'.

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 40 contains 5 essay type questions including Numerical questions (without any divisions in the question), with internal choice(Either/or type), each carrying 8 marks, i.e., Max. Marks: $5 \times 8 = 40$.

Section 'C' with Max marks of 10 contains single essay type, Higher order Thinking skills question (HoTs)including Numerical questions, without choice (without any divisions in the question),

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, ie. $4 \times 10 = 40$.

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 $3\frac{1}{2}$ 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 $3\frac{1}{2}$ academic years & not more than 6 / 7 academic years.
- ii. He / she have completed all the Courses.
Students who fail to fulfil all the academic requirements for the award of the Diploma within 6 / 7 academic years from the year of admission shall forfeit their seat in the course & their seat shall stand cancelled.

For IVC & ITI Lateral Entry students:

- i. He / She pursued a course of study for not less than $2\frac{1}{2}$ academic years & not more than 4 / 5 academic years.

- ii. He / she has completed all the Courses.
Students who fail to fulfill 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 ie., for 2-Tier evaluation.
- (iv) On re-verification by a single member, if the variation is more than 12% of maximum marks, it will be referred to 2-Tier evaluation.
- (v) If the 2-Tier evaluation confirms variation in marks as more than 12% of maximum marks, the variation is considered as follows:
 - a) If the candidate has already passed and obtains more than 12% of the maximum marks on Re-verification, then the variation is considered.
 - b) If the candidate is failed and obtains more than 12% of the maximum marks on Re-verification and secured pass marks on re-verification, then the status of the candidate changes to PASS.
 - c) If a candidate is failed and obtains more than 12% of the maximum marks on Re-verification and if the marks secured on re-verification are still less than the minimum pass marks, the status of the candidate remain FAIL only.
- (vii) After Re-verification of valued answer script the same or change if any therein on Re-verification, will be communicated to the candidate.
- (viii) On Re-verification of Valued Answer Script if the candidate's marks are revised, the fee paid by the candidate will be refunded or else the candidate has to forfeit the fee amount.

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

20. MAL PRACTICE CASES:

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

21. DISCREPANCIES/ PLEAS:

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

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.

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.

24. EQUIVALENCE WITH CME BRANCH:

On comparison, 80% of the curriculum is common for both DCME and DAIME branches. It is therefore recommended that the candidates with DAIME may also be considered eligible for lateral entry into the higher education on par with DCME.

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 Vijayawada.
- iii. In case of any ambiguity in the interpretation of the above rules, the decision of the Secretary, SBTET, A.P is final.

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	By conducting 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	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-2020

(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	4	-	120	3	20	80	100
AIM-104	Engineering Chemistry and Environmental studies	4	-	120	3	20	80	100
AIM-105	Basics of Artificial Intelligence and Machine Learning	3	-	90	3	20	80	100
AIM-106	Programming in C	5	-	150	3	20	80	100
PRACTICAL SUBJECTS								
AIM-107	Engineering Drawing	-	6	180	3	40	60	100
AIM-108	Programming in C Lab		6	180	3	40	60	100
AIM-109	Physics Lab	-	3	90	1.5	20	30	50
	Chemistry Lab	-			1.5	20	30	50
AIM-110	Computer Fundamentals Lab		3	90	3	40	60	100
	Total	24	18		-			1000

AIM-101,102,103,104,107,109,110 common with all branches

AIM-106,108 common with DCME,DCBDE and DCCNE branch

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

CURRICULUM-2020 (III Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Semester	Scheme Of Examinations			
		Theor y	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-301	Mathematics –II	4		60	3	20	80	100
AIM-302	Python programming	5	-	75	3	20	80	100
AIM-303	Operating Systems	4	-	60	3	20	80	100
AIM-304	Digital Electronics & Computer Organization	6	-	90	3	20	80	100
AIM-305	DBMS	6	-	60	3	20	80	100
PRACTICAL SUBJECTS								
AIM-306	Python Programming Lab	-	3	45	3	40	60	100
AIM-307	Computer Hardware & Network Maintenance Lab	-	6	90	3	40	60	100
AIM-308	DBMS Lab	-	4	60	3	40	60	100
AIM-309	Multimedia Lab		4	60	3	40	60	100
	Total	25	17	630		260	640	900

AIM-301 common with all branches

AIM-302,306,307 common with DCBDE, DCCNE

AIM-303 common with DCCNE

AIM-304 common with DCBDE and common with DCCNE-403

AIM-305, 308,309 common with DCME, DCBDE, DCCNE

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

CURRICULUM-2020

(IV Semester)

Sub Code	Name of the Subject	Instruction		Total Periods Per Semester	Scheme Of Examinations			
		Periods/Week						
		Theory	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-401	Mathematics III	3	-	45	3	20	80	100
AIM-402	Web Technologies	5	-	75	3	20	80	100
AIM-403	Artificial Intelligence	5	-	75	3	20	80	100
AIM-404	Java Programming	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	-	6	90	3	40	60	100
AIM-407	Java Programming Lab & Mini Project	-	6	60	3	40	60	100
AIM-408	Communication Skills	-	3	45	3	40	60	100
AIM-409	Artificial Intelligence Lab using prolog	-	4	60	3	40	60	100
	Total	23	19	630	-	260	640	900

AIM-401&408 common with all branches

AIM-402,406 common with DCME, DCBDE, DCCNE

AIM-404, 407 common with DCBDE, DCCNE

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

CURRICULUM-2020

(V Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Semester	Scheme Of Examinations			
		Theory	Pract-icals		Duration (hrs)	Sessio-nal Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-501	Industrial Management and Entrepreneurship	5	-	75	3	20	80	100
AIM-502	Natural Language Processing	5	-	75	3	20	80	100
AIM-503	Software Engineering	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 Leaning Lab	—	6	90	3	40	60	100
AIM-508	Life Skills	-	3	45	3	40	60	100
AIM-509	Project work	-	6	90	3	40	60	100
	Total	23	19	630	-	260	640	900

AIM-501,508 common with all branches

AIM-503,504,509 common with DCME, DCBDE, DCCNE

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

CURRICULUM-2020

(VI Semester)

AIM601 Industrial Training

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 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
				Demonstratio n 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.

FIRST YEAR

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

CURRICULUM-2020

(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	4	-	120	3	20	80	100
AIM-104	Engineering Chemistry and Environmental studies	4	-	120	3	20	80	100
AIM-105	Basics of Artificial Intelligence and Machine Learning	3	-	90	3	20	80	100
AIM-106	Programming in C	5	-	150	3	20	80	100
PRACTICAL SUBJECTS								
AIM-107	Engineering Drawing	-	6	180	3	40	60	100
AIM-108	Programming in C Lab		6	180	3	40	60	100
AIM-109	Physics Lab	-	3	90	1.5	20	30	50
	Chemistry Lab	-			1.5	20	30	50
AIM-110	Computer Fundamentals Lab		3	90	3	40	60	100
	Total	24	18		-			1000

AIM-101,102,103,104,107,109,110 common with all branches

AIM-106,108 common with DCME, DCBDE and DCCNE branch

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
2	Living in Harmony	8	CO1, CO2, CO3, CO4
3	Connect with Care	8	CO1, CO2, CO3, CO4
4	Humour for Happiness	8	CO1, CO2, CO3, CO4
5	Never Ever Give Up!	8	CO1, CO2, CO3, CO4
6	Preserve or Perish	9	CO1, CO2, CO3, CO4
7	The Rainbow of Diversity	8	CO1, CO2, CO3, CO4
8	New Challenges- Newer Ideas	8	CO1, CO2, CO3, CO4
9	The End Point First!	8	CO1, CO2, CO3, CO4
10	The Equal Halves	8	CO1, CO2, CO3, CO4
11	Dealing with Disaster	9	CO1, CO2, CO3, CO4
Total Periods		90	

Course Objectives	To improve the skills of English Language use by enriching vocabulary and learning accurate structures for effective communication.
	To comprehend themes for value based living in professional and personal settings.

CO No.	Course Outcomes
CO1	Applies perceptions of themes related to societal responsibility of adolescents towards their surroundings.
CO2	Demonstrates knowledge of form and function of 'grammar items' and use them in both academic and everyday situations.
CO3	Demonstrates effective English communication skills with competence in listening, speaking, reading and writing in academic, professional and everyday contexts.
CO4	Displays positivity and values of harmonious living in personal and professional spheres as reflected through communication.

CO-PO Matrix

Course Code	Course Title: English				No. of Periods: 90
AIM101	Number of Course Outcomes: 4				
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	CO1, CO2, CO3, CO4	20	22		>50%: Level 3
PO6	CO1, CO2, CO3, CO4	52	58		21-50%: Level 2
PO7	CO1, CO2, CO3, CO4	18	20		Up to 20%: Level 1

Level 3 – Strongly Mapped
Level 2- Moderately Mapped

Level 1- Slightly Mapped

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1					✓	✓	✓
CO 2					✓	✓	✓
CO3					✓	✓	✓
CO 4					✓	✓	✓

NOTE:CO-PO groups shall be fulfilled through 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.

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.

Blue Print of Question Paper:

S. No.	Name of the Unit	Periods Allocated	Weightage Allocated	Marks Wise Distribution of Weightage				Question Wise Distribution of Weightage				CO's Mapped
				R	U	Ap	An	R	U	Ap	An	
1	English for Employability	8	17	3	8*			1	1*	1*		CO1, CO2, CO3, CO4
2	Living in Harmony	8		3				1				CO1, CO2, CO3, CO4
3	Connect with Care	8				3						CO1, CO2, CO3, CO4
4	Humour for Happiness	8	14		3	8*			1	1*		CO1, CO2, CO3, CO4
5	Never Ever Give Up!	8			3				1			CO1, CO2, CO3, CO4
6	Preserve or Perish	9	14		8*	3			1*	1		CO1, CO2, CO3, CO4

7	The Rainbow of Diversity	8			3				1		CO1, CO2, CO3, CO4
8	New Challenges - Newer Ideas	8									CO1, CO2, CO3, CO4
9	The End Point First!	8		8*	8*+ 3+3 +3		1*	4		1*	CO1, CO2, CO3, CO4
10	The Equal Halves	8				10*					CO1, CO2, CO3, CO4
11	Dealing with Disasters	9									CO1, CO2, CO3, CO4
TOTAL		90	80	6	30	34	10	2	5	8	1

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

All Questions are compulsory : 60 minutes

PART-B: 5 Questions 8 marks each =40 Marks

Internal choice : 90 minutes

Part-C: 1 Question 10 marks =10 Marks
(Higher Order Question)

No choice, one compulsory question : 30 minutes

NOTE: * indicates questions can be given from any of the corresponding lessons in the blue print.
Question Paper Pattern for Unit Tests

Part A: 16 marks: 4 questions with 1 mark each (FIB, True/false, one word/phrase, etc.)
4 questions with 3 marks each (short answer/ descriptive/ applicative questions)
Part B: 24 marks: 3 questions 8 marks each with internal choice

Learning Outcomes

1. English for Employability

- 1.1. Explain 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. Explain the importance of humour for a healthy living
- 4.2. Improve vocabulary related to the theme
- 4.3. Display reading and speaking skills
- 4.4. Frame sentences with proper Subject – Verb agreement
- 4.5. Explain 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. Practice 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. Describe 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. Illustrate and value other cultures for a happy living in multi-cultural workspace
- 7.2. use 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. Explain the functional difference between Active Voice and Passive Voice
- 8.2. Use Passive Voice to speak and write in various contexts
- 8.3. List the major parts and salient features of an essay
- 8.4. Explain latest innovations and get motivated

9. The End Point First!

- 9.1. Illustrate 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. write different kinds of reports

Textbook: INTERACT (A Textbook for I Year English) - Published 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 |

STATE BOARD OF TECHNICAL EDUCATION- A.P
Model Question Paper
C20-AIM-101- ENGLISH

Time: 3hrs

Max.Marks:80

PART-A

10X3=30 Marks

Instructions: Answer all the questions. Each question carries Three marks.

1. a) Fill in the blanks with suitable articles:

I have seen _____ European at _____ local market.

- b) Fill in with proper form of adjective given in the bracket:

China is the _____ country in the world. (populous, more populous, most populous)

- c) i) Choose the synonym from the following for the word : 'filthy'

dirty / clean / hygienic / tidy

- ii) Choose the antonym from the following for the word: 'exterior'

external / internal / open / interior

***(Question1 : Remembering- Mapping with CO2 & CO3)**

2. a) i) Give prefix for the word: 'popular'

- ii) Write suffix for the word : 'king'

- b) He was married _____ her _____ January 2015. (Fill in with appropriate preposition)

- c) Match the words in column A with their corresponding meanings in column B:

Column-A

Column-B

i) Dynamic

a) tasty

ii) Gloomy

b) active

c) sad

d) proud

***(Question 2 : Remembering- Mapping with CO2 & CO3)**

3. a) The old man *hunted* for his spectacles. (Give the contextual meaning of the word in italics)

- b) The committee / have submitted / its report / to the President. (identify the part which contains an error)

- c) recently has a scooter purchased Shanthi. (Rearrange the jumbled words to make a meaningful sentence.)

***(Question 3 : Understanding- Mapping with CO2 & CO3)**

4. a) Use the following primary auxiliary verb in sentence of your own:

' does '

- b) Fill in the blank with proper modal auxiliary verb based on the clue in the bracket:

Harish _____ speak four languages. (ability)

- c) Rakesh wants two hundred rupees from his father. (Write the sentence how he requests his father)

***(Question 4 : Applying - Mapping with CO2 & CO3)**

5. Fill in the blanks with suitable form of the verb given in brackets:

a) He _____ (go) for a walk daily.

b) The bus _____ (arrive) just now.

c) We _____ (live) in Chennai since 2005.

***(Question 5 : Applicative- Mapping with CO2 & CO3)**

6. Change the voice of the following sentences:

- a) English is spoken all over the world.
- b) They watched a movie yesterday.
- c) The Chief Minister will inaugurate the exhibition.

***(Question 6 : Applicative- Mapping with CO2 & CO3)**

- 7. a) It is a beautiful rainbow. (Change into an exclamatory sentence)
- b) C.V. Raman won the Nobel Prize in 1930. (Frame a question using 'When')
- c) He can swim across the river. (change into 'Yes / No' question)

***(Question 7 : Applicative- Mapping with CO2 & CO3)**

- 8. Change the speech of the following:
- a) He said, "I will go to Delhi tomorrow."
- b) Ravi said to Ashok, " Where are you going?"
- c) She told him to mind his own business.

***(Question 8 : Applicative- Mapping with CO2 & CO3)**

- 9. Rewrite as directed:
- a) In spite of being busy he attended the meeting. (Rewrite the sentence using 'though')
- b) She is poor. She is honest. (combine the two sentences using 'but')
- c) On seeing the tiger, he climbed a tree. (split into two simple sentences)

***(Question 9 : Applicative- Mapping with CO2 & CO3)**

- 10. Rewrite the following sentences after making necessary corrections:
- a) We have gone to picnic yesterday.
- b) Suresh watched T.V when I went to his house.
- c) They left Gujarat before the earthquake occurred.

***(Question 10 : Applicative- Mapping with CO2 & CO3)**

PART-B

5X8=40

Instructions: Answer the following questions. Each question carries EIGHT marks.

11. Write a paragraph in about 100 words on what you do daily.

OR

Write a paragraph in about 100 words on the uses and misuses of social media.

***(Question 11 : Understanding - Mapping with CO1, CO3 & CO4)**

12. Construct a dialogue of at least five turns between an American and you about places worth visiting in your city.

OR

Compose a dialogue of at least five turns between two friends, one favouring homemade food and the other, fast food.

***(Question 12 : Applying - Mapping with CO1, CO3 & CO4)**

13. Write a letter to your parents about your preparation for year-end examinations.

OR

Write a letter to the editor of a newspaper about the inconvenience caused due to loud speakers in your area.

***(Question 13 : Understanding - Mapping with CO1, CO3 & CO4)**

14. Write an essay in about 120 words on measures to prevent water pollution.

OR

Write an essay in about 120 words on importance of gender equality.

***(Question 14 : Applying - Mapping with CO1, CO3 & CO4)**

15. Read the following passage and answer the questions that follow:

A farmer in ancient China had a neighbour who was a hunter, and who owned ferocious and poorly trained hunting dogs. They jumped over the fence frequently and chased the farmer's lambs. The farmer asked his neighbour to keep his dogs in check, but this fell on deaf ears. One day the dogs again jumped the fence, attacked and severely injured several of the lambs.

The farmer had had enough, and went to town to consult a judge who listened carefully to the story and said: "I could punish the hunter and instruct him to keep his dogs chained or lock them up. But you would lose a friend and gain an enemy. Which would you rather have, friend or foe for a neighbour?" The farmer replied that he preferred a friend. "Alright, I will offer you a solution that keeps your lambs safe, and which will keep your a neighbour a friend." Having heard the judge's solution, the farmer agreed.

Once at home, the farmer immediately put the judge's suggestions to the test. He took three of his best lambs and presented them to his neighbour's three small sons, who were beside themselves with joy and began to play with them. To protect his son's newly acquired playthings, the hunter built a strong kennel for his dogs. Since then, the dogs never again bothered the farmer's lambs. Out of gratitude for the farmer's generosity toward his sons, the hunter often shared the game he had hunted with the farmer. The farmer reciprocated by sending the hunter the cheese he had made. Within a short time the neighbours became good friends.

- a) What kind of dogs does the neighbor have?
- b) When did the farmer consult the judge?
- c) What would be the consequence if the judge punished the neighbor?
- d) What was the solution suggested by the judge?
- e) What did the neighbour's sons do with the gifts they received?
- f) How did the dogs stop bothering the farmer's lambs?
- g) What items are exchanged happily between the two neighbours?
- h) Pick the word from the passage that would mean: 'a closed shelter for dogs'.

OR

Read the following short poem and answer the questions that follow:

Crisp in the winter's morning,
Softly all through the night,
What is this without warning,

Falling and white?

I have never seen snow,
But I can imagine it quite –
Not how it tastes, but I know,
It falls and is white.

One morning I'll open the door,
To bring in the morning's milk,
And all around there'll be snow –
Fallen and still.

How I'll roll in the stuff!
How I'll tumble and spin!
Until the neighbours cry,
Enough! And send me back in.

Q.1. What is the poem about?

2. How does snow fall?

3. Did you ever touch snow? How did you feel?

4. a) Pick the word from the poem that means 'slip and fall'

b) Write the antonym for the word 'soft'

***(Question 15 : Understanding - Mapping with CO1, CO3 & CO4)**

SECTION – C

1X10=10 Marks

16. Write a report on the blood donation camp organized by International Red Cross Society in your college.

Use the following clues: date, time, place, arrangements, donors, equipment, doctors, response, sponsors, snacks, volunteers, help others, save lives...etc.

***(Question 16 : Applying - Mapping with CO1, CO3 & CO4)**

STATE BOARD OF TECHNICAL EDUCATION –A.P
C20-AIM-101-ENGLISH
UNIT TEST-1

Time: 90 minutes

Max. Marks: 40

PART-A

4X4= 16 marks

Instructions: Answer all the questions. Each question carries FOUR Marks.

1. Rewrite / Fill in the blank as directed. Each question carries ½ Mark. (CO1,CO2)
 - a) Write the antonym of ‘cruel’ CO2
 - b) Write the synonym of ‘love’ CO2
 - c) Give prefix to ‘adventure’. CO2
 - d) Give suffix to ‘liberate’ CO2
 - e) It is _____ universal truth. (Fill in with suitable article) CO1
 - f) The boy is fond _____ ice-cream. (Fill in the blank with proper preposition) CO1
 - g) He _____not like sweets. (Fill in the blank with correct primary auxiliary verb.) CO1
 - h) We _____ respect our national flag. (Fill in with a proper modal verb) CO1
2. Rewrite the sentences as directed. Each question carries One mark. 4X1=4 Marks CO1
 - a) No other metal is so useful as iron. (Change into superlative degree)
 - b) Very few students are so clever as Ramesh. (Change into comparative degree)
 - c) Guess the contextual meaning of the italicized word in the following sentence.
“The CBI officer has *interrogated* the bank employees in connection with the scam.”
 - d) only sings plays Prasanth not also well but cricket. (Rearrange the jumbled words)
3. Fill in the blanks with proper form of the verb given in brackets. 4X1 = 4 marks CO1
The IPSGM _____(hold) in our college last month. Nearly all the colleges in our zone _____(participate) in the event. The prizes _____ (distribute) by the district collector.
Next year, Government Polytechnic, Vijayawada _____ (conduct) the games meet.
4. Rewrite the following sentences after making necessary corrections: 4X 1= 4 Marks CO1
 - a) The police has arrested the culprit.
 - b) Three hundred miles are a long distance.
 - c) The Principal along with the Heads of Sections have visited the laboratories.
 - d) Either he or I is to blame.

PART-B

3X8=24 Marks

Instructions: Answer all the questions and each question carries EIGHT marks.

5. Write a dialogue of at least five turns between a shopkeeper and customer about buying a mobile phone.
CO3

6. Make an analysis and write a paragraph in around 100 words about your strengths and weaknesses in learning and using English and also the measures to improve it.
CO3

7. Write a paragraph in about 100 words on how to overcome low esteem and negativity. CO3

STATE BOARD OF TECHNICAL EDUCATION –A.P
C20-AIM-101-ENGLISH
UNIT TEST-II

Time: 90 minutes

Max. Marks: 40

PART-A

4X4= 16 Marks

Instructions: Answer all the questions. Each question carries FOUR marks.

1. Match the words in column A with their corresponding meanings in column B **CO2**

Column A

- a) Deserve
- b) hidden
- c) Preserve
- d) Incessant

Column B

- i) continuous
- ii) protect
- iii) worthy
- iv) praise
- v) unseen
- vi) affection

2. Rewrite as directed:

CO1

- a) You ask your Mom to give you another chocolate. (Change into a request)
- b) The baby fell down and got injured. (Change into an exclamatory sentence)
- c) The match was very interesting. (Frame a question using 'how')
- d) Hemanth submitted his project report last week. (Frame Yes-No question)

3. Fill in the blanks with appropriate forms of verbs given in brackets:

CO1

- a) The Sun _____ (set) in the west.
- b) Balu _____ (sing) for over fifty years in the films.
- c) We _____ (see) a camel on the road yesterday.
- d) They _____ (enter) the stadium before the gates were closed.

4. Change the voice of the following:

CO1

- a) Marconi invented the radio.
- b) Sravanthi has been offered a job.
- c) Pragathi can type the letter.
- d) The Chief Guest will be received by the Final year students.

PART-B

3X8=24 Marks

Answer all the questions. Each question carries EIGHT marks.

CO3

- 5. Write a letter to your younger brother motivating him to deal with failures and hurdles in life.
- 6. Write an essay in around 120 words on the role of robots in the modern world.
- 7. Read the following passage and answer the questions that follow:

The greatest enemy of mankind, as people have discovered, is not science, but war. Science merely reflects the social forces by which it is surrounded. It was found that when there is peace, science is constructive when there is war, science is perverted to destructive end. The weapons which science gives us do not necessarily create war. These make war increasingly more terrible. Until now, it has brought us on the doorstep of doom. Our main problem, therefore, is not to curb science, but to substitute law for force, and international government for anarchy in the relations of one nation with another. That is a job in which everybody must participate, including the scientists. Now we are face to face with these urgent questions: Can education and tolerance, understanding and creative

intelligence run fast enough to keep us side by side without our mounting capacity to destroy? That is the question which we shall have to answer, one way or the other, in this generation. Science must help us in the answer, but the main decision lies within ourselves. The hour is late and our work has scarcely begun.

- a. What is the chief enemy of man?
- b. What does science reflect?
- c. When is science perverted?
- d. What makes war more terrible?
- e. Why do we need international government?
- f. What are the four aspects that may stop destruction?
- g. Have we really started our work to fight the problem discussed?
- h. Pick the word from the passage that would mean: 'replace with other one'

STATE BOARD OF TECHNICAL EDUCATION –A.P
C20-AIM-101-ENGLISH
UNIT TEST-III

Time: 90 minutes

Max.

Marks: 40

PART-A

4X4 = 16 Marks

Instructions: Answer all the questions. Each question carries Four marks.

1. Give the meaning of the word in italics: **CO1 CO2**
 - a) When the girls laughed in the class, the teacher was *furious*.
 - b) He was *rusticated* from the school for his misbehavior.
 - c) Vikramaditya was a *benevolent* Indian King.
 - d) We should not show any *discrimination* between boys and girls.
2. Change the speech of the following: **CO2**
 - a) He said, "I am sorry."
 - b) The teacher said to the boys, "Why are you late?"
 - c) Sushma said that she had submitted her report recently.
 - d) Pratap requested Priya to give him her pen.
3. Rewrite as directed: **CO2**
 - a) Though he was weak, he took the test. (change into a simple sentence)
 - b) You must work hard to achieve success. (change into a complex sentence)
 - c) If you run fast, you will catch the bus. (change into a compound sentence)
 - d) The fog disappeared when the Sun rose. (Split into two simple sentences)
4. Locate eight errors from the following passage and correct them. **CO3, CO1**

Once upon a time there live a king who was very kind to his people. In his council of ministers, there is a wise man. He had a son called Sumanth who was a educated and highly learned. Once the wise minister fall sick. All the physicists in the country could not heal him. Then Sumanth will go in search of medicine in Himalayas. He bring the special medicinal roots to cure his father's sickness. Sumanth looked before his father carefully and healed him. The king rewarded Sumanth with rich gifts.

PART- B

3X8 = 24 Marks

Instructions: Answer all the questions and each one carries eight marks. CO3

5. Read the following paragraph and make notes first and then its summary.

Astronauts are people who travel on space ships. They need to have a very clean home. They travel far from Earth. We need clean kitchens everywhere on earth and in space. Astronauts have to solve two problems: how to get food and how to keep their spaceship clean. Here is how they solved the food problem. At first, the astronauts took tubes of food with them into space. They would squeeze a tube and eat semi-liquid food. It did not taste great, but since they did not need to take dishes or silverware with them, they had no dishes to wash. Today's spaceships have a bigger menu. Astronauts can eat from bowls. In fact, they take cereal and other standard foods with them. The foods are packaged in special containers to keep them fresh. They use knives, forks, and spoons. One unusual item on their table is a pair of scissors. They use the scissors to open the food packages. They can eat right from the package. They have a kitchen on the spaceship. Its oven can heat food to 170 degrees. The kitchen has water and sets of meals that come on trays. The astronauts choose their menu before they go into space. They take a lot of food with them.

The astronauts keep bread and fresh fruits and vegetables in a special food locker. How do they keep the kitchen clean? They do not have to worry about mice or other rodents. They make sure that there are no rodents before the ship leaves. But sometimes mice travel on the ship. Those mice are part of experiments. They live in cages. How do astronauts keep their trays clean? That is another health problem the astronauts solve. They need to stay healthy in space. To carry a lot of water to wash trays would be a lot of extra weight. They pack wet wipes in plastic bags. They use them to clean trays. So, their kitchen is clean and they stay healthy.

6. Write an essay in about 120 words on the importance of goal setting and your short and long term goals.
7. Write a report about the bush fire that raged in Australia recently by using the following clues: forest, natural disaster, wild fire, dried leaves, no rain fall, wild animals, burnt alive, loss of flora and fauna, fire fighters, uncontrollable, moderate rains, environmental pollution, measures to protect...etc.

Course Code	Course Title	No. of Periods/week	Total No. of periods	Marks for FA	Marks for SA
AIM102	Engineering Mathematics-I	5	150	20	80

S.No.	Unit Title	No. of periods	COs mapped
1	Algebra	31	CO1
2	Trigonometry	44	CO2
3	Co-ordinate Geometry	23	CO3
4	Differential Calculus	33	CO4
5	Applications of Differentiation	19	CO4, CO5
Total Periods		150	

Course Objectives	(i) To apply the principles of Algebra, Trigonometry and Co-Ordinate Geometry to real-time problems in engineering. (ii) To comprehend and apply the concept of Differential Calculus in engineering applications.
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Course Outcomes	CO1	Identify various functions, resolve partial fractions and solve problems on matrices.
	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	Evaluate solutions for engineering problems using differentiation.

ENGINEERING MATHEMATICS – I

COMMON TO ALL BRANCHES

Learning Outcomes

UNIT - I

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

L.O. 1.1 Define Set, ordered pairs and Cartesian product - examples.

1.2 Explain Relations and functions – examples

1.3 Find Domain & Range of functions – simple examples.

1.4 Classify types of functions (into, many-to-one, one-one, onto and bijective).

1.5 Define inverse functions - examples.

1.6 Define rational, proper and improper fractions of polynomials.

1.7 Explain the procedure of resolving rational fractions of the type mentioned below into partial fractions

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

$$\text{iii) } \frac{f(x)}{(x^2 + a^2)(bx + c)} \quad \text{iv) } \frac{f(x)}{(x^2 + a^2)(x^2 + b^2)}$$

1.8 Define a matrix and order of a matrix

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

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

1.11 Define the transpose of a matrix and write its properties;

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

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

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

1.15 Solve 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.

2.2 List the values of trigonometric ratios at specified values.

2.3 Draw graphs of trigonometric functions

2.4 Explain periodicity of trigonometric functions.

2.5 Define compound angles and state the formulae of $\sin(A \pm B)$, $\cos(A \pm B)$,
 $\tan(A \pm B)$ and $\cot(A \pm B)$

2.6 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.

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

2.8 Solve simple problems on compound angles.

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

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

2.11 Solve simple problems using the above formulae

- 2.12 Derive the formulae on transforming sum or difference of two trigonometric ratios into a product and vice versa, examples on these formulae.
- 2.13 Solve problems by applying these formulae to sum or difference or product of three or more terms.
- 2.14 Explain the concept of the inverse of a trigonometric function by selecting an appropriate domain and range.
- 2.15 Define inverses of six trigonometric functions along with their domains and ranges.
- 2.16 Derive relations between inverse trigonometric functions so that given $A = \sin^{-1}x$, express angle A in terms of other inverse trigonometric functions with examples.
- 2.17 State various properties of inverse trigonometric functions and identities like $\sin^{-1}x + \cos^{-1}x = \frac{\pi}{2}$ etc.
- 2.18 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
- 2.19 Explain what is meant by solutions of trigonometric equations and find the general solutions of $\sin x = k$, $\cos x = k$ and $\tan x = k$ with appropriate examples.
- 2.20 Solve models of the type $a \sin^2 x + b \sin x + c = 0$, $a \cos x + b \sin x = c$ etc., and problems using simple transformations.
- 2.21 State sine rule, cosine rule, tangent rule and projection rule.

2.22 Explain the formulae for $\sin A/2$, $\cos A/2$, $\tan A/2$ and $\cot A/2$ in terms of semi-perimeter S and sides a, b, c and solve problems.

2.23 List various formulae for the area of a triangle.

2.24 Solve problems using the above formulae.

2.25 Define $\sinh x$, $\cosh x$ and $\tanh x$ and list the hyperbolic identities.

2.26 Represent inverse hyperbolic functions in terms of logarithms.

2.27 Define complex number, its modulus, conjugate and list their properties.

2.28 Define the operations on complex numbers with examples.

2.29 Define amplitude of a complex number

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

2.31 Write DeMoivre's theorem (without proof) and illustrate with simple 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 Solve simple problems on the above forms

3.3 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.

3.4 Define locus of a point and define a circle.

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

3.6 Find the equation of a circle given (i) centre and radius, (ii) two ends of a diameter (iii) Centre and a point on the circumference (iv) three non collinear points.

3.7. Define a conic section.

3.8 Explain the terms focus, directrix, eccentricity, axes and latus rectum of a conic with illustrations.

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

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

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 Mention 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 the problems using these standard limits.

4.4 Explain the concept of continuity of a function at a point and on an interval with some examples whether a given function is continuous or not.

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 State the significance of derivative in scientific and engineering applications.

4.7 Find the derivatives of elementary functions like x^n , a^x , e^x , $\log x$, $\sin x$, $\cos x$, $\tan x$, $\sec x$, $\csc x$ and $\cot x$ using the first principles.

4.8 Find the derivatives of simple functions from the first principle.

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

- 4.10 Explain the method of differentiation of a function of a function (Chain rule) with illustrative examples.
- 4.11 Find the derivatives of Inverse Trigonometric functions and examples using the Trigonometric transformations.
- 4.12 Explain the method of differentiation of a function with respect to another function and also differentiation of parametric functions with examples.
- 4.13 Find the derivatives of hyperbolic functions.
- 4.14 Explain the procedures for finding the derivatives of implicit function with examples.
- 4.15 Explain the need of taking logarithms for differentiating some functions with examples like $[f(x)]^{g(x)}$.
- 4.16 Explain the concept of finding the higher order derivatives of second and third order with examples.
- 4.17 Explain the concept of functions of several variables, partial derivatives and difference between the ordinary and partial derivatives with simple examples.
- 4.18 Explain the definition of Homogenous function of degree n
- 4.19 Explain Euler's theorem for homogeneous functions with applications to simple problems.

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

L.O. 5.1 State the geometrical meaning of the derivative as the slope of the tangent to the curve $y=f(x)$ at any point on the curve.

5.2 Explain the concept of derivative to find the slope of tangent and to find the equation of tangent and normal to the curve $y=f(x)$ at any point on it.

5.3 Find the lengths of tangent, normal, sub-tangent and sub normal at any point on the curve $y=f(x)$.

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

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

5.6 Define the concept of increasing and decreasing functions.

5.7 Explain the conditions to find points where the given function is increasing or decreasing with illustrative examples.

5.8 Explain the procedure to find the extreme values (maxima or minima) of a function of single variable- simple problems yielding maxima and minima.

5.9 Solve problems on maxima and minima in applications like finding areas, volumes etc.

5.10 Apply the concept of derivatives to find the errors and approximations in simple problems.

Syllabus for Unit test-III completed

CO/PO – Mapping

AIM102	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	2.5	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-20

Engineering Mathematics – I

PO- CO – Mapping strength

PO no	Mapped with	CO periods addressing PO in	Level	Remarks
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	CO no	column I		(1,2 or 3)	
		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	
5					25% to 40% Level 2 Moderately addressed
6					
7					
PSO 1	CO1, CO2, CO3,CO4,CO5	150	100%	3	5% to 25% Level 1 Low addressed <5% Not addressed
PSO 2	CO1, CO2, CO3,CO4,CO5	135	90%	3	
PSO 3	CO1, CO2, CO3,CO4,CO5	125	83.3%	3	

ENGINEERING MATHEMATICS – I**COMMON TO ALL BRANCHES****COURSE CONTENT****Unit-I****Algebra****1. Relations and Functions:**

Define Set, Ordered pairs, Cartesian product, Relations, functions, domain & range of functions. Describe types of functions (in-to, many-to-one, one-one, onto and bijective) and inverse functions – examples.

2. Partial Fractions:

Define rational, proper and improper fractions of polynomials. Resolve rational fractions in to their partial fractions covering the types mentioned below.

$$\begin{array}{ll} \text{i)} \quad \frac{f(x)}{(ax+b)(cx+d)} & \text{ii)} \quad \frac{f(x)}{(ax+b)^2(cx+d)} \\ \text{iii)} \quad \frac{f(x)}{(x^2+a^2)(bx+c)} & \text{iv)} \quad \frac{f(x)}{(x^2+a^2)(x^2+b^2)} \end{array}$$

3. Matrices:

Definition of a matrix, types of matrices-examples, algebra of matrices-equality of two matrices, sum, 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 Cramers'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 submultiple angle $A/2$ with problems.

7. 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, equations involving usage of transformations- problems.

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. Hyperbolic functions:

Definitions of hyperbolic functions, identities of hyperbolic functions, inverse hyperbolic functions and expression of inverse hyperbolic functions in terms of logarithms.

12. Complex Numbers:

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

UNIT-III

Coordinate geometry

13 Straight lines: various forms of straight lines, angle between lines, perpendicular distance from a point, distance between parallel lines-examples.

14. Circle: locus of a point, Circle, definition-Circle equation given (i) centre and radius, (ii) two ends of a diameter (iii) centre and a point on the circumference (iv) three non collinear points - general equation of a circle – finding centre, radius.

15. 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

16. Concept of Limit- Definition- Properties of Limits and Standard Limits -Simple Problems-Continuity of a function at a point- Simple Examples only.

17. Concept of derivative- Definition (first principle)- different notations-derivatives of elementary functions- problems. Derivatives of sum, product, quotient, scalar multiplication of functions - problems. Chain rule, derivatives of inverse trigonometric functions, derivative of a function with respect to another function, derivative of parametric functions, derivative of hyperbolic, implicit functions, logarithmic differentiation – problems in each case. Higher

order derivatives - examples – functions of several variables - partial differentiation, Euler's theorem-simple problems.

UNIT-V

Applications of Derivatives:

18. Geometrical meaning of the derivative, equations of Tangent and normal to a curve at any point. Lengths of tangent, normal, subtangent and subnormal to the curve at any point - problems.
19. Physical applications of the derivative – velocity, acceleration, derivative as a rate measure –Problems.
20. Applications of the derivative to find the extreme values – Increasing and decreasing functions, finding the maxima and minima of simple functions - problems leading to applications of maxima and minima.
21. 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

Blue print

S. No	Chapter/ Unit title	No of Periods		Weightage Allotted	Marks wise distribution of weightage				Question wise distribution of weightage				COs mapped
		Theor y	Practice		R	U	Ap	An	R	U	Ap	An	
	Unit - I : Algebra												
1	Relations and Functions	4	2	3	0	3	0	0	0	1	0	0	CO 1
2	Partial Fractions	3	2	3	0	3	0	0	0	1	0	0	CO 1
3	Matrices and Determinants	10	10	11	3	0	8	0	1	0	1	0	CO 1
	Unit - II : Trigonometry												
4	Trigonometric Ratios	1	1	0	0	0	0	0	0	0	0	0	CO2
5	Compound Angles	3	2	3	3	0	0	0	1	0	0	0	CO2
6	Multiple and Submultiple angles	4	4	3	0	3	0	0	0	1	0	0	CO2
7	Transformations	3	3	8	0	8	0	0	0	1	0	0	CO2
8	Inverse Trigonometric Functions	3	2										
9	Trigonometric Equations	3	2	8	0	0	8	0	0	0	1	0	CO2
10	Properties of triangles	3	2										
11	Hyperbolic Functions	1	1	0	0	0	0	0	0	0	0	0	CO2
12	Complex Numbers	4	2	3	3	0	0	0	1	0	0	0	CO2
	Unit III : Co-ordinate Geometry												
13	Straight Lines	4	2	3	3	0	0	0	1	0	0	0	CO3

14	Circle	3	2	8	0	8	0	0	0	1	0	0	CO3
15	Conic Sections	8	4										
	Unit – IV : Differential Calculus												
16	Limits and Continuity	4	2	3	0	3	0	0	0	1	0	0	CO4
17	Differentiation	17	10	14	3	11	0	0	1	2	0	0	CO4
	Unit - V : Applications of Differentiation												
18	Geometrical Applications	3	2	10	0	0	0	10	0	0	0	1	CO5
19	Physical Applications	2	2										
20	Maxima and Minima	3	4										
21	Errors and Approximations	2	1										
Total		89	61	80	15	39	16	10	5	8	2	1	

R: Remembering Type : 15 Marks

U: understanding Type : 39 Marks

Ap: Application Type : 16 Marks

An: Analysing Type : 10 Marks

Engineering Mathematics – I

Unit Test Syllabus

Unit Test	Syllabus
Unit Test-I	From L.O. 1.1 to L.O. 2.11
Unit Test-II	From L.O. 2.12 to L.O. 3.10
Unit Test-III	From L.O.4.1 to L.O. 5.10

Unit Test I

C –20, 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 $f(x) = x^2$ and domain $= \{-1, 0, 1\}$, then find range. (CO1)

b. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, then find $3A$. (CO1)

c. Write the value of $\sin 120^\circ$ (CO2)

d. Write the formula for $\tan 2A$ in terms of $\tan A$ (CO2)

2. If $f: R \rightarrow R$ is defined by $f(x) = 3x - 5$, then prove that $f(x)$ is onto. (CO1)

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

4. Prove that $\sin^2 45^\circ - \sin^2 15^\circ = \frac{\sqrt{3}}{4}$ (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 $\frac{x+4}{x^2-3x+2}$ into partial fractions. (CO1)

7. A) Using cramer's rule to solve
 $x - y + z = 2, 2x + 3y - 4z = -4, 3x + y + z = 8$ (CO1)

or

B) Prove that $\begin{vmatrix} bc & b+c & 1 \\ ca & c+a & 1 \\ ab & a+b & 1 \end{vmatrix} = (a-b)(b-c)(c-a)$ (CO1)

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

or

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

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

b. If $z = 2 + 3i$, then find $|z|$ (CO2)

c. $\sinh x = \frac{e^x - e^{-x}}{2}$: State TRUE/FALSE (CO2)

d. Write the eccentricity of rectangular hyperbola. (CO3)

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

3. Find the perpendicular distance from (1,1) to the line $2x + 3y - 1 = 0$ (CO3)

4. Find the angle between lines $2x - y + 3 = 0$ and $x + y - 2 = 0$ (CO3)

5. Find the centre and radius of the circle $x^2 + y^2 - 2x + 4y - 4 = 0$ (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 $\frac{\sin 2\theta + \sin 4\theta + \sin 6\theta}{\cos 2\theta + \cos 4\theta + \cos 6\theta} = \tan 4\theta$ (CO2)
or

B) Prove that $\tan^{-1} \frac{1}{2} + \tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{8} = \frac{\pi}{4}$ (CO2)

7. A) Solve $2\sin^2 \theta - \sin \theta - 1 = 0$ (CO2)

or

B) In any $\triangle ABC$, If $\angle B = 60^\circ$ then $\frac{c}{a+b} + \frac{a}{b+c} = 1$ (CO2)

8. A) Find the equation of circle with (2,3) and (6,9) as the end points of diameter and also find centre and radius of circle. (CO3)

or

A) Find the equation of ellipse whose focus is (1, -1), directrix is $x - y + 3 = 0$ and eccentricity is $1/2$. (CO3)

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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. Find $\lim_{x \rightarrow 1} \frac{x^2 + 1}{x + 5}$ (CO4)

b. $\lim_{\theta \rightarrow 0} \frac{\sin 2\theta}{\theta} = 2$: State TRUE/FALSE (CO4)

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

d. Formula for percentage error in x is _____. (CO5)

2. Evaluate $\lim_{x \rightarrow 2} \frac{x^5 - 32}{x^2 - 4}$ (CO4)

3. Find the derivative of $3 \tan x - 4 \log x + 7^x$ w.r.t. x (CO4)

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

5. Find the derivative of $\frac{2x+3}{3x+4}$ (CO4)

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

or

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

7. A) Verify Euler's theorem when $u(x, y) = \frac{x^4 + y^4}{x - y}$ (CO4)

or

B) Find the equation of tangent and normal to the curve $3y = x^2 - 6x + 17$ at $(4, 3)$
(CO5)

8. A) Circular patch of oil spreads on water and the area is growing at the rate of 8 sqcm/min .

How fast is the radius increasing when radius is 5 cm . (CO5)

or

B) Find the maxima and minima values of $f(x) = x^3 - 6x^2 + 9x + 15$. (CO5)

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END-EXAM MODEL PAPERS

STATE BOARD OF TECHNICAL EDUCATION, A.P

ENGINEERING MATHEMATICS 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 $A = \left\{0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}\right\}$ and $f : A \rightarrow B$ is a function such that $f(x) = \cos x$, then find the range of f . CO 1

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

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 $A+B$ and $A-B$. CO1

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

5. Prove that $\frac{\sin 2\theta}{1 - \cos 2\theta} = \cot \theta$.

CO2

6. Find the modulus of the complex number $\left(\frac{1-i}{2+i}\right)$.

CO2

7. Find the distance between parallel lines $x+2y+3=0$ and $x+2y+8=0$. CO3

8. Find $\lim_{x \rightarrow 0} \frac{\sin 77x}{\sin 11x}$.

CO4

9. Differentiate $3\tan x - 4\log x - 7x^2$ w.r.t. x . CO4

10. If $x = at^2, y = 2at$, then find $\frac{dy}{dx}$.

CO4

PART-B

Answer All questions. Each question carries EIGHT marks.

5x8=40M

11 A) Find the inverse of the matrix $\begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$. **CO1**

Or

B) Solve the system of equations $x + y + z = 6$, $x - y + z = 2$ and $2x - y + 3z = 9$ by Cramer's rule. **CO1**

12 A) If $\cos x + \cos y = \frac{3}{5}$ and $\cos x - \cos y = \frac{2}{7}$, then show that **CO2**

$$21 \tan\left(\frac{x-y}{2}\right) + 10 \cot\left(\frac{x+y}{2}\right) = 0.$$

Or

B) If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \pi$ then show that $x + y + z = xyz$. **CO2**

13 A) Solve $\sqrt{3}\cos\theta - \sin\theta = 1$. **CO2**

Or

B) In any ΔABC , Show that $\cot \frac{A}{2} + \cot \frac{B}{2} + \cot \frac{C}{2} = \frac{s^2}{\Delta}$. **CO2**

14 A) Find the equation of the circle with $(4, 2)$ and $(1, 5)$ as the two ends of its diameter and also find its centre and radius. **CO**

Or

B) Find the centre, vertices, equation of axes, lengths of axes, eccentricity, foci, equations of directrices and length of latus rectum of the ellipse $4x^2 + 16y^2 = 1$. **CO 3**

15 A) Find the derivative of $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$ w.r.t. $\tan^{-1}\left(\frac{2x}{1-x^2}\right)$ **CO4**

Or

B) If $u = \tan^{-1}\left(\frac{x^3 - y^3}{x + y}\right)$, then prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$. **CO4**

PART-C

Answer the following question. Question carries TEN marks.

1x10=10M

16. The sum of two numbers is 24. Find them so that the sum of their squares is minimum.

CO 5

TIME : 3 HOURS**MODEL PAPER- II****MAX.MARKS : 80M****PART-A****Answer All questions. Each question carries THREE marks.****10x3=30M**

1. If $f : R \rightarrow R$ is a bijective function such that $f(x) = ax + b$, then find $f^{-1}(x)$. **CO 1**

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

3. If $A = \begin{bmatrix} 0 & -1 & 3 \\ 1 & 0 & 7 \\ -3 & x & 0 \end{bmatrix}$ is a skew-symmetric matrix, find the value of x . **CO 1**

4. Find the value of $\sin^2 82^\circ \frac{1}{2} - \sin^2 22^\circ \frac{1}{2}$. **CO2**

5. Prove that $\frac{\cos 3A}{2\cos 2A - 1} = \cos A$.

CO2

6. Find the conjugate of the complex number $(3-2i).(4+7i)$ **CO2**

7. Find the equation of the line passing through the points $(1, 2)$ and $(3, -4)$. **CO3**

8. Find $\lim_{x \rightarrow 2} \frac{x^5 - 32}{x - 2}$.

CO4

9. Differentiate $\sqrt{x} - \sec x + \log x$ w.r.t. x . **CO4**

10. If $u(x, y) = x^3 - 3axy + y^3$, then find $\frac{\partial u}{\partial x}$ and $\frac{\partial u}{\partial y}$. **CO4**

PART-B

Answer All questions. Each question carries EIGHT marks. 5x8=40M

11 A) Show that $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$. **CO1**

Or

B) Solve the system of equations $x+2y+3z=6$, $3x-2y+4z=5$ and $x-y-z=-1$ using matrix inversion method. **CO1**

12 A) Prove that $\frac{\sin 2\theta + \sin 4\theta + \sin 6\theta}{\cos 2\theta + \cos 4\theta + \cos 6\theta} = \tan 4\theta$. **CO2**

Or

B) Prove that $\tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{7} + \tan^{-1} \frac{1}{8} = \frac{\pi}{4}$. **CO2**

13 A) Solve $2\cos^2 \theta - 3\cos \theta + 1 = 0$. **CO2**

Or

B) In any $\triangle ABC$, Show that $\sum a^3 \cos(B-C) = 3abc$. **CO2**

14 A) Find the equation of the circle passing through the points $(0,0)$, $(6,0)$ and $(0,8)$. **CO3**

Or

B) Find the equation of the rectangular hyperbola whose focus is $(1,2)$ and directrix is $3x+4y-5=0$. **CO3**

15 A) If $\sin y = x \sin(a + y)$, then prove that $\frac{dy}{dx} = \frac{\sin^2(a + y)}{\sin a}$. **CO4**

Or

B) If $y = \tan^{-1} x$, then prove that $(1 + x^2)y_2 + 2xy_1 = 0$. **CO4**

PART-C

Answer the following question. Question carries TEN marks. 1x10=10M

16 Show that the semi-vertical angle of the cone of maximum volume and of given slant height is $\tan^{-1} \sqrt{2}$.
CO4

Course code	Course Title	No. of Periods per week	Total No. of Periods	Marks for FA	Marks for SA
AIM-103	Engineering Physics	4	120	20	80

S.No	Unit Title/Chapter	No of Periods	COs Mapped
1	Units and Dimensions	08	CO1
2	Elements of Vectors	12	CO1
3	Dynamics	12	CO2
4	Friction	10	CO2
5	Work, Power and Energy	12	CO3
6	Simple harmonic motion	12	CO3
7	Heat and Thermodynamics	12	CO4
8	Sound	10	CO4
9	Properties of matter	10	CO5
10	Electricity and Magnetism	12	CO5
11	Modern physics	10	CO5
Total		120	

➤ **Course Objectives**

Course Title: Engineering Physics	
Course Objectives	1. To familiarize with the concepts of Physics involved in the process of various Engineering, Industrial and Daily life Applications. 2. To understand and apply the basic principles of physics in the field of engineering and technology to familiarize certain natural phenomenon occurring in the day to day life 3. To reinforce theoretical concepts by conducting relevant experiments/exercises

➤ **Course outcomes**

Course Outcomes	CO1	Explain S.I units and dimensions of different physical quantities, basic operations among vector quantities.
	CO2	Explain the motion of objects moving in one dimensions and two dimensions, the causes of motion and hindrance to the motion of the objects especially with respect to friction.
	CO3	Explain the mechanical energy of bodies like PE, KE and conservation law of energy, the properties of simple harmonic motion.
	CO4	Explain gas laws, ideal gas equation, Isothermal and adiabatic processes, Specific heats, to study the laws of thermodynamics. Causes, consequences and methods to minimise noise pollution, explain beats, Doppler effect, Reverberation, echoes.
	CO5	Explain certain properties of solids, liquids like elastic properties, viscosity and surface tension. Explain Ohm's law, to study Kirchoff's laws, to study the principle of Wheatstone's bridge and its application to meter bridge. To study the magnetic force and understand magnetic field. To compute magnetic field strength on axial and equatorial lines of a bar magnet. To familiarise with modern topics like photoelectric effect, optical fibres, superconductivity and nanotechnology.

➤ **Learning Outcome**

➤ **COs-POs mapping strength (as per given table)**

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

3 = strongly mapped

2= moderately mapped 1= slightly mapped

➤ **Model Blue Print with weightages for Blooms category and questions for 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	Units and Dimensions	08	03	3	0	0	0	1	0	0	0	CO1
2	Elements of Vectors	12	11	3	8	0	0	1	1	0	0	CO1
3	Dynamics	12	11	3	8	0	0	1	1	0	*	CO2
4	Friction	10	11	3	0	8	0	1	0	1	0	CO2
5	Work, Power and Energy	12	11	3	8	0	0	1	1	0	0	CO3
6	Simple harmonic motion	12	11	3	8	0	0	1	1	0	*	CO3
7	Heat and Thermodynamics	12	11	0	8	3	0	0	1	1	*	CO4
8	Sound	10	11	0	8	3	0	0	1	1	0	CO4
9	Properties of matter	10	08	0	8	0	0	0	1	0	0	CO5
10	Electricity and Magnetism	12	14	6	0	8	0	2	0	1	0	CO5
11	Modern physics	10	08	0	8	0	0	0	1	0	0	CO5
Total		120	110	24	64	22	0	8	8	4	* 10	

***One question of HOTs for 10 marks from any of the unit title 3 or 6 or 7**

Learning Outcomes

1.0 Concept of Units and dimensions

- 1.1 Explain the concept of Units , Physical quantity, Fundamental physical quantities and Derived physical quantities
- 1.2 Define unit, fundamental units and derived units, State SI units with symbols
- 1.3 State Multiples and submultiples in SI system, State Rules of writing S.I.units, State advantages of SI units
- 1.4 Define Dimensions, Write Dimensional formulae of physical quantities
- 1.5 List dimensional constants and dimensionless quantities
- 1.6 State the principle of Homogeneity of Dimensions
- 1.7 State the applications and limitations of Dimension analysis
- 1.8 Errors in measurement, Absolute error, relative error, percentage error, significant figures
- 1.9 Solve problems

2.0 Concept of Elements of Vectors

- 2.1 Explain the concept of scalars, Vectors and give examples
- 2.2 Represent vectors graphically, Classify the Vectors, Resolve the vectors
- 2.3 Determine the resultant of a vector by component method, represent a vector in Space using unit vectors ($\hat{i}, \hat{j}, \hat{k}$)
- 2.4 State and explain triangle law, parallelogram law, polygon law of addition of vectors
- 2.5 Define Dot product of two vectors with examples (Work done, Power), Mention the Properties of dot product
- 2.6 Define cross products of two vectors with examples (Torque, Linear velocity) Mention the properties of Cross product.
- 2.7 Solve the related numerical problems

3.0 Concept of Dynamics

- 3.1 Write the equations of motion in a straight line Explain the acceleration due to

gravity

- 3.2 Explain vertical motion of a body and derive expressions for a) Maximum Height, b) time of ascent, c) time of descent, and d) time of flight
- 3.3 Derive height of a tower when a body projected vertically upwards from the top of a tower.
- 3.4 Explain projectile motion with examples
- 3.5 Explain Horizontal projection and Derive an expression for the path of a projectile in horizontal projection
- 3.6 Explain oblique projection and derive an expression for it. Derive formulae for a) Maximum Height, b) time of ascent, c) time of descent, and d) time of flight e) Horizontal Range, f) Maximum range
- 3.7 Define force, momentum, angular displacement, angular velocity, angular acceleration, angular momentum, moment of inertia, torque
- 3.8 Solve the related numerical problems

4.0 Concept of Friction

- 4.1 Define friction and classify the types of friction.
- 4.2 Explain the concept of Normal reaction
- 4.3 State the laws of friction
- 4.4 Define coefficients of friction, Angle of friction and Angle of repose
- 4.5 Derive expressions for acceleration of a body on a rough inclined plane (upwards and downwards)
- 4.6 List the Advantages and Disadvantages of friction
- 4.7 Mention the methods of minimizing friction
- 4.8 Explain why it is easy to pull a lawn roller than to push it
- 4.9 Solve the related numerical problems

5.0 Concepts of Work, Power, and Energy

- 5.1 Define the terms Work, Power and Energy. State SI units and dimensional formulae

- 5.2 Define potential energy and give examples, derive an expression for P.E
- 5.3 Define Kinetic energy and give examples, derive an expression for K.E
- 5.4 State and derive Work-Energy theorem
- 5.5 Derive the relation between Kinetic energy and momentum
- 5.6 State the law of conservation of energy and Verify it in the case of a freely Falling body
- 5.7 Solve the related numerical problems

6.0 Concepts of Simple harmonic motion

- 6.1 Define Simple harmonic motion, Give examples, State the conditions
- 6.2 Explanation of uniform circular motion of a particle is a combination of two perpendicular SHMs.
- 6.3 Derive expressions for displacement, velocity, acceleration, Frequency, Time period of a particle executing SHM.
- 6.4 Define phase of SHM
- 6.5 Define Ideal simple pendulum and derive expression for Time period of simple pendulum
- 6.6 State the laws of motion of simple pendulum
- 6.7 Solve the related numerical problems

7.0 Concept of Heat and thermodynamics

- 7.1 Explain the concept of expansion of gases
- 7.2 State and explain Boyle's and Charles laws.
- 7.3 Define absolute zero temperature, absolute scale of temperature
- 7.4 Define ideal gas and distinguish from real gas
- 7.5 Derive Ideal gas equation. Define Specific gas constant and Universal gas Constant, write S.I unit and Dimensional Formula. Calculate the value of R.
- 7.6 Explain why universal gas constant is same for all gases
- 7.7 State and Explain Isothermal process and adiabatic process
- 7.8 State first and second laws of thermodynamics and state applications
- 7.9 Define specific heats & molar specific heats of a gas, Derive $C_p - C_v = R$

7.10 Solve the relevant numerical problems

8.0 Concept of Sound

8.1 Concept of the sound, Wave motion (longitudinal and transverse wave)

8.2 Distinguish between musical sound and noise

8.3 Explain noise pollution and state SI unit for intensity level of sound

8.4 Explain causes, effects and methods of minimizing of noise pollution

8.5 Explain the phenomenon of beats State the applications

8.6 Define Doppler effect, List the Applications

8.7 Define reverberation and reverberation time and Write Sabine's formula

8.8 Define and Explain echoes state its applications

8.9 State conditions of good auditorium

8.10 Solve the related numerical problems

9.0 Concepts of properties of matter

9.1 Explain the terms Elasticity, stress, strain and types of Stress and Strain

9.2 State and explain Hooke's law

9.3 Definitions of Modulus of elasticity, Young's modulus(Y), Bulk modulus (K),

Rigidity modulus (n), Poisson's ratio (σ),

9.4 Define surface tension and give examples

9.5 Explain Surface tension with reference to molecular theory

9.6 Define angle of contact and capillarity and write formula for Surface Tension

9.7 Explain the concept of Viscosity; give examples, Write Newton's formula.

9.8 Define co-efficient of viscosity and write its units and dimensional formula and

State Poiseuille's equation for Co-efficient of viscosity

9.9 Explain the effect of temperature on viscosity of liquids and gases

9.10 Solve the related numerical problems

10. Concepts of Electricity and Magnetism

10.1 Explain Ohm's law in electricity and write the formula

10.2 Define specific resistance, conductance and state their units

10.3 Explain Kichoff's laws

- 10.4 Describe Wheat stone's bridge with legible sketch
- 10.5 Describe Meter Bridge for the determination of resistivity with a circuit diagram
- 10.6 Explain the concept of magnetism. State the Coulomb's inverse square law of magnetism
- 10.7 Define magnetic field and magnetic lines of force and write the properties of magnetic lines of force
- 10.8 Derive an expression for the moment of couple on a bar magnet placed in a uniform magnetic field
- 10.9 Derive equations for Magnetic induction field strength at a point on the axial line and on the equatorial line of a bar magnet.
- 10.10 Solve the related numerical problems

11.0 Concepts of Modern physics

- 11.1 State and Explain Photo-electric effect and Write Einstein's photoelectric equation
- 11.2 State laws of photo electric effect
- 11.3 Explain the Working of photo electric cell, write its applications.
- 11.4 Recapitulate fraction of light and its laws, critical angle, Total Internal Reflection
- 11.5 Explain the principle and working of Optical Fiber, mention different types of Optical Fibre, state the applications
- 11.6 Define super conductor and superconductivity and mention examples
- 11.7 State the properties of super conducting materials and list the applications
- 11.8 Nanotechnology definition, non materials, applications

COURSE CONTENT

1. Units and Dimensions:

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 – Dimensions and Dimensional formulae- Dimensional constants and Dimensionless quantities- Principle of Homogeneity- Advantages and limitations of Dimensional analysis-Errors in measurement, Absolute error, relative error, percentage error, significant figures-Problems.

2. Elements of Vectors:

Scalars and Vectors—Types of vectors(Proper Vector, NullVector,UnitVector,Equal, Negative Vector, Like Vectors, Co-Initial Vectors, Co-planar Vectors and Position Vector).Addition of vectors-Representation of vectors- Resolution of vectors - Parallelogram, Triangle and Polygon laws of vectors—Subtraction of vectors- Dot and Cross products of vectors-Problems

3. Dynamics

Introduction-Concept of acceleration due to gravity-Equations of motion for a freely falling body and for a body thrown up vertically- Projectiles- Horizontal and Oblique projections- Expressions for maximum height, time of flight, range-Define force, momentum, angular displacement, angular velocity, angular acceleration, angular momentum, moment of inertia, torque—problems

4. Friction:

Introduction to friction- Causes- Types of friction- Laws of friction- Angle of repose-Angle of friction- rough inclined plane- Advantages and disadvantages of friction-Methods of reducing friction—Problems

5. Work, Power and Energy:

Work, Power and Energy- Definitions and explanation- potential energy- kinetic energy- Derivations of Potential and Kinetic energies-K.E and Momentum relation - Work-Energy theorem- Law of Conservation of energy- Problems

6. Simple Harmonic Motion:

Introduction- Conditions of SHM- Definition- Examples- Expressions for displacement, velocity, acceleration, Time period, frequency and phase in SHM- Time period of a simple pendulum- Laws of simple pendulum-seconds pendulum-Problems

7. Heat and Thermodynamics:

Expansion of Gases-Boyle's law-Absolute scale of temperature- Charles laws- Ideal gas equation- Universal gas constant- Differences between r and R -Isothermal and adiabatic processes- Laws of thermodynamics- Specific heats - molar specific heats of a gas - Different modes of transmission of heat Laws of thermal conductivity, Coefficient of thermal conductivity-Problems

8. Sound:

Sound- Nature of sound- Types of wave motion -musical sound and noise- Noise pollution – Causes & effects- Methods of reducing noise pollution- Beats- Doppler effect- Echo- Reverberation-Reverberation time-Sabine 's formula-Conditions of good auditorium-Problems

9. Properties of matter

Definition of Elasticity –Definition of stress and strain -the units and dimensional formulae for stress and strain-The Hooke's law-Definitions of Modulus of elasticity,

Young's modulus(Y), Bulk modulus(K), Rigidity modulus (n),Poisson's ratio (σ), relation between Y , K , n and σ (equations only no derivation)

Definition of surface tension-Explanation of Surface tension with reference to molecular theory - Definition of angle of contact -Definition of capillarity -The formula for surface tension based on capillarity - Explanation of concept of Viscosity - Examples for surface tension and Viscosity - Newton's formula for viscous force- Definition of co-efficient of viscosity- The effect of temperature on viscosity of liquids and gases - Poiseuille's equation for Co-efficient of viscosity- The related numerical problems

10. Electricity & Magnetism:

Ohm's law and explanation-Specific resistance-Kirchoff's laws- Wheat stone's bridge- Meter bridge-Coulomb's inverse square law magnetic field- magnetic lines of force-Magnetic induction field strength- magnetic induction field strength at a point on the axial line - magnetic induction field strength at a point on the equatorial line-problems.

11. Modern Physics;

Photoelectric effect –Einstein's photoelectric equation-laws of photoelectric effect-photo electric cell–Applications of photo electric effect- Total internal reflection- fiber optics- - principle and working of an optical fiber -types of optical fibers - Applications of optical fibers- superconductivity–applications-Nanotechnology definition, non-materials, applications

REFERENCEBOOKS

1. Telugu Academy (English version)	Intermediate physics Volume-I & 2
2. Dr. S .L. Guptha and Sanjeev Guptha	Unified physics Volume 1,2,3 and 4
3.Resnick& Holiday	Text book of physics Volume I
4. Dhanpath Roy	Text book of applied physics
5. D.A Hill	Fibre optics
6. XI & XII Standard	NCERT Text Books

➤ 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 4.9

Unit Test – 2	From 5.1 to 8.10
Unit Test – 3	From 9.1 to 11.8

➤ **Model question paper for Unit Test with COs mapped**

UNIT TEST –I

Model Question Paper (C-20)

ENGINEERING PHYSICS (AIM-103)

TIME: 90 minutes

Total Marks:40

PART-A

16 Marks

Instructions: (1) Answer all questions.

(2) First question carries 4 marks and others carry 3 marks each.

(3) Answers for Question Numbers 2 to 5 should be brief and straight to

The point and shall not exceed five simple sentences.

1. i) The dimensional formula of force is _____ (CO1)
- ii) which of the following is a scalar (CO1) []
- a) force b) work c) displacement d) velocity
- iii) we can add a scalar to a vector (Yes / No) (CO1)
- iv) Friction is a self-adjusting force. [True / False] (CO2)

2. Define dot product. Give one example. (CO1)
3. A force of 150 N acts on a particle at an angle of 30° to the horizontal. Find the horizontal and vertical components of force (CO1)
4. Define projectile. Give two examples.(CO2)
5. It is easier to pull a lawn roller than to push it. Explain (CO2)

PART—B

3x8=24

Instructions: (1) Answer all questions. Each question carries 8marks.

(2) Answer should be comprehensive and the criteria for evaluation is content but not the length of the answer.

- 6) (A) Derive an expression for magnitude and direction of resultant of two vectors using parallelogram law of vectors (CO1)

OR

(B) Write any four properties of dot product and any four properties of cross product (CO1)

- 7) (A) Show that path of a projectile is a parabola in case of oblique Projection. (CO2)

OR

(B) Derive the expression for range and time of flight of a projectile (CO2)

- 8) (A) State and explain polygon law of vector addition with a neat diagram (CO1)

OR

(B) Derive the equation for acceleration of a body on a rough inclined plane (CO2)

BOARD DIPLOMA EXAMINATION, (C-20)

FIRST YEAR EXAMINATION

AIM-103, ENGINEERING PHYSICS

**Time : 3 hours]
80**

[Total Marks :

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 dimensional formula of the following physical quantities (CO1)
(a) Velocity (b) Force (c) Angular momentum
2. Write any three properties of scalar product.(CO1)
3. Define projectile. Give two examples.(CO2)

4. It is easier to pull a lawn roller than to push it. Explain.(CO2)
5. Define potential energy and kinetic energy. (CO3)
6. For a body in simple harmonic motion velocity at mean position is 4m/s, if the time period is 3.14 s, find its amplitude. (CO3)
7. State first and second laws of thermodynamics. (CO4)
8. Write any three conditions of good auditorium (CO4)
9. Define ohmic and non-ohmic conductors.(CO5)
10. State Coulomb's inverse square law of magnetism.(CO5)

PART—B

8 ×5= 40

Instructions : (1) Each question carries eight marks.

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

11. A) Derive an expression for magnitude and direction of the resultant of two vectors using parallelogram law of vectors. (CO1)

OR

B) Show that path of a projectile is parabola in case of oblique projection and derive expression for maximum height.(CO2)

12. A) Derive expression for acceleration of a body sliding downwards on a rough inclined plane.(CO2)

OR

B) Verify the law of conservation of energy in case of a freely falling body.(CO3)

13. A) Derive an expression for velocity and acceleration of a particle performing simple harmonic motion. (CO3)

OR

B) Define ideal gas and derive ideal gas equation.(CO4)

14. A) Two tuning forks A and B produce 4 beats per second. On loading B with wax 6 beats are produced. If the quantity of wax is reduced the number of beats drops to 4. If the frequency of A is 326 Hz, find the frequency of B.(CO4)

OR

- B) Explain surface tension based on molecular theory. Write three examples of surface tension. (CO5)

15. A) Derive an expression for balancing condition of Wheat stone's bridge with a neat circuit diagram.(CO5)

OR

- B) Explain principle and working of optical fibers. Write any three applications (CO5).

PART C

1 x 10 = 10

- 16) Derive relationship between C_p and C_v and hence show that C_p is greater than C_v . (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	4	120	20	80

S.No	Unit Title/Chapter	No of Periods	COs Mapped
1	Fundamentals of Chemistry	18	CO1
2	Solutions	10	CO1
3	Acids and bases	10	CO1
4	Principles of Metallurgy	8	CO1
5	Electrochemistry	16	CO2
6	Corrosion	8	CO2
7	Water Treatment	10	CO3
8	Polymers	12	CO4
9	Fuels	6	CO4
10	Chemistry in daily life	6	CO4
11	Environmental Studies	16	CO5
Total		120	

➤ **Course Objectives**

Course Title: Engineering Chemistry & Environmental Studies

Course Objectives	4. To familiarize with the concepts of chemistry involved in the process of various Engineering Industrial Applications. 5. 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. 6. to reinforce theoretical concepts by conducting relevant experiments/exercises
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➤ **Course outcomes**

Course Outcomes	CO1	Explain Bohr's atomic model, chemical bonding, mole concept, acids and bases, P^H metallurgical process and alloys
	CO2	Explain electrolysis, Galvanic cell, emf and corrosion
	CO3	Synthesise of Plastics and rubber and industrial applications of fuels
	CO4	Describe the methods of treatment of water and give the information about chemical compounds used in our daily life
	CO5	Explain the causes, effects and control methods of air and water pollution and measures to protect the environment

➤ **COs-POs mapping strength (as per given table)**

AIM104	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	1	2					3		
CO2	3			2				2	1	
CO3	3		2							
CO4	3				2		2			
CO5	3				3					3

3 = strongly mapped

2 = moderately mapped

1 = slightly mapped

➤ **Model Blue Print with weightages 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	18	19	8	8	3		1	1	1		CO1
2	Solutions	10	11	0	0	8	3			1	1	CO1
3	Acids and bases	10	11	0	8	0	3		1		1	CO1
4	Principles of Metallurgy	8	8	8	0	0		1				CO1
5	Electrochemistry	16	11	8	3	0		1	1		*	CO2
6	Corrosion	8	8	0	8	0			1			CO2
7	Water Treatment	10	11	8	3	0		1	1			CO3
8	Polymers	12	11	3	8	0		1	1		*	CO4
9	Fuels	6	3	3	0	0		1				CO4
10	Chemistry in daily life	6	3	0	0	3				1		CO4
11	Environmental Studies	16	14	3	11	0		1	2			CO5
Total		120	110	12	6	6	6	20	35	5	* 10	

***One question of HOTS for 10 marks from any of the unit title 5 or 8**

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

ENGINEERINGCHEMISTRY AND ENVIRONMENTAL STUDIES

1.0 Atomic structure

- 1.1 Explain the charge, mass of fundamental particles of an atom (electron, proton and neutron) and the concept of atomic number and mass number.
- 1.2 State the Postulates of Bohr's atomic theory and its limitations.
- 1.3 Explain the significance of four Quantum numbers.
- 1.4 Explain 1. Aufbau principle, 2 Pauli's exclusion principle 3 Hund's rule.
- 1.5 Define Orbital of an atom , draw the shapes of s,p and d- Orbitals 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 ,MgO, 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.
- 1.11 Structures of ionic solids-define a) Unit cell b) co-ordination number and the structures of NaCl and CsCl unit cells.

2.0 Solutions

- 2.1 Define the terms 1. Solution, 2. Solute and 3. Solvent
- 2.2 Classify solutions based on physical state and 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 , $\text{Ca}(\text{OH})_2$, $\text{Al}(\text{OH})_3$) 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

3.0 Acids and bases

3.1 Explain Arrhenius theory of Acids and Bases and give the limitations of Arrhenius theory of Acids and Bases.

3.2 Explain Bronsted– Lowry theory of acids and bases and give the limitations of Bronsted– Lowry theory of acids and bases.

3.3 Explain Lewis theory of acids and bases and give the limitations of Lewis theory of acids and bases.

3.4 Explain the Ionic product of water

3.5 Define pH and explain P^H scale and solve the Numerical problems on pH(Strong Acids and Bases)

3.6 Define and explain buffer solution and give the examples of buffer solutions.

3.7 State the application of buffer solutions

4.0 Principles of Metallurgy

4.1 List out the Characteristics of Metals and non-metals

4.2 Distinguish between Metals and Non-metals

4.3 Define the terms 1.Mineral, 2.Ore, 3. Gangue, 4.Flux 5.Slag

4.4 Describe the methods of concentration of Ore; 1.Handpicking, 2.Levigation and 3. Froth Floatation

4.5 Describe the methods involved in extraction of crude metal- Roasting, Calcination and Smelting.

4.6 Explain the purification of Copper by Electrolytic Refining

4.7 Define an Alloy and Write the composition and uses of the following alloys.

1. Brass

2. German silver

3. Nichrome.

5.0 Electrochemistry

5.1 Define the terms

1. Conductor

2. Semiconductor

3. Insulator

4. Electrolyte

5. Non-electrolyte. Give two examples each.

5.2 Distinguish between metallic conduction and Electrolytic conduction

5.3 Explain electrolysis by taking example used NaCl

5.4 Explain Faraday's laws of electrolysis

5.5 Define 1. Chemical equivalent (E) 2. Electrochemical equivalent (e) and their relation.

5.6 Solve the Numerical problems on Faraday's laws of electrolysis and applications of electrolysis (Electro plating)

5.7 Define Galvanic cell and explain the construction and working of Galvanic cell.

5.8 Distinguish between electrolytic cell and galvanic cell

5.9 Explain the electrode potentials and standard electrode potentials

5.10 Explain the electro chemical series and its significance

5.11 Explain the emf of a cell and solve the numerical problems the cell based on standard electrode potentials.

6.0 Corrosion

6.1 Define the term corrosion.

6.2 state the Factor influencing the rate of corrosion

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

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

6.5 Explain the methods of prevention of corrosion

- a) Protective coatings (anodic and cathodic coatings)

- b) Cathodic protection (Sacrificial anode process and Impressed-voltage process)

7.0 Water Treatment

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

7.2 Define and Classify the hardness of water.

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

- 7.4 State the disadvantages of using hard water in industries.
- 7.5 Define Degree of hardness and units of hardness (mg/L) or(ppm).
- 7.6 Explain the method so f softening of hard water: a) Ion-exchange process, b)Permuted process or zeolite process
- 7.7 State the essential qualities of drinking water.
- 7.8 Chemistry involved in treatment of water (Coagulation, Chlorination, deflouridation)
- 7.9 Explain Osmosis and Reverse Osmosis with examples.
- 7.10 State the applications of Reverse Osmosis.

8.0 Polymers

- 8.1 Explain the concept of polymerization
- 8.2 Describe the methods of polymerization a) additionpolymerization of ethylene
b)condensation polymerization of Bakelite(Only flowchart)
- 8.3 Define the term plastic and classify the plastics with examples.
- 8.4 Distinguish between thermo plastics and the rmo setting plastics
- 8.5 List the Characteristics of plastics and state the disadvantages of using plastics.
- 8.6 State the advantages of plastics over traditional materials.
- 8.7 Explain the methods of preparation and uses of the following plastics:
1. PVC, 2.Teflon, 3. Polystyrene 4. Nylon 6,6
- 8.8 Explain processing of Natural rubber and write the structural formula of Natural rubber.
- 8.9 List the Characteristics of raw rubber
- 8.10 Define and explain Vulcanization and List out the Characteristics of Vulcanized rubber.
- 8.11 Define the term Elastomer and describe the preparation and uses of the following synthetic rubbers a) Buna-s and b)Neoprene rubber.

9.0 Fuels

- 9.1 Define the term fuel
- 9.2 Classify the fuels based on physical state and based on occurrence.
- 9.3 List the characteristics of good fuel.
- 9.4 State the composition and uses of gaseous fuels.
a)water gas b)producer gas, c)natural gas, d) Coal gas, e)Biogas.

10.0 Chemistry in daily life

10. Give the basic chemical composition, applications, health aspects and pollution impacts of
- a) soaps, and detergents
 - b) vinegar
 - c) Insect repellent sand
 - d) activated charcoal
 - e) Soft drinks

11.0 ENVIRONMENTAL STUDIES

- 11.1 Define the term environment and explain the scope and importance of environmental studies
- 11.2 Define the segments of environment 1).Lithosphere, 2).Hydrosphere, 3).Atmosphere, 4).Biosphere,
- 11.3 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) C onsumers 1 4) Decomposers with examples
- 11.4 State the renewable and non renewable energy sources with examples.
- 11.5 Explain biodiversity and threats to biodiversity
- 11.6 Define air pollution and classify the air pollutants-based on origin and physical state of matter.
- 11.7 Explain the causes, effects of air pollution on human beings, plants and animals and control methods of air pollution.
- 11.8 State the uses of forest resources.
- 11.9 State the deforestation and its causes and effects.
- 11.10 Explain the 1.) Green house effect , 2) Ozone layer depletion and 3) Acidrain
- 11.11 Define Water pollution, explain the causes, effects and control methods of Water pollution.

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: Introduction – types of chemical bonds – Ionic and covalent bond with examples – Properties of Ionic and Covalent compounds – structures of ionic crystals (NaCl and CsCl).

2. Solutions

Introduction of concentration methods – mole concept, molarity and normality – Numerical problems on mole, molarity and normality.

3. Acids and Bases

Introduction – Theories of acids and bases and limitations – Arrhenius theory – Bronsted – Lowry theory – Lewis acid base theory – Ionic product of water – pH related numerical problems – Buffer solutions, action of buffer and its applications.

4. Principles of Metallurgy

Characteristics of Metals and non-metals – Distinguish between Metals and Non-metals, Define the terms i) Metallurgy ii) ore iii) Gangue iv) flux v) Slag – Concentration of Ore – Hand picking, Levigation, Froth floatation – Methods of Extraction of crude Metal – Roasting, Calcination, Smelting – Alloys – Composition and uses of brass, German silver and ni chrome.

5. Electrochemistry

Conductors, semiconductors, insulators, electrolytes and non-electrolytes – electrolysis – Faraday's laws of electrolysis – application of electrolysis (electroplating) – numerical problems on Faraday's laws – Galvanic cell – standard electrode potential – electrochemical series – emf and numerical problems on emf of a cell.

6. 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.

7. Water technology

Introduction – soft and hard water – causes of hardness – types of hardness

– disadvantages of hard water – degree of hardness (ppm and mg/lit) – softening methods – permutit process – ion exchange process – qualities of drinking water – Chemistry involved in treatment of water (Coagulation, Chlorination, defluoridation) – Osmosis, Reverse Osmosis – Applications of Reverse osmosis.

8. Polymers

Introduction – polymerization – types of polymerization – addition, condensation with examples – plastics – types of plastics – advantages of plastics over traditional materials – Disadvantages of using plastics – Preparation and uses of the following plastics i) PVC ii) Teflon iii) Polystyrene iv) Nylon 6,6 – Processing of natural rubber – Vulcanization – Elastomers – Preparation and applications of Buna-s, Neoprene rubbers.

9. Fuels

Definition and classification of fuels—characteristics of good fuel-composition and uses of gaseous fuels.

10. Chemistry in daily life

Basic composition, applications, health aspects and pollution impacts of soaps and detergents, vinegar, insect repellants, soft drinks, activated charcoal.

11. ENVIRONMENTAL STUDIES

Introduction— environment –scope and importance of environmental studies – important terms related to environment— renewable and non-renewable energy sources—Concept of ecosystem – Biotic components –Forest resources – Deforestation -Biodiversity and its threats-Air pollution – causes-effects—Global environmental issues – control measures – Water pollution – causes – effects – control measures.

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 4.7
Unit Test - 2	From 5.1 to 8.11
Unit Test - 3	From 9.1 to 11.11

REFERENCE BOOKS

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-20)

ENGINEERING CHEMISTRY & ENVIRONMENTAL STUDIES (AIM-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 of neutrons in ${}_{11}\text{Na}^{23}$ is -----(CO1)
 - b. The molarity and normality of HCl is the same (True or False)(CO1)
 - c. What is the p^{H} range of base?(CO1)
 - d. Graphite is a good conductor of electricity (Yes or No)(CO1)
2. Define Covalent bond. Explain the formation of covalent bond in Oxygen and Nitrogen molecules.(CO1)

3. Define mole. Calculate the number of moles present in 50 gm of CaCO_3 and 9.8 gm of H_2SO_4 .(CO1)
4. Define P^{H} . Calculate the P^{H} of 0.001M HCl and 0.01M NaOH solution.(CO1)
5. Write the composition and applications of German silver and Nichrome.(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) Express molarity normality with mathematical equation. Calculate the molarity and normality of 10gm of NaOH present in 500 ml solution.(CO1)

(OR)

B) Explain Bronsted-Lowry theory of acids and bases. Give its limitations.(CO1)

8. A) Explain Froth floatation process.(CO1)

(OR)

B) Explain Electrolytic refining processing of copper.(C01)

Model Question Paper (C-20)

ENGINEERING CHEMISTRY & ENVIRONMENTAL STUDIES (AIM-104)

TIME: 3hrs

Total

Marks:80

PART-A

**Instructions: (1) Answer all questions.
(2) each question carries 3 marks.**

Answer all questions. Each question carries three marks.

3x10=30M

1. Draw the shapes of s and p orbitals. (CO1)
2. Define mole. Find the mole number of 10 g of CaCO_3 (CO1)
3. Define Buffer solution.. Give any two examples. (CO1)
4. Define chemical equivalent and electrochemical equivalent. Give their relation. (CO2)
5. State name of the salts and their formulae that cause hardness. (CO3)
6. Write any three disadvantages of using plastics. (CO4)
7. Classify the fuels based on their occurrence. (CO4)
8. Mention the basic chemical composition and applications of vinegar. (CO4)
9. List out any three threats to biodiversity. (CO5)

10. Define pollutant and contaminant. Give an example each. (CO5)

PART – B

Each question carries eight marks.

8x5=40M

11. A) Explain Bhore's atomic theory and give its limitations. (CO1)
- (OR)
- B) Explain ionic bond formation and covalent bond formation with one example each (CO1)
12. A) Calculate the molarity and normality of 250 ml of sodium carbonate solution that contains 10.6 gm of sodium carbonate. (CO1)
- (OR)
- B) Explain Bronstead and Lowry theory of acids and bases. Give its limitations. (CO1)
13. A) Explain froth floatation and electrolytic refining of copper with neat diagrams. (CO1)
- (OR)
- B) Explain the construction and working of galvanic cell. (CO2)
14. A) Explain Cathode protection methods. (CO2)
- (OR)
- B) Explain ion-exchange of softening of hard water with a neat diagram. (CO3)
15. A) Explain addition and condensation polymerisation with an example each. (CO4)
- (OR)
- B) Explain the causes and effects of air pollution. (CO5)

PART –C

Question carries ten marks

10x1 =10M

16. Describe methods of preparation and applications of Polystyrene and Teflon. (CO4)

Course code	Course Title	No. of Periods/W eeks	Total No. of periods	Marks for FA	Marks for SA
AIM-105	Basics of Artificial Intelligence and Machine Learning	3	90	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Fundamentals of Computers	15	CO1,CO3,CO4
2.	Programming Methodology	10	CO2
3.	Operating System basics	20	CO1,CO3
4.	Computer Hardware and Networking Basics	25	CO1,CO4,CO5
5.	Basics of Data structures and Emerging Trends in Computer Technologies	20	CO2,CO6
Total Periods		90	

Course Objectives	Upon completion of the course the student shall be able to		
	i) know the fundamentals of Computers ii)familiarize programming methodologies like algorithms and flowcharts iii) understand Operating system basics iv)To familiarize basics of data structures and Emerging Technologies		

Course Outcomes	Upon completion of the course the student shall be able to		
	CO1	AIM105.1	Explain computer fundamentals
	CO2	AIM105.2	Explain various flowchart, algorithm methods
	CO3	AIM105.3	Apply the features of Basic Computer operating systems
	CO4	AIM105.4	Analyse functioning of various Hardware components
	CO5	AIM105.5	Explain Networking process in computers

	CO6	AIM105.6	Explain basics of data structures and emerging technologies in the fields of AI and Machine learning.
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CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM105.1	3							3	1	1
AIM105.2	1	2	2	1		3		1	3	1
AIM105.3	3	1		1		1	1	3	1	1
AIM105.4	3		2	2	1		1	2	1	2
AIM105.5	3		2		1	1	1	2	1	2
AIM105.6	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 Basics of Data Structures and Emerging Trends in Computer Technology

5.1. Overview of Data Structures

- 5.1.1. Define Data structures.
- 5.1.2.Classify Data Structures.
- 5.1.3.Stack Concepts (Definition,operations,Applications)
- 5.1.4.Queue Concepts (Definition,operations,Applications)
- 5.1.5.List(Definition,Types-Single,Double,Circular,Operations-Insertion,Deletion,Search,Sort)
- 5.1.6.Define the terms Searching and sorting
- 5.1.7.Illustrate Linear search
- 5.1.8.List various sorting techniques
- 5.1.9.List the applications of searching and sorting.
- 5.2.1.Define the terms Tree,Binary Tree,Graph,Root,Internal node,Sibling node,Leaf Node, Degree of a Node and Height of Tree
- 5.1.10. List the application of trees and graphs.

5.2 Introduction to Artificial Intelligence

- 5.1.11. Introduction
- 5.1.12. Define AI
- 5.1.13. History of AI
- 5.1.14. Types of AI
- 5.1.15. Features of AI
- 5.1.16. Intelligent systems

- 5.1.17. Foundations of AI
- 5.1.18. Tic-tac-toe game playing
- 5.1.19. History of AI languages
- 5.1.20. Current Trends in AI
- 5.1.21. List searching algorithms
- 5.1.22. Applications of AI
- 5.1.23. Terminology of AI
- 5.3 Introduction to Machine Learning
 - 5.3.1 Define Machine Learning, Compare Traditional Programming with Machine Learning
 - 5.3.2 List the applications and key elements of Machine Learning
 - 5.3.3 Define the terms in relation to approaches to Machine Learning(Decision tree learning, Association rule learning, Artificial neural networks, Deep Learning, Inductive Learning, Genetic algorithms, Clustering)
 - 5.3.4 Explain Inductive Learning
 - 5.3.5 Classify the Machine Learning
- 5.4 Introduction to Big data
 - 5.4.1 Define and list sources of Big data
 - 5.4.2 Evolution of data/big data
 - 5.4.3 List and explain the characteristics of big data – the three V's of big data
 - 5.4.4 Describe Storing and selecting of Big Data
 - 5.4.5 State the Need of Big Data
 - 5.4.6 List types of tools used in Big Data
 - 5.4.7 List applications of big data

COURSE CONTENT

1.0 Fundamentals of Digital Computer

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

2.0 Programming Methodology.

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

3.0 Understand Operating Systems

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

4.0 Computer Hardware and Networking Basics

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

5.0 Basics of Data Structures and Emerging Trends in Computer Technology

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

Introduction to AI – Definition - History of AI - Types of AI -Features of AI - intelligent systems-foundations of AI - Tic-tac-toe game playing - History of AI languages - Current Trends in AI-searching algorithms- Applications - Terminology of AI

Introduction to Machine Learning - Compare Traditional Programming with Machine Learning-applications -know the key elements- Define the terms - learning, Association rule learning, Artificial neural networks, DeepLearning, InductiveLearning, Geneticalgorithms, Clustering- Explain Inductive Learning- Classify the Machine Learning -List the applications

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

REFERENCE BOOKS

1. Information Technology - Curtin.
2. Computer Science Theory & Application - E. Balaguruswamy, B. Sushila
3. Introduction to Computers (Special Indian Edition) - Peter Norton
4. Cloud Computing : Principles and Paradigms -RajkumarBuyya, James Broberg and AndrzejGoscinski
5. Big Data Basics part1 and 2 in www.mssqltips.com
6. <http://www.ijeset/media>(for Basics of EthicalHacking)
7. Brief-Introduction-of-Virtual-Reality-its-Challenge by SharmisthaMandalInternational Journal of Scientific & Engineering Research, Volume 4, Issue April-2013)

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	A p	An	R	U	A p	An	
1	Fundamentals of Digital Computers	15	14	3	11			1	2			CO1,CO3,CO4
2	Programming Methodologies	10	14	3	3	8	*	1	1	1	*	CO2
3	Operating system basics	20	14	3	3	8		1	1	1		CO1,CO3
4	Computer Hardware and Networking Basics	25	14	3	11		*	1	2		*	CO1,CO4,CO5
5	Basics of Data structures and Emerging Trends in	20	14	6	8			2	1			CO2,CO6

	Computer Technologies											
	Total	90	70 +(10*)	18	36	16	10*	6	7	2	1	

Note: Part-C: 10 marks single analytical question may be chosen from any one of starred chapters.

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 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
UNIT TEST-1**

SCHEME: C-20
MAX MARKS:40

SUBJ CODE: AIM-105
TIME: 90 MINUTS

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 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SCHEME: C-20
AIM-105
MAX MARKS:80
SUBJ CODE:
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. List the features of Machine Learning (CO6)
10. List the sources of big data (CO6)

PART-B

5x8=40Marks

Note: Answer all questions

11. A.Explain the generations of computers? (CO1)
OR
- 11.B i) State the use of storage devices used in a Computer. (CO1)
ii) State the importance of cache memory. (CO1)
12. A.Differentiate algorithm and flowchart with suitable examples? (CO2)
OR
- 12.B. Explain in detail the characteristics of an algorithm. (CO2)
- 13.A.Explain about atleast 10 Internal Commands and 5 External Commands. (CO3)
OR
- 13.B. Explain the procedure for changing resolution, color, appearance, screensaver options of the display. (CO3)
- 14.A.Explain 3 types of Software in detail. (CO4)
OR
- 14.BExplain Internet Security. (CO5)
- 15.A.Explain the characteristics of Big data. (CO6)
OR
- 15.B.Explain in detail about Penetrate testing. (CO6)

PART-C

1X10=10Marks

16. “There is no recursive function without terminating condition” Justify your answer. (CO2)

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

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Introduction to C Language	20	CO1,CO2
2.	Input and output statements, Operators and Expressions In C.	25	CO1,CO2,CO3
3.	Decision making, iterative and other control statements	40	CO1,CO2,CO3
4.	Arrays and strings, Structures and Unions	30	CO1,CO2,CO3
5.	User defined functions, pointers, file management and pre-processor directives.	35	CO1,CO2,CO3,CO4,CO5
Total Periods		150	

Course Objectives	Upon completion of the course the student shall be able to
	1. Relate basics of programming language constructs using C Language 2. Classify and implement datatypes, derived data types, pointers, files, statements 3. Analyse and develop effective modular programming 4. Construct mathematical, logical and scientific problems and real time applications using C-language

Course Outcomes	Upon completion of the course the student shall be able to		
	CO 1	AIM106.1	Develop, compile and debug programs using C- fundamentals and different programming statements in C language.
	CO 2	AIM106.2	Use various operations using primary and derived data types in C.
	CO 3	AIM106.3	Analyse programs using predefined functions, modules and recursive techniques
	CO 4	AIM106.4	Write scientific and logical programs using pointers, file pointers
	CO 5	AIM106.5	Develop programs using information passing

CO-PO/PSO Matrix:

CO NO.	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO1	PSO2	PSO3
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**1.0 Introduction to C-Language**

- 1.1 Describe the history of C-language, structure of C-language program
- 1.2 Describe the programming style of C language
- 1.3 Explain the steps involved in Editing, compiling, executing and debugging of C program
- 1.4 Describe character set, C-Tokens, Keywords, Identifiers, Constants, Variables
- 1.5 Define Data Type
- 1.6 Classify Data Types and explain them with examples.
- 1.7 Explain declaration of constants and variables
- 1.8 Explain initializing values to variables in declaration
- 1.9 Explain about user defined data types with a simple program
- 1.10 Explain the usage of type qualifiers

2.0 Input and output statements, Operators and Expressions in C

- 2.1 Explain the importance of Pre-processor Directive #include
- 2.2 Illustrate
 - 2.2.1 Reading a character using getch(), getche() and getchar()
 - 2.2.2 Writing a character using putch(), putchar()
 - 2.2.3 Formatted input using scanf() & write sample programs using it.
 - 2.2.4 Formatted output using printf() & write sample programs using it.
- 2.3 Explain character functions
- 2.4 Define an operator, an expression
- 2.5 Explain
 - 2.5.1 Various arithmetic operators and explain the evaluation of arithmetic expressions with example.
 - 2.5.2 Various relational operators and discuss evaluation of relational expressions
 - 2.5.3 Various logical operators and discuss evaluation of logical expressions

- 2.6 Explain the difference between unary and binary operators
- 2.7 Describe various assignment operators, increment and decrement operators
- 2.8 Illustrate nested assignment
- 2.9 Explain conditional operators with an example
- 2.10 Explain
 - 2.10.1 Bit-wise operators and explain each with an example
 - 2.10.2 Special operators with examples
 - 2.10.3 Precedence and Associativity of operators
- 2.11 Describe evaluation of compound expression
- 2.12 Illustrate type conversion techniques
- 2.13 Write sample programs by using all the operators

- 3.0 Decision making, iterative and other control statements**
- 3.1 Explain decision making statements and its need in programming
- 3.2 Explain
 - 3.2.1 Simple if and if-else statement with syntax and sample program
 - 3.2.2 Nested if..else statements with syntax and sample program
 - 3.2.3 if-else-if ladder with syntax and sample program
 - 3.2.4 switch statement with syntax and sample program
- 3.3 State the importance of break statement with switch and illustrate
- 3.4 Compare
 - 3.4.1 Conditional operator with if-else statement
 - 3.4.2 if-else with switch statement
- 3.5 Define looping or iteration
- 3.6 List and explain iterative statements with syntax and examples
- 3.7 Compare different loop statements
- 3.8 What is nested loop and illustrate.
- 3.9 Explain the usage of goto, break and continue statements with loop statements
- 3.10 Differentiate break and continue statements.
- 3.11 Define structured programming.
- 4.0 Arrays, strings, Structures and Unions**
- 4.1 Define Array
- 4.2 Describe
 - 4.2.1 Declaration and initialization of One Dimensional (1D) Array with syntax and sample programs.
 - 4.2.2 Accessing the elements in 1D-Array with sample programs.
 - 4.2.3 Reordering an array in ascending order.
- 4.3 Explain declaration and initialization and usage of two Dimensional (2D)Arrays.
- 4.4 Illustrate the concept of arrays with sample programs on matrix addition, subtraction and matrix multiplication
- 4.5 Define String
- 4.6 Describe
 - 4.6.1 Declare and initialize of String variables.
 - 4.6.2 gets() and puts()
 - 4.6.3 Reading and displaying of strings from terminal with sample programs.
 - 4.6.4 Explain about various String handling functions with sample programs.
- 4.7 Explain Character arithmetic.
- 4.8 Define a structure.
- 4.9 Explain
 - 4.10 Initializing structure, Declaring structure, Declaring Structure Variables.
 - 4.11 Accessing of the structure members
 - 4.12 Structure assignment.
 - 4.13 How to find size of a structure.
 - 4.14 Nested structureconcept.
 - 4.15 Structures containing arrays
 - 4.16 Array of structures

- 4.17 Define Union, declare, initialize and use of union.
- 4.18 Distinguish between Structures and Unions
- 4.19 Write sample programs for all the concepts of structures and unions
- 5.0 **User defined functions, pointers, file management and preprocessor directives**
- 5.1 Explain
 - 5.1.1 Need of user defined functions
 - 5.1.2 Advantages of the functions
 - 5.1.3 Elements of function
 - 5.1.4 Return values and their types
- 5.2 Define a functioncall, function prototype
- 5.3 Explain
 - 5.3.1 Function declaration in programs
 - 5.3.2 Functions with no arguments and no return values with sample programs
 - 5.3.3 Functions with arguments with no return values with sample programs
 - 5.3.4 Functions with arguments with return values with sample programs
 - 5.3.5 Functions with no arguments with return values with sample programs
 - 5.3.6 Functions that return multiple values with sample programs
 - 5.3.7 Recursion with sample programs
 - 5.3.8 Passing arrays to functions with sample programs
 - 5.3.9 Structure as function arguments and structures as function values.
 - 5.3.10 Structures containing pointers.
 - 5.3.11 Self referential structures with examples.
 - 5.3.12 Storage classes-auto, register, static, extern
 - 5.3.13 Scope, visibility and lifetime of variables in functions
- 5.4 Differentiate Local and Externalvariables
- 5.5 Define Globalvariable
- 5.6 Discuss passing the global variables as parameters using sampleprograms
- 5.7 Explain
 - 5.7.1 Declaration and initialization of Pointers.
 - 5.7.2 Accessing the address of a variable using &operator
 - 5.7.3 Accessing the value of a variable through pointer
 - 5.7.4 Pointer Arithmetic
 - 5.7.5 Precedence of address and de-referencingoperators.
 - 5.7.6 Relationship between arrays and pointers.
 - 5.7.7 Accessing array elements using pointers
 - 5.7.8 Pointers as functionarguments
 - 5.7.9 Pointer arrays withexamples.
- 5.8 Differentiate between address and de-referencingoperators.
- 5.9 Explain
 - 5.10 Dynamic memory management functions withexamples.
 - 5.11 Structures containingpointers.
 - 5.12 Pointer tostructure.
 - 5.13 Self referential structures withexamples.
- 5.14 Explain
 - 5.15 Files and how to declare file pointer to afile
 - 5.16 Illustrate the concept of file opening using variousmodes
 - 5.17 Illustrate the concept of closing of afile
 - 5.18 Illustrate the concept of Input / Output operations on afile
 - 5.19 Illustrate the concept of random accessingfiles
 - 5.20 Explain different file handling functions
- 5.21 Explain
 - 5.22 Pre-processordirectives
 - 5.23 Need of pre-processor directives.

5.24 Write

5.25 Simple programs using pre-processor directives.

5.26 Simple program using command line arguments(argc and argv)

COURSE CONTENT

1. **Introduction to C Language:** History of C language - importance of C Define language - structure of C language - programming style of C language - steps involved in executing the C program-Character set - C Tokens - Keywords and Identifiers- Constants and Variables - Data Types and classification - declaration of constants and variables-initializing values to variables-user defined data types-usage of type qualifiers.
2. **Input and output statements, Operators and Expressions in C:**importance of Pre-processor #include-reading and writing asingle character functions- formatted input and output statements-operators-classification of operators-operator precedence and associativity-expressions and expression evaluation-type conversion techniques.
3. **Understand Decisionmaking, iterative and other control statements:**simpleif, if-else, if else ladder, nested if-else-switch statement - else if, nested if , else if ladder, switchstatements- Classification of various loop statements- while statement – do.. while statement ram - for loop statement - nesting of loops- Comparisons of different loop statements –goto statement-break and continue statements –concept of structuredprogramming
4. **UnderstandArrays and strings , basics of Structures and Unions:** Arrays -One Dimensional Arrays – array programs -two Dimensional Arrays- programs on matrix - Strings – String handling functions - Structure- Array of structures - Nested structures- pointer to structure Self referential structures - Union and illustrate use of a union – difference between Structures and Union
5. **Understand User definedfunctions, basics of pointers, file management and pre-processor directives:** Function – user defined functions – Advantages - Recursion concept - parameter passing –storage classes - scope, visibility and lifetime of variables in functions- Local and External variables -Global variable- - Pointer - Differentiate address and de-referencing operators - Pointer Arithmetic- precedence of address and de- referencing operators - -Relationship between Arrays and Pointers - Pointers as Function Arguments - Dynamic memory management-
6. Files - file pointers - file opening in various modes - Concept of closing of a file –operations on files - Need of Pre-processor directives - Various Pre-processor directives- Macros – Command line arguments

REFERENCE BOOKS

- | | | |
|---|--------------------------------------|------------------|
| 1 | Programming inANSI C E.Balaguruswamy | TataMcGrawHill |
| 2 | Programming withC Gottfried | Tata McGraw Hill |
| 3 | C Thecomplete Reference Schildt | Tata McGrawHill |

Model Blue Print

Note: Part-C: 10 marks single analytical question may be chosen from any one of starred chapters.

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

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

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

SCHEME: C-20

SUBJ

CODE: AIM-106

MAX MARKS: 40

TIME: 90 MINUTES

PART-A

16Marks

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	Ap	An	
1	Introduction to C Language	20	14	6	8			2	1			CO1,CO2
2	Input and output statements, Operators and Expressions in C	25	14		6	8	*		2	1	*	CO1,CO2,C3
3	Decision making, iterative and other control statements	40	14		6	8	*		2	1	*	CO1,CO2,CO3
4	Arrays and strings, Structures and Unions	30	14	3	3	8	*	1	1	1	*	CO1,CO2,CO3
5	User defined functions, pointers, file management and pre-processor directives	35	14	3	3	8	*	1	1	1	*	CO1,CO2,CO3,CO4,CO5
	Total *	150	70 +10(*)	12	26	32	10*	4	7	4	1	CO1,CO2,CO3,CO4

Instructions:1) Answer all questions

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

1. a) Int 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) List any three data types of C language. (CO1)
- 3) Define a) Keyword b) Identifier c) Constant (CO1)
- 4) Write a sample program using Conditional operator? (CO2)
- 5) Distinguish between pre-increment and post-increment operators. (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) Write the C-Programming structure and explain each part of it (CO1)
(Or)
- b) Explain various generations of computers (CO1)
- 7.a) Explain Arithmetic, Relational, Logical operators with examples. (CO2)
(Or)
- b) Evaluate the following C-Expression and write the final value (CO2)
$$X = ((2 + 6 / 2 + 3 * 6) - ((4 + 6) / 2 + 5) / 10) + 1 / 5.0$$
8. a) Illustrate Type Conversion techniques in detail (CO2)
Or
- b) Write the C-program using formatted input and output functions. (CO2)

**BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER - END EXAMINATION
PROGRAMMING IN C**

SCHEME: C-20

SUBJ

CODE: AIM-106

MAX MARKS: 80

TIME: 3 HOURS

PART-A

Note: Answer all questions. Each question carries 3 marks

10 X 3 = 30M

1. Define an identifier and write two valid identifiers CO1
2. Write a short note on type qualifiers CO1
3. Write the syntax of formatted output statement CO1
4. Write a program to print the biggest of two numbers using conditional operators

- | | | |
|----|--|-----|
| 5. | Differentiate between break and continue | CO3 |
| 6 | What is nesting? Give an example. | CO3 |
| 7 | What is an array? How to declare an array? | CO2 |
| 8 | List any three string functions | CO2 |
| 9 | Define a pointer. Write the syntax to declare a pointer variable | CO2 |
| 10 | State the importance of “void”. | CO4 |

PART-B

**Note: 1. Answer all the question and making use of internal choice.
2. Each question carries 8 marks**

5 X 8=40M

11(a).Write the C-Programming structure and explain each part of it . CO1
OR

11(b).List and explain different data types supported by C-Language CO1

12(a).Explain all the operators supported by C-language with examples CO2
OR

12(b).Evaluate the following C-Expression and write the final value CO2

$X = ((2 + 6 / 2 + 3 * 6) - ((4 + 6) / 2 + 5) / 10) + 1) / 5.0$

13(a).Write a program to print the following pattern CO3

```

      1
    1 2 1
  1 2 3 2 1
“ “ up to nth level

```

OR

13(b) Explain any four control statements in C-language. CO3

14(a).Write eight differences between structures and unions CO3

(OR)

14(b). Write a C-program to input 3X4 matrix and print in the form of matrix CO3

15(a). Write a program to calculate the factorial of a function using recursive concept with the help of parameter passing and return value CO3 & CO5

(OR)

15(b). Explain any four file handling functions. 2X4=8
CO4

PART-C

Note: Answer the following question, this question carries 10 Marks 1 X10=10M

16. “Is it possible to compile an assembly language program using C compiler” Justify. (CO3)

ENGINEERING DRAWING

Subject Title : **Engineering Drawing**
Subject Code : **AIM-107**
Periods/Week : **06**
Periods Per Year : **180**

TIME SCHEDULE

S.No	Major Topics	No. of Drawing plates	No. Of Periods	Marks to be awarded	Short Answer Questions	Essay type Questions
1	Importance of Engineering Drawing	--	01	-	-	-
2	Engineering Drawing Instruments	01	05	-	-	-
3	Free hand lettering & Numbering	01	06	05	1	-
4	Dimensioning Practice	01	09	05	1	-
5	Geometrical constructions	03	24	15	1	1
6	Projections of Points, Lines, Planes & Auxiliary Planes	03	21	05	1	
7	Projections of Solids	01	12	10		1
8	Sections of Solids	01	21	10	-	1
9	Orthographic Projections	01	30	10	-	1
10	Isometric Views	01	30	10	-	1
11	Development of surfaces	01	21	10	-	1
Total		14	180	80	04	06

Course Objectives and Course Outcomes

Course Objectives		Upon completion of the course the student shall able to understand the basic graphic skills and use them in preparation of engineering drawings, their reading and interpretation	
Course Outcomes	CO 1	AIM107.1	Practice the use of engineering drawing instruments
	CO 2	AIM107.2	Familiarise with the conventions to be followed in engineering drawing as per BIS
	CO 3	AIM -107.3	Construct the i) basic geometrical constructions ii) engineering curves
	CO 4	AIM -107.4	Visualise and draw the orthographic projections of i) Points ii) Lines iii) Regular Planes iv) Regular Solids V) Sections of Regular Solids
	CO 5	AIM -107.5	Visualise and draw the isometric views of machine components
	CO 6	AIM -107.6	Draw the developments of surfaces of regular solids and use them to make the components used in daily life

PO-CO Mapping

Course Code : AIM107	Course Title: ENGINEERING DRAWING Number of Course Outcomes: 06			No. of Periods: 180	
POs	Mapped with CO No.	CO Periods addressing PO in Column 1		Level (1,2,3)	Remarks
		No	%		
PO1	CO2, CO3, CO4, CO5, CO6	50	42	3	>40% Level 3 Highly addressed 25% to 40% Level 2 Moderately Addressed 5 to 25% Level 1 Low addressed <5% Not addressed
PO2	CO1, CO2, CO3, CO4, CO5, CO6	30	25	2	
PO3	CO1, CO2, CO3, CO4, CO5, CO6	30	25	2	
PO4					
PO5					
PO6					
PO7	CO1, CO2, CO3, CO4, CO5, CO6	10	08	1	

AIM107	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2				1	2	3	1
CO2	3	2	2				1	2	3	1
CO3	3	2	2				1	2	3	1
CO4	3	2	2				1	2	3	1
CO5	3	2	2				1	2	3	1
CO6	3	2	2				1	2	3	1

3: High, 2: Moderate, 1: Low

LEARNING OUTCOMES

Upon completion of the course the student shall able to

1.0 Understand the basic concepts of Engineering Drawing

- 1.1 State the importance of drawing as an engineering communication medium
- 1.2 State the necessity of B.I.S. Code of practice for Engineering Drawing.
- 1.3 Explain the linkages between Engineering drawing and other subjects of Mechanical Engineering.

2.0 Use of Engineering Drawing Instruments

- 2.1 Select the correct instruments to draw the different lines / curves.
 - 2.2 Use correct grade of pencil to draw different types of lines and for different purposes
 - 2.3 Select and use appropriate scales for a given application.
 - 2.4 Identify different drawing sheet sizes as per I.S. and Standard Lay- outs.
 - 2.5 Prepare Title block as per B.I.S. Specifications.
 - 2.6 Identify the steps to be taken to keep the drawing clean and tidy.
- Drawing Plate 1: (Having two exercises)

3.0 Write Free Hand Lettering and Numbers

- 3.1 Write titles using vertical lettering and numerals of 7mm, 10mm and 14mm height.
 - 3.2 Write titles using sloping lettering and numerals of 7mm, 10mm and 14mm height.
 - 3.3 Select suitable sizes of lettering for different layouts and applications.
- Drawing plate 2: (Having 5 to 6 exercises)

4.0 Understand Dimensioning Practice

- 4.1 Acquaint with the conventions, notations, rules and methods of dimensioning in engineering drawing as per the B.I.S.
 - 4.2 Dimension a given drawing using standard notations and desired system of dimensioning.
- Drawing Plate 3: (Having 08 to 10 exercises)

5.0 Apply Principles of Geometric Constructions

- 5.1 Practice the basic geometric constructions like i) dividing a line into equal parts
ii) exterior and interior tangents to the given two circles
iii) tangent arcs to two given lines and arcs
 - 5.2 Draw any regular polygon using general method when i) side length is given
ii) inscribing circle radius is given iii) describing circle radius is given
 - 5.2 Draw the conics using general and special methods,
 - 5.3 Draw the engineering curves like i) involute ii) cycloid iii) helix
 - 5.4 Identify the applications of the above constructions in engineering practice.
- Drawing Plate -4: Having problems up to construction of polygon
Drawing Plate -5: Having problems of construction of conics

Drawing Plate -6: Having problems of construction of involute, cycloid and helix

6.0 Projections of points, lines, planes & auxiliary planes

- 6.1 Explain the basic principles of the orthographic projections
- 6.2 Visualise and draw the projection of a point with respect to reference planes (HP&VP)
- 6.3 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)
- 6.4 Visualise and draw the projections of planes (up to planes perpendicular to one plane and inclined to other plane)
- 6.5 Identify the need of Auxiliary views for a given engineering drawing.
- 6.5 Draw the auxiliary views of a given engineering component .

Drawing Plate -7: Having problems up to projection of points and Lines (15 exercises)

Drawing Plate -8: Having problems of projection of planes (6 exercises)

Drawing Plate -9: Having problems on auxiliary planes (Having 4 exercises)

7.0 Draw the Projections of Solids

- 7.1 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)

Drawing plate No.10: Having problems of projection of solids (10 exercises)

8.0 Appreciate the need of Sectional Views

- 8.1 Identify the need to draw sectional views.
- 8.2 Differentiate between true shape and apparent shape of section
- 8.3 Draw sectional views and true sections of regular solids by applying the principles of hatching.

Drawing Plate-11: Having problems of section of solids (6 exercises)

9.0 Apply principles of orthographic projection

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

Drawing Plate 12 : (Having 10 to 12 exercises)

10.0 Prepare pictorial drawings

- 10.1 identify the need of pictorial drawings.
- 10.2 Differentiate between isometric scale and true scale.
- 10.3 Prepare Isometric views from the given orthographic drawings.

Drawing plate 13: (Having 10 to 12 exercises)

11.0 Interpret Development of surfaces of different solids

- 11.1 State the need for preparing development drawing.
- 11.2 Draw the development of simple engineering objects and their truncations (cubes, prisms, cylinders, cones, pyramid)
- 11.3 Prepare development of surface of engineering components like
 - i) funnel ii) 90° elbow iii) Tray

Drawing plate No. 14: (Having 05 exercises)

Competencies and Key competencies to be achieved by the student

S.No	Major topic	Key Competency
1.	Importance of Engineering Drawing	Explain the linkages between Engineering drawing and other subjects of study in Diploma course.
2.	Engineering Drawing Instruments	Select the correct instruments to draw various entities in different orientation
3.	Free hand lettering & Numbering	Write titles using sloping and vertical lettering and numerals as per B.I.S (Bureau of Indian standards)
4.	Dimensioning Practice	Dimension a given drawing using standard notations and desired system of dimensioning
5.	Geometrical construction	Construct ellipse, parabola, rectangular hyperbola, involute, cycloid and helix from the given data.
6.	Projection of points, Lines, Planes & Solids	Draw the projections of points, straight lines, planes & solids with respect to reference planes (HP& VP)
7.	Auxiliary views	- Draw the auxiliary views of a given Engineering component - Differentiate between Auxiliary view and apparent view
8.	Sections of Solids	- Differentiate between true shape and apparent shape of section - Apply principles of hatching. - Draw simple sections of regular solids
9.	Orthographic Projection	Draw the minimum number of views needed to represent a given object fully.
10.	Isometric Views	- Differentiate between isometric scale and true scale. - Draw the isometric views of given objects,.
11.	Development of surfaces	Prepare development of Surface of regular solids and other components like i) funnel ii) 90° elbow iii) Tray

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 The importance of Engineering Drawing

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 – Link between Engineering drawing and other subjects of study.

2.0 Engineering drawing Instruments

Classifications: Basic Tools, tools for drawing straight lines, tools for curved lines, tools for measuring distances and special tools like mini drafter & drafting machine – 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,

3.0 Free hand lettering & numbering

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

4.0 Dimensioning practice

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.

5.0 Geometric Construction

Division of a line: to divide a straight line into given number of equal parts

Construction of tangent lines: to draw interior and exterior tangents to two circles of given radii and centre distance

Construction of tangent arcs:

i) To draw tangent arc of given radius to touch two lines inclined at given angle (acute, right and obtuse angles).

ii)Tangent arc of given radius touching a circle or an arc and a given line.

iii)Tangent arcs of radius R, touching two given circles internally and externally.

Construction of polygon: construction of any regular polygon by general method for given side length, inscribing circle radius and describing/superscribing circle radius

Conics: Explanation of Ellipse, Parabola, Hyperbola, as sections of a double cone and a loci of a moving point, Eccentricity of above curves – Their Engg. Applications viz., Projectiles, reflectors, Cooling Towers, P-V Diagram of a Hyperbolic process - Construction of any conic section of given eccentricity by general method - Construction of ellipse by concentric circles method, Oblong Method and Arcs of circles method - Construction of parabola by rectangle method and Tangent method - Construction of rectangular hyperbola

General Curves: Involute, Cycloid and Helix, explanations as locus of a moving point, their engineering application, viz., Gear tooth profile, screw threads, springs etc. – their construction

6.0 Projection of points, lines and planes & auxiliary views

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 in different quadrants

Projections of straight line -

- (a) Parallel to both the planes.
- (b) Perpendicular to one of the planes.
- (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.

Auxiliary views

Need for drawing auxiliary views -Explanation of the basic principles of drawing an auxiliary views explanation of reference plane and auxiliary plane - Partial auxiliary view.

7.0 Projections of regular solids

- (a) Axis perpendicular to one of the planes
- (b) Axis parallel to VP and inclined to HP and vice versa.

8.0 Sections of Solids

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

9.0 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 engg 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 miter 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.

10.0 Pictorial Drawings

Brief description of different types of pictorial drawing viz., Isometric, oblique, and perspective and their use - Isometric drawings: Isometric axes, angle between them, meaning of visual distortion in dimensions - Need for an isometric scale, difference between Isometric scale, and true scale - difference between Isometric view and Isometric projection - Isometric and non-Isometric lines -Isometric drawing of common features like rectangles, circular - shapes, non-isometric lines – Drawing the isometric views for the given orthographic projections -Use of box / offset method

11.0 Development of Surfaces

Need for preparing development of surface with reference to sheet metal work-Concept of true length of a line with reference to its orthographic projection when the line is (i) parallel to the plane of projection (ii) inclined to one principal and parallel to the other -Development of simple solids like cubes, prisms, cylinders, cones, pyramid and truncation of these solids-Types of development: Parallel line and radial line development -Procedure of drawing development of funnels, 90° elbow pipes, Tray.

REFERENCE BOOKS

Engineering Graphics by P I Varghese – (McGraw-hill)

Engineering Drawing by Basant Agarwal & C.M Agarwal - (McGraw-hill)

Engineering Drawing by N.D.Bhatt.

T.S.M. & S.S.M on “ Technical Drawing” prepared by T.T.T.I., Madras.

SP-46-1998 – Bureau of Indian Standards.

C-20-AIM-107

BOARD DIPLOMA EXAMINATIONS MODEL QUESTION PAPER I-YEAR ENGINEERING DRAWING

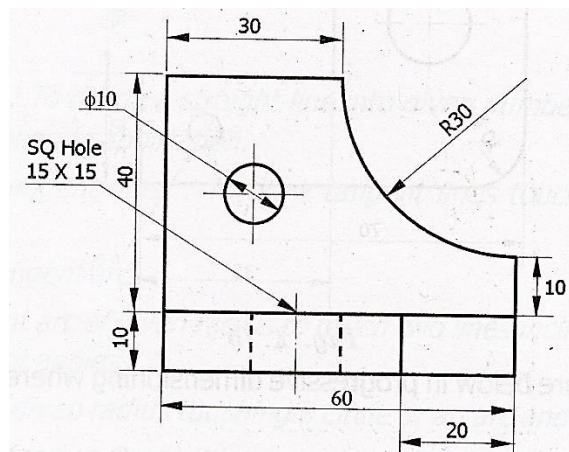
- Instructions:**
01. All the dimensions are in mm
 02. Use first angle projections only
 03. Due weightage will be given for the dimensioning and neatness

PART – A

05 x 04=20

01. Answer all the questions
02. Each question carries FIVE marks

01. Write the following in single stroke capital vertical lettering of size 10mm
ORTHOGRAPHIC PROJECTIONS
02. Redraw the given fig. and dimension it according to SP-46:1988. Assume suitable scale



03. Draw internal common tangents to two unequal circles of radii 26mm and 20mm. The distance between the circles is 75mm.
04. Draw the projections of a regular pentagon of side length 40 mm inclined to the H.P. by 30° and perpendicular to V.P. using auxiliary plane method

PART – B

10 X 04 = 40

01. Answer any FOUR of the following questions
02. Each question carries TEN marks

05. 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.
06. 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.

-

-

1. Chapters 8, 10 and 11 are not required and they may be removed
2. The remaining chapter 1 to 7 & 9 are required and they can be taught only in 90 periods (out of 180 periods allotted)
3. Instead of chapters 8, 10 & 11, Basic 2D and 3D animation practical course may be included for remaining 90 Periods (3 Periods per week)

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

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

COURSE OBJECTIVES	Upon completion of the course the student shall be able to 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 on text files using different file operating modes and file pointers. 7. Write C-programs to implement dynamic memory allocation using pointer concepts
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Course Outcomes		Upon completion of the course the student shall be able to
CO 1	AIM108.1	Perform Edit, compile and debug and execution of C-Programs
CO 2	AIM108.2	Develop programs using different predefined functions, keywords, user defined identifiers
CO 3	AIM108.3	Write different expressions using available C-operators and valid data supported by C-language
CO 4	AIM108.4	Develop C-programs using control statements, array's, structures, unions, files
CO 5	AIM108.5	Develop C-programs using user defined functions and recursion
CO 6	AIM108.6	Develop C-programs to implement dynamic memory concept

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
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=moderately mapped, 1=slightly mapped

LEARNING OUTCOMES:

Fundamentals and Input / Output statements

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

Control statements

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

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

Arrays, structures and unions

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

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

24. Exercise on user-defined function
25. Exercise on storage classes
26. Exercise on parameter passing techniques

27. Exercise on recursion
28. Exercise on pointers
29. Exercise on text files
30. Exercise on macros

The competencies and key competencies to be achieved by the student

S. No	Name of the experiment	Objectives	Key Competencies
1	Exercise on structure of C program	For a given C program, identify the different building blocks	❖ Identify different building block in a C program
2	Exercise on Keywords and identifiers	For a given C program identify the keywords and identifiers	❖ Identify different keywords ❖ Check whether the keywords are in lowercase ❖ Differentiate identifiers and keywords
3	Exercise on constants and variables	For a given C program identify the constants and variables	❖ Identify the constants ❖ Identify the variables ❖ Declare variables with proper names ❖ Know the assignment of values to variables
4	Execution of simple C program	Execute a simple C program	❖ Acquaint with C program editing ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program
5	Exercise on operators and expressions	Write a C program that uses different arithmetic operators	❖ Identify different arithmetic operators ❖ Build arithmetic expressions ❖ Identify the priorities of operators ❖ Evaluate arithmetic expression ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program ❖ Check the output for its correctness
6	Exercise on special operators	Write a C program that uses special operators	❖ Identify different special operators ❖ Build expressions using special operators ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program ❖ Check the output for its correctness
7	Exercise on input and output of characters	Write a C program for reading and writing characters	❖ Know the use of get char() function ❖ Know the use of put char() function ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program ❖ Check whether the correct output is printed for the given input
8	Exercise on formatted input	Write a C program using formatted input and	❖ Know the use of format string for different types of data in scan f()

	and output	formatted output	function ❖ Know the use of format string for different types of data in print f() function ❖ Check whether the data is read in correct format ❖ Check whether the data is printed in correct format
9	Exercise on Escape Sequence Characters	Write a C program using Escape Sequence Characters	❖ Know the use of Escape sequence characters ❖ Use the Escape sequence characters ❖ Check whether the data is read in correct format ❖ Rectify the syntax errors ❖ Check the output for correctness
10	Exercise on simple if statement	Write a C program using simple if statement	❖ Build a relational expression ❖ Use the if statement for decision making ❖ Rectify the syntax errors ❖ Check the output for correctness
11	Exercise on if..else statement	Write a C program using if..else statement	❖ Build a relational expression ❖ Use the if..else statement for decision making ❖ Rectify the syntax errors ❖ Check the output for correctness
12	Exercise on else..if ladder statement	Write a C program using else..if ladder statement	❖ Use else..if ladder statements with correct syntax ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check the output for correctness
13	Exercise on switch statement	Write a C program using switch statement	❖ Use switch statement with correct syntax ❖ Identify the differences between switch and else..if ladder ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check the output for correctness
14	Exercise on conditional operator	Write a C program using (? :) conditional operator	❖ Build the three expressions for conditional operator ❖ Use conditional operator with correct syntax ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Differentiate conditional operator and if..else statement
15	Exercise on while statement	Write a C program using while statement	❖ Build the termination condition for looping ❖ Use while statement with correct syntax ❖ Check whether correct number of iterations are performed by the while loop

			❖ Rectify the syntax errors ❖ Debug logical errors
16	Exercise on for statement	Write a C program using for statement	❖ Build the initial, increment and termination conditions for looping ❖ Use for statement with correct syntax ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check whether correct number of iterations are performed by the for loop ❖ Differentiate for and while statements
17	Exercise on do..while statement	Write a C program using do statement	❖ Build the termination condition for looping ❖ Use do statement with correct syntax ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check whether correct number of iterations are performed by the while loop ❖ Differentiate do..while, while and for statements
18	Exercise on one dimensional arrays	Write a C program to create and access one dimensional array	❖ Create a one dimensional array with correct syntax ❖ Store elements into array ❖ Read elements from array ❖ Validate boundary conditions while accessing elements of array ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
19	Exercise on two dimensional arrays	Write a C program to create and access two dimensional array	❖ Create a two dimensional array with correct syntax ❖ Store elements into array ❖ Read elements from array ❖ Validate boundary conditions while accessing elements of array ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
20	Exercise on strings	Write a C program for reading and writing strings	❖ Declare and initialize string variables ❖ Read strings from keyboard ❖ Print strings to screen
21	Exercise on structure	Write a C program using structure	❖ Define a structure with correct syntax ❖ Identify different members of a structure ❖ Declare a structure variable ❖ Access different members of structure ❖ Observe the size of the structure ❖ Rectify the syntax errors ❖ Debug logical errors

			❖ Check for the correctness of output for the given input
22	Exercise on union	Write a C program using union	❖ Define a union with correct syntax ❖ Identify different members of a union ❖ Declare a union variable ❖ Access different members of union ❖ Observe the size of the union ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
23	Exercise on array of structures	Write a C program to create an array of structures and store and retrieve data from that array	❖ Define a structure with correct syntax ❖ Identify different members of a structure ❖ Declare a structure variable ❖ Create an array of structure ❖ Access individual element of the array of structure ❖ Access different members of structure ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
24	Exercise on user-defined function	Write a C program to define and call user-defined functions	❖ 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
25	Exercise on storage classes	Write a C program using different storage classes	❖ Know the use of different storage classes ❖ Use the different storage classes ❖ Check whether the scope of variables is correctly defined or not. ❖ Rectify the syntax errors ❖ Check the output for correctness
26	Exercise on parameter passing techniques	Write a C program using parameter passing techniques	❖ Know the use of parameter passing ❖ Use the different parameter passing techniques ❖ Check whether the parameters passed correctly or not. ❖ Rectify the syntax errors ❖ Check the output for correctness
27	Exercise on recursion	Write a C program using recursion	❖ Identify where recursive call is made in the function ❖ Validate the termination condition

			❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
28	Exercise on pointers	Write a C program using pointer data type	❖ Declare pointer variable ❖ Initialize pointer variable ❖ Access a variable through its pointer ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
29	Exercise on text files	Write a C program to create a text file, write data into it and read data from it	❖ Define a file pointer ❖ Use the various modes of file opening ❖ Close the file ❖ Write text into file ❖ Read text from file ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
30	Exercise on macros	Write a C program using macros	❖ Know the need of macros ❖ Use the macros/pre processor directives ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input

PHYSICS LAB PRACTICE
(C-20 CURRICULUM COMMON TO ALL BRANCHES)

Subject Title : **Physics Laboratory**
Subject Code : **AIM-109 A**
Periods per week : **03**
Total periods per year : **45**

TIMESCHEDULE

S.No	Name of the Experiment	No.of
1.	Hands on practice on Vernier Calipers	03
2.	Hands on practice on Screw gauge	03
3.	Verification of Parallelogram law of forces and Triangle law of forces	03
4.	Simple pendulum	03
5.	Velocity of sound in air – (Resonance method)	03
6.	Focal length and Focal power of convex lens (Separate & Combination)	03
7.	Refractive index of solid using travelling microscope	03
8.	Boyle's law verification	03
9.	Meter bridge	03
10.	Mapping of magnet lines of force and locate null points	03
	DEMONSTRATION EXPERIMENTS	
11.	Surface tension of liquid using travelling microscope	03
12.	Coefficient of viscosity by capillary method	03
	Revision	06
	Test	03
	Total:	45

Objectives:

Upon completion of the course the student shall be able to

- 1.0 Practice with Vernier calipers to determine the volumes and areas of a cylinder and sphere and their comparison etc .
- 2.0 Practice with Screw gauge to determine thickness of a glass plate, cross sectional area of a wire and volumes of sphere and also their comparison etc
- 3.0 Verify the parallelogram law and Triangle law
- 4.0 Determine the value of acceleration due to gravity using Simple Pendulum
- 5.0 Determine the velocity of sound in air at room temperature and its value at zero degree centigrade
- 6.0 Calculate the Focal length and focal power of convex lenses using distant object method , U-V method , U-V graph and $1/U - 1/V$ graph methods and their comparison.
- 7.0 Determine the refractive index of a solid using travelling microscope
- 8.0 Verify the Boyle's law employing a Quill tube
- 9.0 Determine the specific resistance of material of a wire using Meter Bridge
- 10.0 Drawing magnetic lines of force under N-S and N-N methods and locate null points

- 11.0 Determine the surface tension of a liquid using travelling Microscope (**Demo**)
- 12.0 Determine the viscosity of a liquid using capillary method (**Demo**)

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)	• Find the Least count • Fix the specimen in posit • Read the scales • Calculate the physical quantities of given object	• Read the scales • Calculate the requisite physical quantities of given objects
2. Hands on practice on Screw gauge(03)	• Find the Least count • Fix the specimen in posit • Read the scales • Calculate thickness of glass plate and cross section of wire and other quantities	• 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)	• 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	• Find the angle at equilibrium point • Constructing parallelogram • Construct triangle • Compare the ratios of force and length
4. Simple pendulum(03)	• 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 $l-T$ and $l-T^2$ graph	• Find the time for number of oscillations • Find the time period • Calculate the acceleration due to gravity • Draw $l-T$ and $l-T^2$ graph

5. Velocity of sound in air –Resonance method (03)	• Arrange the resonance apparatus • Adjust the reservoir level for booming sound • Find the first and second resonating lengths • Calculate velocity of sound	• Adjust the reservoir level • Find the first and second resonating lengths • Calculate velocity of sound at room temperature • Calculate velocity of sound at 0°C
6. Focal length and Focal power of convex lens (Separate & Combination) (03)	• 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	• Calculate the focal length and power of convex lens • Draw u-v and $1/u - 1/v$ graphs
7. Refractive index of solid using traveling microscope(03)	• Find the least count of vernier on microscope • Place the graph paper below microscope • Read the scale • Calculate the refractive index of glass slab	• Read the scale • Calculate the refractive index of glass slab
8. Boyle's law verification (03)	• Note the atmospheric pressure • Fix the quill tube to retort stand • Find the length of air column • Find the pressure of enclosed air • Find and compare the calculated value $P \times l$	• Find the length of air column • Find the pressure of enclosed air • Find the value $P \times l$
9. . Meter bridge(03)	• Make the circuit connections • Find the balancing length • Calculate unknown resistance • Find the radius of wire • Calculate the specific resistance	• Find the balancing length • Calculate unknown resistance • Calculate the specific resistance

10. Mapping of magnet lines of force(03)	• 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	• Draw magnetic lines of force • Locate the neutral points along equatorial and axial lines
11. Surface tension of liquid using traveling microscope(03)	• Find the least count of vernier on microscope • Focus the microscope to the lower meniscus & bent pin • Read the scale • Calculate height of liquid rise • Calculate the surface tension of water	• Read the scale • Calculate height of liquid rise • Calculate the surface tension of water
12.. Coefficient of viscosity by capillary method(03)	• Find the least count of vernier • Fix the capillary tube to aspiratory bottle • Find the mass of collected water • Find the pressure head • Calculate rate of volume of liquid collected • Find the radius of capillary tube	• Find the pressure head • Calculate rate of volume of liquid collected • Find the radius of capillary tube • Calculate the viscosity of water

Scheme of Valuation for end Lab Practical Examination :

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

(C-20 curriculum common to all Branches)

Subject Title : **Chemistry Laboratory**
Subject Code : **AIM -109-B**
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

TIMESCHEDULE

S.No	Name of the Experiment	No.of Periods	Mapped with COs
1.	a) Recognition of chemical substances and solutions used in the laboratory by senses. b) Familiarization of methods for Volumetric analysis	03	CO1
2.	Preparation of Std Na_2CO_3 and making solutions of different	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.	Estimation of H_2SO_4 using Std. NaOH solution	03	CO2
6.	Estimation of Mohr's Salt using Std. KMnO_4	03	CO3
7.	Determination of acidity of water sample	03	CO2
8.	Determination of alkalinity of water sample	03	CO2
9.	Determination of total hardness of water using Std. EDTA	03	CO4
10.	Estimation of Chlorides present in water sample	03	CO4
11.	Estimation of Dissolved Oxygen(D.O) in water sample	03	CO5
12.	Determination of pH using pHmeter	03	CO5

13.	Determination of conductivity of water and adjusting ionic	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 and using Std. NaOH solution for estimation of H_2SO_4
- 6.0 Conduct titrations adopting standard procedures and using Std. KMnO_4 solution for estimation of Mohr's Salt
- 7.0 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)
- 8.0 Conduct titrations adopting standard procedures to determine the alkalinity of given samples of water (One ground water and one surface / tap water)
- 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 titrometric / 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
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Familiarization of methods for Volumetric analysis. Recognition of chemical substances And solutions (03)	-	--
Preparation of Std Na_2CO_3 and making solutions of different dilution(03)	▪ Weighing the salt to the accuracy of .01 mg ▪ Measuring the water with volumetric flask, measuring jar, volumetric pipette and graduated pipette ▪ Making appropriate dilutions	▪ Weighing the salt to the accuracy of .01 mg ▪ Measuring the water with volumetric flask, measuring jar, volumetric pipette and graduated pipette ▪ Making appropriate dilutions
Name of the Experiment (No of Periods)	Competencies	Key competencies
Estimation of HCl solution using Std. Na_2CO_3 solution (03)	▪ Cleaning the glassware and rinsing with appropriate solutions ▪ Making standard solutions ▪ Measuring accurately the standard solutions and titrants ▪ Filling the burette with titrant ▪ Fixing the burette to the stand ▪ Effectively Controlling the flow of the titrant ▪ Identifying the end	▪ 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)		
Estimation of H_2SO_4 using Std. NaOH solution (03)		
Estimation of Mohr's Salt using Std. KMnO_4 (03)		
Determination of acidity of water sample (03)		
Determination of alkalinity of water sample (03)		
Determination of total hardness of water using Std. EDTA solution (03)		

Estimation of Dissolved Oxygen(D.O)in water sample (By titration method) (03)	point ▪ Making accurate observations ▪ Calculating the results	
Estimation of Dissolved Oxygen(D.O)in water sample (By electrometric method) (03)	▪ Familiarize with instrument ▪ Choose appropriate 'Mode' / 'Unit' ▪ Prepare standard solutions / buffers, etc. ▪ Standardize the instrument with appropriate standard solutions ▪ Plot the standard curve ▪ Make measurements accurately ▪ Follow Safety precautions	▪ Prepare standard solutions / buffers, etc. ▪ Standardize the instrument with appropriate standard solutions ▪ Plot the standard curve ▪ Make measurements accurately
Determination of pH using pH meter (03)		
Determination of conductivity of water and adjusting ionic strength to required level (03)		
Determination of turbidity of water (03)		
Name of the Experiment (No of Periods)	Competencies	Key competencies

Estimation of total solids present in water sample (03)	- Measuring the accurate volume and weight of sample - Filtering and air drying without losing any filtrate - Accurately weighing the filter paper, crucible and filtrate - Drying the crucible in an oven	- Measuring the accurate volume and weight of sample - Filtering and air drying without losing any filtrate - Accurately weighing the filter paper, crucible and filtrate
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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-110 (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	

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

CO-PO/PSO MATRIX

CO NO.	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM110.1	3	3	3	3	3	3	3	3	2	3
AIM - 110.2	3	3	3	3	3	3	3	3	2	3
AIM - 110.3	3	3	3	3	3	3	3	3	2	3
AIM - 110.4	3	3	3	3	3	3	3	3	2	3
AIM -	3	3	3	3	3	3	3	3	2	3

110.5										
Average	3	3	3	3	3	3	3	3	2	3

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

Learning Outcomes:

I. Computer Hardware Basics

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

II. Windows's operating system

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

III. Practice with MS-WORD

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

IV. Practice with MS-EXCEL

13. To familiarize with MS-EXCEL layout
14. To access and enter data in the cells
15. To edit a spread sheet- Copy, Cut, Paste, and selecting Cells
16. To use built in functions and Formatting Data
17. To create Excel Functions, Filling Cells

18. To enter a Formula for automatic calculations
19. To sort and filter data in table.
20. To present data using Excel Graphs and Charts.
21. To develop lab reports of respective discipline.
22. To format a Worksheet in Excel, Page Setup and Print

V. Practice with MS-POWERPOINT

23. To familiarize with Ribbon layout features of PowerPoint 2007.
24. To create a simple PowerPoint Presentation
25. To set up a Master Slide in PowerPoint
26. To insert Text and Objects
27. To insert a Flow Charts
28. To insert a Table
29. To insert a Charts/Graphs
30. To insert video and audio
31. To practice Animating text and objects
32. To Review 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	a. Identify the parts of a Computer system: i). CPU ii). Mother Board iii) Monitor iv) CD/DVD Drive v) Power Switch vi) Start Button vii) Reset Button b. Identify and connect various peripherals c. Identify and connect the cables used with computer system d. Identify various ports on CPU and connect Keyboard & Mouse	Connect cables to external hardware and operate the computer
(b).	To Start and Shut down Computer correctly	a. Log in using the password b. Start and shut down the computer c. Use Mouse and Key Board	a. Login and logout as per the standard procedure b. Operate mouse & Key Board
(c).	To Explore Windows Desktop	a. Familiarize with Start Menu, Taskbar, Icons and Shortcuts b. Access application programs using Start menu, Task manager c. Use Help support	a. Access application programs using Start menu b. Use taskbar and Task manager
2.	To check the software details of the computer	a. Find the details of Operating System being used b. Find the details of Service Pack installed	Access the properties of computer and find the details
3.	To check the hardware present in your computer	a. Find the CPU name and clock speed b. Find the details of RAM and Hard disk present c. Access Device manager using Control Panel and check the status of devices like mouse and key board d. Use My Computer to check the details of Hard drives and partitions e. Use the Taskbar	a. Access device manager and find the details b. Type /Navigate the correct path and Select icon related to the details required
4.	Working with Files and Folders	a. Create folders and organizing files in different folders b. Use copy / paste move commands to organize files	a. Create files and folders Rename , arrange and search for the required

		and folders	folder/file
	Working with Files and Folders Continued....	c. Arrange icons – name wise, size, type, Modified d. Search a file or folder and find its path e. Create shortcut to files and folders (in other folders) on Desktop f. Familiarize with the use of My Documents g. Familiarize with the use of Recycle Bin	b. Restore deleted files from Recycle bin
5.	To use Windows Accessories: Calculator – Notepad – WordPad – MS Paint	a. Familiarize with the use of Calculator b. Access Calculator using Run command c. Create Text Files using Notepad and WordPad and observe the difference in file size d. Use MS paint and create .jpeg, .bmp files using MS Paint	a. Use windows accessories and select correct text editor based on the situation. b. Use MS paint to create /Edit pictures and save in the required format.
6.	To familiarize with Ribbon layout of MS word. – Home – Insert- page layout- References-Review-View	a. Create/Open a document b. Use Save and Save as features c. Work on two Word documents simultaneously d. Choose correct Paper size and Printing options	a. Create a Document and name appropriately and save b. Set paper size and print options
7.	To practice Word Processing Basics	a. Typing text b. Keyboard usage c. Use mouse (Left click / Right click / Scroll) d. Use Keyboard shortcuts e. Use Find and Replace features in MS- word f. Use Undo and Redo Features g. Use spell check to correct Spellings and Grammar	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	a. Formatting Text b. Formatting Paragraphs c. Setting Tabs d. Formatting Pages e. The Styles of Word f. Insert bullets and numbers g. Themes and Templates h. Insert page numbers, header and footer	a. Format Text and paragraphs and use various text styles. b. Use bullets and numbers to create lists c. Use Templates /Themes d. Insert page numbers date, headers and footers

9.	To insert a table of required number of rows and columns	a. Edit the table by adding the fields – Deleting rows and columns –inserting sub table – marking borders. Merging and splitting of cells in a Table b. Changing the background colour of the table c. Use table design tools d. Use auto fit – fixed row/ column height/length – Even distribution of rows / columns features e. Convert Text to table and Table to Text f. Use Sort feature of the Table to arrange data in ascending/descending order	a. Insert table in the word document and edit b. Use sort option for arranging data.
10.	To Insert objects, clipart and Hyperlinks	a. Create a 2-page document. &Insert hyperlinks and t Bookmarks. b. Create an organization chart c. Practice examples like preparing an Examination schedule notice with a hyperlink to Exam schedule table.	a. Insert hyperlinks &Bookmarks b. Create organization charts/flow charts
11.	To Use Mail merge feature of MS Word	a. Use mail merge to prepare individually addressed letters b. Use mail merge to print envelopes.	Use Mail merge feature
12.	To use Equations and symbols features.	a. Explore various symbols available in MS Word b. Insert a symbol in the text c. Insert mathematical equations in the document	Enter Mathematical symbols and Equations in the word document
13.	To Practice with MS-EXCEL	a. Open /create an MS Excel spreadsheet and familiarize with MS Excel 2007 layout like MS office Button- b. Use Quick Access Toolbar- Title Bar- Ribbon- Worksheets- Formula Bar- Status Bar	a. Familiarize with excel layout and use b. Use various features available in toolbar
14.	To access and Enter data in the cells	a. Move Around a Worksheets- Quick access -Select Cells b. Enter Data-Edit a Cell-Wrap Text-Delete a Cell Entry-Save	a. Access and select the required cells by various addressing methods

		a File-Close Excel	b. Enter data and edit
15.	To edit spread sheet Copy, Cut, Paste, and selecting cells	a. Insert and Delete Columns and Rows-Create Borders-Merge and Center b. Add Background Color-Change the Font, Font Size, and Font Color c. Format text with Bold, Italicize, and Underline-Work with Long Text-Change a Column's Width	Format the excel sheet
16.	To use built in functions and Formatting Data	a. Perform Mathematical Calculations verify -AutoSum b. Perform Automatic Calculations-Align Cell Entries	Use built in functions in Excel
17.	To enter a Formula for automatic calculations	a. Enter formula b. Use Cell References in Formulae c. Use Automatic updating function of Excel Formulae d. Use Mathematical Operators in Formulae e. Use Excel Error Message and Help	Enter formula for automatic calculations
18.	To Create Excel Functions, Filling Cells	a. Use Reference Operators b. Work with sum, Sum if , Count and Count If Functions c. Fill Cells Automatically	a. Create Excel sheets involving cross references and equations b. Use the advanced functions for conditional calculations
19.	To sort and filter data in table	a. Sort data in multiple columns b. Sort data in a row c. Sort data using Custom order d. Filter data in work sheet	a. Refine the data in a worksheet and keep it organized b. Narrow a worksheet by selecting specific choice
20.	To Practice Excel Graphs and Charts	a. Produce an Excel Pie Chart b. Produce c. Excel Column Chart	a. Use data in Excel sheet to Create technical charts and graphs Produce Excel Line Graph b. Produce a Pictograph in Excel
21.	To develop lab reports of respective discipline	Create Lab reports using MS Word and Excel	a. Insert Practical subject name in Header and page numbers in Footer

22.	To format a Worksheet in Excel, page setup and print	a. Shade alternate rows of data b. Add currency and percentage symbols c. Change height of a row and width of a column d. Change data alignment e. Insert Headers and Footers f. Set Print Options and Print	a. Format Excel sheet b. Insert headers & footers and print
23.	To familiarize with Ribbon layout & features of PowerPoint 2007.	Use various options in PowerPoint a. Home b. Insert c. Design d. Animation e. Slideshow f. View g. Review	Access required options in the tool bar
24.	To create a simple PowerPoint Presentation	a. Insert a New Slide into PowerPoint b. Change the Title of a PowerPoint Slide c. PowerPoint Bullets d. Add an Image to a PowerPoint Slide e. Add a Textbox to a PowerPoint slide	a. Create simple PowerPoint presentation with photographs/ClipArt and text boxes b. Use bullets option
25.	To Set up a Master Slide in PowerPoint and add notes	a. Create a PowerPoint Design Template b. Modify themes c. Switch between Slide master view and Normal view d. Format a Design Template Master Slide e. Add a Title Slide to a Design Template f. The Slide Show Footer in PowerPoint g. Add Notes to a PowerPoint Presentation	a. Setup Master slide and format b. Add notes

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

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

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

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

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

III SEMESTER

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

CURRICULUM-2020 (III Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Semester	Scheme Of Examinations			
		Theor y	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-301	Mathematics –II	4		60	3	20	80	100
AIM-302	Python programming	5	-	75	3	20	80	100
AIM-303	Operating Systems	4	-	60	3	20	80	100
AIM-304	Digital Electronics & Computer Organization	6	-	90	3	20	80	100
AIM-305	DBMS	6	-	60	3	20	80	100
PRACTICAL SUBJECTS								
AIM-306	Python Programming Lab	-	3	45	3	40	60	100
AIM-307	Computer Hardware & Network Maintenance Lab	-	6	90	3	40	60	100
AIM-308	DBMS Lab	-	4	60	3	40	60	100
AIM-309	Multimedia Lab		4	60	3	40	60	100
	Total	25	17	630		260	640	900

AIM-301 common with all branches

AIM-302,306,307 common with DCBDE, DCCNE

AIM-303 common with DCCNE

AIM-304 common with DCBDE and common with DCCNE-403

AIM-305, 308,309 common with DCME, DCBDE, DCCNE

C-20

ENGINEERING MATHEMATICS-II

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	Indefinite Integration	22	CO1
2	Definite Integration and its applications	24	CO2
3	Differential Equations of first order	14	CO3
Total Periods		60	

Course Objectives	(i) To understand the concepts of indefinite integrals and definite integrals with applications to engineering problems. (ii) To understand the formation of differential equations and learn various methods of solving them.
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Course Outcomes	Upon completion of the course the student shall be able	
	CO1	Integrate various functions using different methods.
	CO2	Evaluate definite integrals with applications.
	CO3	Obtain differential equations and solve differential equations of first order and first degree.

ENGINEERING MATHEMATICS – II

Learning Outcomes

Unit-I

C.O. 1 Integrate various functions using different methods.

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 Integrals $\int (u + v) dx$ and $\int ku dx$ where k is constant and u, v are functions of x .

1.3. Solve integration 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 $f(x)dx$ 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 integrals of the form $\int \sin^m x \cos^n x dx$ where m and n are suitable positive integers.

1.7. Evaluate integrals of suitable powers of $\tan x$ and $\sec x$.

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

1.9. Evaluate the integrals of the type

$$\int \frac{1}{a+b\sin\theta} d\theta, \int \frac{1}{a+b\cos\theta} d\theta \text{ and } \int \frac{1}{a\cos\theta+b\sin\theta+c} d\theta.$$

1.10. Evaluate integrals using decomposition method.

1.11. Solve problems using integration by parts.

1.12 Use Bernoulli's rule for evaluating the integrals of the form $\int u.v dx$.

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

Unit-II

C.O.2 Evaluate definite integrals with applications.

L.O.2.1. State the fundamental theorem of integral calculus

2.2. Explain the concept of definite integral.

2.3. Solve problems on definite integrals over an interval using the above concept.

2.4. State various properties of definite integrals.

2.5. Evaluate simple problems on definite integrals using the above properties.

Syllabus for Unit test-I completed

2.6. Explain definite integral as a limit of sum by considering an area.

2.7. Find the areas under plane curves and area enclosed between two curves using integration.

2.8. Obtain the mean value and root mean square value of the functions in any given interval.

2.9. Obtain the volumes of solids of revolution.

2.10. Solve some problems using Trapezoidal rule, Simpson's 1/3 rule for approximation of integrals.

Unit -III

C.O. 3 Form differential equations and solve differential equations of first order and first degree.

L.O.3.1. Define a Differential equation, its order and degree

3.2 Find order and degree of a given differential equation.

3.3 Form a differential equation by eliminating arbitrary constants.

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

3.5 Solve Homogeneous differential equation of first order and first degree.

3.6 Solve exact differential equation of first order and first degree.

3.7 Solve linear differential equation of the form $dy/dx + Py = Q$, where P and Q are functions of x or constants.

3.8 Solve Bernoulli's differential equation reducible to linear form.

3.9 Solve simple problems arising in engineering applications.

Syllabus for Unit test-II completed

Engineering Mathematics – II

CO/PO – Mapping

AIM-301	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	2				3	1	2
CO2	3	3	3	3				3	3	3
CO3	3	3	3	3				3	3	3
Avg	3	2.6	2.6	2.6				3	2.3	2.6

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 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 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.

C-20

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	60	100%	3	>40% Level 3 Highly addressed
2	CO1, CO2, CO3	60	100%	3	
3	CO1, CO2, CO3	60	100%	3	
4	CO2, CO3	38	63.3%	3	25% to 40% Level 2 Moderately addressed
5					
6					
7					
PSO 1	CO1, CO2, CO3	60	100%	3	5% to 25% Level 1 Low addressed
PSO 2	CO1, CO2, CO3	40	66.6%	3	
PSO 3	CO1, CO2, CO3	48	75%	3	
					<5% Not addressed

ENGINEERING MATHEMATICS – II

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 $\tan x$, $\cot x$, $\sec x$, $\operatorname{cosec} x$. Integrals of the form $\int \sin^m x \cdot \cos^n x \, dx$, where at least one of m and n is odd positive integers. Integrals of suitable powers of $\tan x$, $\sec x$ and $\operatorname{cosec} x \cdot \cot x$ by substitution.

Evaluation of integrals which are reducible to the following forms:

$$\begin{aligned} \text{i)} & \frac{1}{a^2 + x^2}, \frac{1}{a^2 - x^2}, \frac{1}{x^2 - a^2} \\ \text{ii)} & \frac{1}{\sqrt{a^2 + x^2}}, \frac{1}{\sqrt{a^2 - x^2}}, \frac{1}{\sqrt{x^2 - a^2}} \\ \text{iii)} & \sqrt{x^2 - a^2}, \sqrt{x^2 + a^2}, \sqrt{a^2 - x^2} \end{aligned}$$

Integration by decomposition of the integrand into simple rational, algebraic functions.

Integration by parts, Bernoulli's rule and integrals of the form $\int e^x [f(x) + f'(x)] \, dx$.

Unit-II**Definite Integral and its applications:**

2. Definite integral-fundamental theorem of integral calculus, properties of definite integrals, evaluation of simple definite integrals. Definite integral as the limit of a sum. Area under plane curves – Area enclosed between two curves. Mean and RMS values of a function on a given interval. Volumes of solids of revolution. Trapezoidal rule, Simpson's 1/3 rule to evaluate an approximate value of a definite integral.

Unit -III

Differential Equations:

3. 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, homogeneous, exact, linear differential equation, Bernoulli's equation.

Textbook:

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

Reference Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. Schaum's Outlines Differential Equations, Richard Bronson & Gabriel B. Costa
3. M.Vygodsky, Mathematical Handbook: Higher Mathematics, Mir Publishers, Moscow.

BLUE PRINT

S. No	Chapter/ Unit title	No of Periods	Weightage allotted	Marks wise distribution of weightage				Question wise distribution of weightage				COs mapped
				R	U	Ap	An	R	U	Ap	An	
1	Unit – I: Indefinite Integration	22	28	11	11	06	0	2	2	2	0	CO1
2	Unit – II: Definite Integration and its applications	24	33	11	03	11	08	2	1	2	1	CO2
3	Unit – III: Differential Equations of first order	14	19	03	03	03	10	1	1	1	1	CO3
Total		60	80	25	17	20	18	5	4	5	2	

R: Remembering Type : 25 Marks

U: understanding Type : 17 Marks

Ap: Application Type : 20 Marks

An: Analysing Type : 18 Marks

C-20

Engineering Mathematics – II

Unit Test Syllabus

Unit Test	Syllabus
Unit Test-I	L.O 1.1 to L.O 2.5
Unit Test-II	L.O 2.6 to L.O 3.9

UNIT TEST MODEL PAPERS

Unit Test I

C –20, AIM-301

State Board of Technical Education and Training, A. P

III SEM

Subject name: **Engineering Mathematics-II**

Sub Code: **AIM-301**

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. Evaluate $\int x^8 dx$

(CO1)

b. Evaluate $\int \frac{1}{\sqrt{4-x^2}} dx$.

(CO1)

c. $\int e^x (f(x) + f'(x)) dx = e^x f(x) + c$ is true/false

(CO1)

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

(CO2)

2. Evaluate $\int \left(3 \cos e^{c^2 x} - 2 \tan x \sec x + \frac{1}{x} \right) dx$.

(CO1)

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

(CO1)

4. Evaluate $\int e^x \sin 2x dx$. (CO1)

5. Evaluate $\int_0^{\frac{\pi}{2}} \sin^2 x dx$ (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) Evaluate $\int \frac{1}{5+4\cos x} dx$. (CO1)
or

B) Evaluate $\int \sin^4 x \cos^3 x dx$. (CO1)

7. A) Evaluate $\int \cos^{-1} \left(\frac{1-x^2}{1+x^2} \right) dx$. (CO1)
or

B) Evaluate $\int x^4 e^{2x} dx$.
(CO1)

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

(CO2)

or

B) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sin^{10} x}{\sin^{10} x + \cos^{10} x} dx$ (CO2)

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Unit Test II

C –20, AIM-301

State Board of Technical Education and Training, A. P

III SEM

Subject name: **Engineering Mathematics-II**

Sub Code: **AIM-301**

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. Volume of the curve $y = f(x)$ over the interval $[a, b]$ when rotated about X-axis is

(CO2)

b. Mean value of $f(x)$ over the interval $[a, b]$ is_____

(CO2)

c. Order of differential equation $\frac{d^2y}{dx^2} + p^2y = 0$ is_____

(CO3)

d. Integrating factor of $\frac{dy}{dx} + Py = Q$ is_____

(CO3)

2. Find the mean value of $x^2 + 2x + 1$ over the interval $[1, 2]$

(CO2)

3. Find the area enclosed by curve $x^2 = 4y$ between the lines $x = 2$ and $x = 4$ (CO2)
4. Form the differential equation by eliminating the arbitrary constants from $y = A \cos 2x + B \sin 2x$.
(CO3)
5. Solve $\frac{dy}{dx} = \sqrt{\frac{1-y^2}{1-x^2}}$. (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) Find the area bounded between the curve $y = x^2 - 5x$ and the line $y = 4 - 2x$ (CO2)
Or
B) Find the R.M.S value of $\sqrt{\log x}$ between the lines $x = e$ to $x = e^2$ (CO2)
7. A) Find the volume of the solid obtained by revolving the ellipse $\frac{x^2}{16} + \frac{y^2}{25} = 1$ about x axis
(CO2)
or
B) Calculate the approximate value of $\int_0^6 \frac{1}{1+x} dx$ by taking $n = 6$ using Trapezoidal rule
(CO3)
8. A) Solve $(y^2 - 2xy)dx + (2xy + x^2)dy = 0$. (CO3)
or
B) Solve $x \frac{dy}{dx} + \frac{y}{x} = x^3 y^6$. (CO3)

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END EXAM MODEL PAPERS

STATE BOARD OF TECHNICAL EDUCATION, A.P

ENGINEERING MATHEMATICS AIM - 301

TIME : 3 HOURS

MODEL PAPER- I

MAX.MARKS : 80M

PART-A

Answer All questions. Each question carries THREE marks. 10x3=30M

1. Evaluate $\int \left(2 \sin x - 3e^x + \frac{4}{1+x^2} \right) dx$. CO 1

2. Evaluate $\int e^x \sin e^x dx$. CO 1

3. Evaluate $\int \sin 3x \cos 2x dx$. CO 1

4. Evaluate $\int xe^x dx$. CO1

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

6. Find the mean value of $y = x^2$ from $x = 0$ to $x = 1$ CO 2

7. Find the area of the region bounded by the curve $y = \sin x$ from $x = 0$ to $x = \pi$
CO 2

8. Find the order and degree of the differential equation $\left(\frac{d^3 y}{dx^3} \right)^2 - 3 \left(\frac{dy}{dx} \right)^2 - x^2 = 1$

CO3

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

CO3

10. Solve $(x^2 + y)dx + (y^2 + x)dy = 0$. CO3

PART-B

Answer All questions. Each question carries EIGHT marks.

5x8=40M

11. A) Evaluate $\int \frac{3x+1}{(x-1)(x+3)} dx$. **CO1**

Or

B) Evaluate $\int \frac{1}{5+4\cos x} dx$. **CO1**

12. A) Evaluate $\int x \sin 3x \cos x dx$. **CO1**

Or

B) Evaluate $\int x^3 \cos x dx$. **CO1**

13. A) Evaluate $\int_0^1 \frac{x^3}{1+x^8} dx$. **CO2**

Or

B) Evaluate $\int_0^{\frac{\pi}{2}} \frac{1}{1+\tan^3 x} dx$. **CO2**

14. A) Find the area of the region bounded by the curves $y^2 = 4x$ and $x^2 = 4y$. **CO2**

Or

B) Find the R.M.S values of $\sqrt{27-4x^2}$ from $x=0$ to $x=3$ **CO2**

15. A) Find the volume of the solid generated by revolution of the ellipse $\frac{x^2}{16} + \frac{y^2}{25} = 1$

about X-axis

CO2

Or

B) Calculate the approximate value of $\int_1^{11} x^3 dx$ by using Simpson's 1/3rd rule by dividing the range into 10 equal parts. **CO2**

PART-C

Answer the following question. Question carries TEN marks.

1x10=10M

16. Solve $2 \sin x \frac{dy}{dx} - y \cos x = xy^3 e^x$. **CO3**

STATE BOARD OF TECHNICAL EDUCATION, A.P

ENGINEERING MATHEMATICS AIM-301

TIME : 3 HOURS

MODEL PAPER-II

MAX.MARKS :

80M

PART-A

Answer All questions. Each question carries THREE marks.

10x3=30M

1. Evaluate $\int \left(3e^x - 2 \cos x + \frac{3}{x} \right) dx$. CO 1

2. Evaluate $\int \cos^2 2x dx$. CO 1

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

4. Evaluate $\int x \cos x dx$. CO1

5. Evaluate $\int_0^2 \frac{1}{\sqrt{4-x^2}} dx$. CO2

6. Find the mean value of $i = a \sin t$ over the complete wave. CO2

7. Find the volume generated by revolving the circle $x^2 + y^2 = 9$ from $x = 0$ to $x = 2$ about x-axis

CO2

8. Obtain the differential equation by eliminating the arbitrary constants A and B from the curve $y = Ae^x + Be^{-x}$

CO3

9. Solve $\frac{dy}{dx} = e^{2x+y}$

CO3

10. Solve $\frac{dy}{dx} + \frac{y}{x} = x$ CO3

PART-B

Answer All questions. Each question carries EIGHT marks. 5x8=40M

11. A) Evaluate $\int \frac{1}{2x^2 + 3x + 5} dx$. **CO1**

Or

B) Evaluate $\int \sin^3 x \cos^5 x dx$. **CO1**

12. A) Evaluate $\int e^x \left(\frac{2 + \sin 2x}{1 + \cos 2x} \right) dx$. **CO1**

Or

B) Evaluate $\int e^{2x} x^4 dx$. **CO1**

13. A) Evaluate $\int_0^1 \frac{\sec^2 x}{(1 + \tan x)^2} dx$. **CO2**

Or

B) Evaluate $\int_0^{\frac{\pi}{2}} \log(1 + \tan \theta) d\theta$. **CO2**

14. A) Find the area bounded between the curves $y = x^2$ and the line $y = 3x + 4$. **CO3**

Or

B) Find the R.M.S value of $\sqrt{\log x}$ between the lines $x = e$ to $x = e^2$ **CO2**

15. A) Find the volume of right circular cone using integration.

CO2

Or

B) Find the approximate value of π from $\int_0^1 \frac{1}{1+x^2} dx$ using Trapezoidal rule by

dividing $[0,1]$ into 5 equal sub-intervals.

CO2

PART-C

Answer the following question. Question carries TEN marks.

1x10=10M

16. Solve $xy^2 dy - (x^3 + y^3) dx = 0$ CO3

Curriculum Gaps identified in this subjects:

- 1 Unit-I: Indefinite Integration and part of Unit-II: Definite Integration are required for AIML branch
- 2 Part of Unit-II: Applications of Definite Integration and Unit-III are not required
- 3 Instead of Part of Unit-II: Applications of Definite Integration and Unit-III, Concepts of Discrete Mathematical Structures may be included which is essential for AIML branch students.

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-302	Python Programming	5	75	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Python Programming Introduction	10(4,6)	CO1, CO2
2.	Standard Data Types and Control Flow	15(2,13)	CO1,CO2
3.	Data Structures	15(2,2,11)	CO1,CO2,CO3
4.	Functions	15(2,1,12)	CO1, CO2,CO4
5.	Object Oriented Programming in Python and File Handling and Exception Handling	20(2,1,17)	CO1,CO2,CO5
Total Periods		75	

Course Objectives	i)To know the fundamentals Python programming ii)To understand fundamental syntactic information about 'Python' iii) To develop various python programs
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Course Outcomes	At the end of the course the student will be able to:		
	CO1	AIM-302.1	Explain Basic constructs like operators, expressions and components of python programming as well as Editing and Debugging
	CO2	AIM-302.2	Write Python programs using expressions, operators, Control statements, Loops
	CO3	AIM-302.3	Develop Python programs using Data structures
	CO4	AIM-302.4	Write python programs using Functions
	CO5	AIM-302.5	Develop Python application programs using OOP Concept, FILES, Exception

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-302.1	3	1	2	1	1	1		2	1	
AIM-302.2	3	2	2	1	1	1	1	2	2	2
AIM-302.3	3	2	2	1	1	1		2	2	2
AIM-302.4	3	1	2	1	2	3	1	2	2	2
AIM-302.5	3	1	2	1	1	3	2	2	2	2
AIM-302.6	3	1	2	3	2	3	2	2	2	1
Average	3	1.3	2	1.3	1.3	2	1.3	2	1.8	1.8

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

Learning Outcomes:**1.0 Introduction**

- 1.1. History of Python.
- 1.2. Python features
- 1.3. Applications of Python
- 1.4. Know about Python Integrated Development and Learning Environment (IDLE)
- 1.5. Running Python Scripts
- 1.6. Identifiers, Keywords, Indentation, Variables
- 1.7. Input and Output
- 1.8. Operators
- 1.9. Operator precedence
- 1.10. Steps in Develop a simple python program and execution

2.0 Standard Data Types and Control Flow

- 2.1. Know the different object (data) types present in Python.
- 2.2. Control Flow
 - 2.2.1 If
 - 2.2.2 If-Else
 - 2.2.3 For Loop
 - 2.2.4 While loop
 - 2.2.5 Break
 - 2.2.6 Continue

3.0 Understand Data Structures

- 3.1. Python Lists
- 3.2. Basic List Operations
- 3.3. Built-in List Functions and Methods
- 3.4. Tuples
- 3.5. Sets
- 3.6. Dictionaries

4.0 Function Basics

- 4.1 Introduction
- 4.2 Function Arguments: Default arguments, Variable Length arguments
- 4.3 Anonymous Functions
- 4.4 Return Statement
- 4.5 Scope of variables: Local Variables and Global Variables
- 4.6 Python Variable: Namespace and scoping
- 4.7 Python Packages

5.0 Object Oriented Programming in Python and File Handling and Exception Handling

- 5.1 Creating Classes
- 5.2 Creating Objects
- 5.3 Method Overloading and Overriding
- 5.4 Data Hiding
- 5.5 Data Abstraction
- 5.6 Opening files in different modes
- 5.7 Processing files
- 5.8 Closing a file
- 5.9 Exception Handling

COURSE CONTENT

UNIT – I:

Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Python IDLE, Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation- Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations

UNIT – II:

Standard Data Types and Control Flow : Types - Integers, Strings, Booleans Control Flow- if, if-elif-else, for, while, break, continue, pass

UNIT – III:

Data Structures Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences, Comprehensions.

UNIT – IV:

Functions - 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

UNIT – V:

Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding,

File Handling: Open Files, File Processing and Closing a File

Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions

REFERENCE BOOKS

1. Python Programing by K. Nageswara Rao, Shaikh Akbar - Scitech Publications (India) Pvt. Ltd.
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
3. Learning Python, Mark Lutz, Orielly
4. Think Python, Allen Downey, Green Tea Press
5. Core Python Programming, W.Chun, Pearson.
6. Introduction to Python, Kenneth A. Lambert, Cengage

ModelBlue 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	Ap	An	
1	Python Programming Introduction	10	11	3	8			1	1			CO1, CO2
2	Standard Data Types and Control Flow	15	14	3	8	3	10*	1	1	1	*	CO1,CO2
3	Data Structures	15	14	3	3	8	10*	1	1	1	*	CO1,CO2,CO3
4	Functions	15	14	3	3	8	10*	1	1	1	*	CO1, CO2,CO4
5	Object Oriented Programming in Python and File Handling and Exception Handling	20	17	3	6	8	10*	1	2	1	*	CO1,CO2,CO5
	Total *	75	70+10*	20	23	27	10*	5	6	4	1	

Note: Part-C: 10 marks single analytical question may be chosen from any one of starred chapters.

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

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.4
Unit test-2	From 3.5 to 5.9

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
Python Programming
UNIT TEST-1**

SCHEME : C-20

SUBJ

CODE : AIM-302

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) Mathematical operations can be performed on a string.(True/False) (CO1)
- b) _____ has 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-20

SUBJ

CODE: AIM-302

MAX MARKS:80

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 |
| | Or | |
| | Explain about running Python scripts. | CO1 |
| 12. | Explain about different data types in Python. | CO1 |
| | or | |
| | Explain different conditional control flow statements in Python with examples. | CO2 |
| 13. | Explain in detail about dictionaries in Python. | CO3 |
| | or | |
| | Write in brief about Sequence operations with suitable examples in python . | CO3 |
| 14. | Explain how to create a user defined exceptions. | CO5 |
| | or | |
| CO5 | What are the two ways of importing a module? Which one is more beneficial? Explain. | |
| 15. | Explain how to implement inheritance in Python. | |
| | CO5 | |
| | Or | |
| | How to handle an exception using try except block? Explain with the help of a program. | |
| | CO5 | |

PART – C

1X10=10Marks

16. Write a Python program to read a word and print the number of letters, vowels and percentage of vowels in the word using a dictionary. CO1,CO2, CO3,CO4

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
3.	Synchronization & Deadlocks	12	CO3

4.	Memory management	12	CO4
5.	Disk scheduling and File management	12	CO5
Total Periods		60	

Course Objectives	Upon completion of the course the student shall be able		
	i) To know about the basics of Operating Systems ii) To familiarize with process management, Scheduling algorithms, Synchronization and deadlock techniques iii) To understand various Memory management techniques iv) To familiarize with File management		

Course Out comes	Upon completion of the course the student shall be able		
	CO1	AIM-303.1	Explain basic concepts of Operating System
	CO2	AIM-303.2	Analyse a given 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	2	2	2	3	2	3	2	3	3	2
AIM-303.6	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 of 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 Define Process synchronization
- 3.2 Describe semaphores
- 3.3 Explain inter process communication
- 3.4 Define Deadlock
- 3.5 State the necessary conditions for arising deadlocks
- 3.6 State various techniques for deadlock prevention
- 3.7 Discuss Deadlock avoidance and detection
- 3.8 Describe the process of recovering from deadlock

4.0 Memory management

- 4.1 Discuss Memory Hierarchy.
- 4.2 Describe briefly address binding, dynamic loading, dynamic linking
- 4.3 Define overlays
- 4.4 Describe briefly on swapping
- 4.5 Explain single partition allocation
- 4.6 Explain multiple partition allocation
- 4.7 Explain the concept of fragmentation
- 4.8 Explain paging concept
- 4.9 Explain how logical address is translated into physical address
- 4.10 Explain segmentation and segmentation with paging
- 4.11 Define and explain virtual memory techniques
- 4.12 Describe demand paging
- 4.13 Describe page replacement
- 4.14 Discuss on page replacement algorithms
 - 4.14.1 FIFO
 - 4.14.2 LRU
 - 4.14.3 Optimal
- 4.15 Explain the concept of thrashing
- 4.16 Explain working set model and page fault frequency

5.0 Disk scheduling and File management

- 5.1 List and define various disk performance parameters like Capacity, Latency time, Seek Time, transfer rate, Access time, reliability, and average transfer time.
- 5.2 Calculate Latency time, Seek Time, transfer rate, transfer time with numerical examples on disk structure.
- 5.3 Disk allocation methods.
- 5.4 Disk scheduling policies
 - 5.2.1 FIFO
 - 5.2.2 SSTF
 - 5.2.3 SCAN methods
- 5.5 Define file management
- 5.6 List and explain various file operations
- 5.7 List and explain various access methods
- 5.8 List and explain various allocation methods
- 5.9 List and explain directory structure
- 5.10 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

Memory Hierarchy, 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 Allocation methods-Disk scheduling policies –Introduction to file systems - File Management-File Operations - Access methods - Directory structure organization - File Protection.

REFERENCE BOOKS

1. Operating Systems,Silber Schatz and Galvin- Wiley
2. Operating Systems, William Stallings-Prentice Hall
3. Operating Systems, Dietel and Dietel -Pearson
4. Operating Systems, Dham here -TMH
5. Advanced Operating Systems, Tanenbaum- Prentice Hall

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	Introduction to Operating system	12	14	6	8			2	1			CO1
2	Process management	12	14	6	8			2	1			CO2
3	Synchronization & Deadlocks	12	14	3	3	8	*	1	1	1	*	CO3

4	Memory management	12	14	6	8			2	1			CO4
5	Disk scheduling and File management	12	14	3	11		*	1	2		*	CO5
	Total	60	70+(10*)	24	38	8	10*	8	6	1	1	

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 3.4
Unit test-2	From 3.5 to 5.10

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

**SCHEME: C-20
303**

SUBJ CODE: AIM-

MAX MARKS:40

TIME: 90 MINUTES

PART-A

16Marks

Instructions:1) Answer all questions

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

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) Define Process Synchronization. (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 concept of Multiprogramming and Time sharing. (CO1)
- (Or)
- b) Explain various system calls with an example. (CO1)

7. a) Differentiate Distributed and Real-time systems. (CO1)
(Or)
b) Explain SJF scheduling algorithm with an example. (CO2)
8. a) Explain Round Robin CPU scheduling algorithm. (CO2)
(Or)
b) Explain Inter process communication. (CO3)

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

SCHEME: C-20
AIM-303
MAX MARKS:80

SUBJ CODE:
TIME: 3 HOURS

Instructions:

- 1) Answer all questions
 - 2) Each question carries Three marks
1. Define Operating system. (CO1)
 2. List different types of system calls. (CO1)
 3. Define the terms program and process? (CO2)
 4. Write about multithreading? (CO2)
 5. List the necessary conditions for deadlock? (CO3)
 6. Define Semaphore. (CO3)
 7. State the need of Virtual Memory? (CO4)
 8. Define Overlay. (CO4)
 9. Define Latency Time and Seek time. (CO5)
 10. List the file allocation methods. (CO5)

PART-B

5x8=40Marks

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

- 11.A. Differentiate multiprogramming and time sharing? (CO1)
OR

- 11.B Explain in detail about OS services? (CO1)
 12.A. Draw and explain process state diagram? (CO2)
 OR
 12.B Explain various scheduling algorithms (CO2)
 13.A. Explain inter process communication (CO3)
 OR
 13.B Explain Deadlock avoidance and detection (CO3)
 14.A. Explain paging concept (CO4)
 OR
 14.B Explain virtual memory techniques (CO4)
 15.A Calculate the average access time for transferring 512 bytes of data with the data rate 40KB per second. The average seek time is 5msec, the disk rotation is 6000RMP, and the controller overhead is 0.1 msec. (CO5)
 OR
 15.B Explain disk organization and structure (CO5)

PART-C

1x10=10Marks

16. Consider the situation, "There are two teams, team A and team B. Both want to play cricket and went to playground but the problem is , team A has just Bat but no ball and team B has just ball and no bat (both team don't care about it as they are assuming there would be some shop nearer and they will purchase the missing item). They reach the playground at the same time and now inquired if there is any sport shop but they come to know there is no shop. Somehow, they come to know about each other problem, now Team A requested team B to provide them their Ball and team but requested team A to provide them their Bat. But both teams are not ready to share their bat or ball as already they have sufficient 11 players and both want to play cricket."

Is there any deadlock situation occurs? Justify the answer.

(CO3)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-304	Digital Electronics & Computer Organization	6	90	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Number systems Logic Gates ,Boolean Algebra and basic Combinational circuits	30	CO1,CO3
2.	Flip-Flops,Counters& Registers	25	CO1,CO2
3.	Information representation & CPU Organization	15	CO1,CO2,CO3
4.	Memory Organization	10	CO2,CO4

5.	I/O Organization	10	CO3,CO4,CO5
Total Periods		90	

Course Objectives	i) To acquire the basic knowledge of Number systems,digital logic levels and apply of knowledge to understand digital logic circuits. ii) To prepare students to perform the analysis and design of various digital electronics circuits iii)To know about Processor organization, information Representation iv)To understand how memory and i/o is organized in an effective way
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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, counting circuits, Registers
	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 peripheral 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 Decimalnumber 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 Signed binary arithmetic.
 - 1.1.8.1 Illustrate addition of two signed binary numbers.
 - 1.1.8.2 Illustrate subtraction of two signed binary numbers.
 - 1.1.8.3 Illustrate binary multiplication.
 - 1.1.8.4 Illustrate Binary division.
- 1.1.9 Binary coded decimal (BCD) coding scheme.
 - 1.1.9.1 Define Binary coded decimal (BCD) coding scheme.
 - 1.1.9.2 List the types of Binary coded decimal (BCD)
 - 1.1.9.3 Draw and explain 8421 code.
 - 1.1.9.4 Draw and explain 2421 code.
 - 1.1.9.5 Draw and explain 8 4-2-1 code.
- 1.1.10 Character representation
 - 1.1.10.1List character representation codes
 - 1.1.10.2Explain the ASCII coding scheme.
 - 1.1.10.3Explain the EBCDIC coding scheme

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 HalfAdder. Explain the function of Half Adder.
 - 1.4.2 Draw Half-Adder circuit using an exclusive OR and an ANDgate.
 - 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
 - 1.4.6 Define the parallel Adder
 - 1.4.7 Explain the function of parallel Adder using logic symbol.
 - 1.4.8 Draw and explain 4-bit parallel adder using full adders.
 - 1.4.9 Explain the working of a serial adder with a block diagram.
 - 1.4.10 List the advantage and disadvantages of a serial adder
 - 1.4.11 List the advantage and disadvantages of a parallel adder.
 - 1.4.12 Distinguish between serial adder and parallel adder.
 - 1.4.13 Explain the operation of a digital comparator circuit for two 4 bitwords.
- 2.0 Flip-Flops,Counters,Registers
 - 2.1 FLIP-FLOPS
 - 2.1.1 List the details of different logicfamilies.
 - 2.1.2 Define positive and negative logiclevels.
 - 2.1.3 Define Flip flop
 - 2.1.4 Draw and explain the basic principle of operation of aFlip-

- flop.
- 2.1.5 Define Latch.
- 2.1.6 Explain the working of a NANDlatch 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 Define Triggering
- 2.1.10 List the types of Triggering
- 2.1.11 Draw and explain the concept of edge triggering(positive, negative)
- 2.1.12 Draw and explain the concept of level triggering. (positive, negative)
- 2.1.13 Explain with block diagram, waveforms and truth tables the workingof RS Flip-flop.
- 2.1.14 Explain with block diagram, waveforms and truth tables the workingof RSTFlip-flop.
- 2.1.15 Explain with block diagram, waveforms and truth tables the workingof DFlip-flop.
- 2.1.16 Explain with block diagram, waveforms and truth tables the workingof JKFlip-flop.
- 2.1.17 Explain with block diagram, waveforms and truth tables the working of T Flip-flop.
- 2.1.18 Distinguish between synchronous and asynchronous inputs of a flip- flop and state theirfunctions.
- 2.1.19 Draw and explain the need for a Master-Slaveflip-flop.
- 2.1.20 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-8 ripple counter circuit diagram with waveforms and truth tables
- 2.2.7 Draw and explain module-16 ripple counter circuit diagram with waveforms and truth tables
- 2.2.8 Draw and explain module-10 (decade) Asynchronous counter circuit diagram with waveforms and truth tables
- 2.2.9 Draw and explain module-8 synchronous counter circuit diagram with waveforms and truth tables
- 2.2.10 Draw and explain module-16 synchronous counter circuit diagram with waveforms and truth tables
- 2.2.11 List the draw backs of ripple counters.
- 2.2.12 List the advantages of synchronous counters
- 2.2.13 Programmable counter
 - 2.2.13.1 Draw and explain the need for a Programmable counter
 - 2.2.13.2 Explain how to design Programmable counter circuit diagram
- 2.2.14 Draw and explain the operation of a 4-bit ring counter.
- 2.2.15 List the applications of counter.

2.3 Register

- 2.3.1 Define Register
- 2.3.2 State the need of Register.
- 2.3.3 List the methods of data transfer in register.
- 2.3.4 List the types of Registers
- 2.3.5 Define Serial in – Serial out register
- 2.3.6 Define Serial in – Parallel out register
- 2.3.7 Define Parallel in – Serial out register
- 2.3.8 Define Parallel in – Parallel out register
- 2.3.9 Explain the working of serial in – serial out register with circuit diagram.
- 2.3.10 Explain the working of serial in – parallel out register with circuit diagram.
- 2.3.11 Explain the working of shift left Register with circuit diagram.
- 2.3.12 Explain the working of shift right registers with circuit diagram.
- 2.3.13 Explain the working of universal shift register.
- 2.3.14 Draw and explain the use of shift register as memory.

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, Subtractor series – Parallel Binary 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 concept of Edge

Triggering and Level Triggering , Synchronous and Asynchronous device.

Counters: Basic Asynchronous, Synchronous Binary and Decade counter and the Ripple counter, their use Decade counter, Ring counter.

Registers: Shift registers, Serial, Parallel register, Serial-in Parallel out, Parallel-in– serial out devices, Universal shift registers, Applications.

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. N o.	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.	Number systems, Logic Gates , Boolean Algebra and basic Combinational circuits	30	14	3	11			1	2		*	CO1,CO3

2.	Flip-flops, Counters and Registers	25	14	6	11		10	2	2		*	CO1,CO2
3	Information representation & CPU Organization	15	14	3	11			1	2		*	CO1,CO2,CO3
4.	Memory Organization	10	14	3	11		10	1	2			CO2,CO4
5.	I/O Organization	10	14	3	8		10	1	1			CO3,CO4,CO5
	TOTAL	90	70 +1 0*	18	52			6	9			

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 parallel Adder in detail with neat diagram. (CO1)

Or

- b) Explain 4-Bit comparator 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)

MODEL PAPER – END EXAMINATION
DIGITAL ELECTRONICS& COMPUTER ORGANIZATION

SCHEME: C-20
MAX MARKS:80

SUBJ CODE:AIM-304
TIME: 3HOURS

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PART-A

10X3=30Marks

Note: Answer all questions

1. Convert 10101000.0010_2 into decimal number system
(CO1)
2. What is Universal Gate and List them.
(CO1)
- 3 Define positive and negative logic levels
(CO2)
- 4 Write any three difference between Asynchronous and Synchronous counters
(CO2)
- 5 What is Accumulator and program counter?
(CO3)
- 6 Define opcode, operand and address.
(CO3)
- 7 State the need for memory hierarchy in a computer
(CO4)
- 8 State the principle of locality of reference
(CO4)
- 9 List modes of data transfer
(CO5)
- 10 List the four bus systems
(CO5)

PART-B

5x8=40Marks

Note: Answer all questions

- 11.A. Draw and explain 4-bit parallel adder using full adders.
(CO1)

OR

11.B Draw and explain 4bit comparator
(CO1)

12.A. Explain Master JK Flip Flop in detail with neat diagram
(CO2)

OR

12.B Explain 16-bit Asynchronous counter in detail
(CO2)

13.A. Explain the stored program concept?
(CO3)

OR

13.B List and explain various addressing modes
(CO3)

14.A. State the significance of various memory device characteristics: access time, access rate, alterability , permanence of storage, cycle time.
(CO4)

OR

14.B.Explain virtual address and physical address organization?
(CO4)

15.A. Explain DMA controlled transfer in detail?
(CO5)

OR

15.B Explain hand shaking procedure of data transfer in detail?
(CO5)

PART-C

1X10=10Marks

17. Simplify the Boolean expression $A'B + A(B' + C) + B(B + C')$ using Karnaugh map .
Boolean laws and draw the logic circuit for reduced expression.

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-305	DBMS	6	90	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	18	CO3
4.	Advanced PL/SQL	16	CO4
5.	Concepts of NoSQL & MongoDB.	16	CO5
Total Periods		90	

Course Objectives	Upon completion of the course the student shall be able
	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	Upon completion of the course the student shall be able		
	CO1	AIM305.1	Describe fundamentals, types and Overall structure of DBMS.
	CO2	AIM305.2	Apply SQL commands to create, retrieve, update, delete data from the Relational data bases.
	CO3	AIM305.3	Describe PL/SQL programming constructs, control statements and sub programs.
	CO4	AIM305.4	Apply cursors, triggers and Exception handling concepts.
	CO5	AIM305.5	Use NOSQL database concepts and MongoDB data base concepts in designing database Schema.

CO-PO/PSO MATRIX

CO NO.	PO 1	PO 2	PO 3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM305.1	3	2	2	2	2	3	2	2	3	1
AIM305.2	2	3	3	3	3	3	3	2	1	2
AIM305.3	3	2	2	2	1	3	2	2	1	1
AIM305.4	1	3	3	2	2	3	3		3	3
AIM305.5	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:

At the end of the syllabus students should be able to

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 the terms Entity, Entity sets, Relationship, Relationship sets,
- 1.9 Explain Super Key, Candidate Key and Primary Key, Foreign Key
- 1.10 Explain Mapping Cardinalities.
- 1.11 List the symbols used in ER model.
- 1.12 Explain the Entity-Relationship Model.
- 1.13 Reduce the ER-diagrams to tables
- 1.14 Explain Generalization, Specialization & Aggregation.
- 1.15 Explain Function Dependencies, Normalizations– 1 NF, 2 NF and 3NF
- 1.16 Explain E.F.CODD's rules for RDBMS

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 long raw etc.
- 2.5 Illustrate the comments within SQL Statement.
- 2.6 Explain SQL Operators.

- 2.7 Describe Data Definition Language commands CREATE, ALTER and DROP.
- 2.8 Explain integrity constraints in 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 groupfunctions.
- 2.13 Explain Transaction ControlCommands COMMIT, SAVEPOINT, ROLLBACK, GRANT, and REVOKE with examples.
- 2.14 Explain SubQueries 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 ofPL/SQL
- 3.3 Explain the data types of PL/SQL
- 3.4 Illustrate declarations and naming conventions ofvariables
- 3.5 Explain PL/SQL tables and user definedrecords.
- 3.6 Explain Input/Output statements.
- 3.7 Explain decision making statements with examples (IF... THEN,IF.THEN.ELSE,IF.HEN.ELSE.IF,CASE,GOTO)
- 3.8 Explain looping statements andillustrate (Simple loop, While loop, For loop).
- 3.9 Explain procedure with syntax and examples.
- 3.10 Explain function with syntax and examples.
- 3.11 Describe the advantages of subprograms.
- 3.12 Explain handling procedures with example programs.
- 3.13 Explain handlingfunctionswith example programs.
- 3.14 Explain the parameter modes in PL/SQL witheexamples (in, out and in out)
- 3.15 DefineRecursion
- 3.16 Explain Recursion with example programs.

4.0 Advanced PL/SQL

- 4.1 Define cursor.
- 4.2 Classify cursors.
- 4.3 Explain implicit cursor with examples.
- 4.4 Explain explicit cursors with examples.
- 4.5 Define trigger.
- 4.6 List Advantages of triggers.
- 4.7 Explain database triggers.
- 4.8 Define the term Exceptionhandling
- 4.9 List the advantages of Exceptionhandling
- 4.10 List the types of Exceptions.
- 4.11 Illustrate built-inExceptions
- 4.12 Illustrate User definedExceptions
- 4.13 Explain propagation and re-raising of exceptions.

5.0 Concepts ofNoSQL&MongoDB.

- 5.1 No SQL
 - 5.1.1 Explain the classification of Databases: RDBMS, OLAP,NoSQL.
 - 5.1.2 State the needof NoSQL& its purpose

- 5.1.3 Compare RDBMS and NoSQL
- 5.1.4 List the Advantages and Disadvantages of NoSQL
- 5.1.5 Explain about the ACID and BASE system.
- 5.1.6 Compare ACID and BASE properties
- 5.1.7 Classify NoSQL as Key-value stores, Column-oriented, Graph and Document oriented Databases.
- 5.1.8 Explain about Key-value stores Databases, Column-oriented Databases, Graph Databases, Document oriented Databases with examples.
- 5.2 MongoDB
 - 5.2.1 What is the purpose of MongoDB.
 - 5.2.2 List the advantages of MongoDB.
 - 5.2.3 Explain the Creation, Dropping, Creation of Collection & Dropping of Collection of Database in MongoDB
 - 5.2.4 Explain the Data types of MongoDB.
 - 5.2.5 Explain Inserting Document, Query Document, Update Document, Deleting Document & Sorting Document with examples

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, 2NF, 3NF - E.F.CODD's rules for RDBMS

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 – declarations – naming conventions – 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 – recursion

4. Advanced PL/SQL

Cursors – Implicit cursor – Explicit cursor – Triggers – Advantages - creating trigger – raising trigger - Advantages of Exceptions – predefined Exceptions – user defined Exceptions .

5. Concepts of NoSQL& 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 - Key-value stores Databases - Column-oriented Databases - Graph Databases - 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-Mc Graw Hill Publications.
2. Oracle Database 11g:The Complete Reference, Kevin Loney-Oracle Press.
3. Fundamentals of Database Systems, Shamkant B. Navathe-Pearson
4. Understanding ORACLE, James T. Peary & Joseph G. Laseer-Sybex Inc.U.S..
5. RDBM with ORACLE, Rolland-Addison Wesley.
6. ORACLE series books of ORACLE Press– TMH.
7. Starting out with Oracle, Covering Databases, John Day & Craig Van-Dream Tech.
8. PL/SQL, Developer Tools & DBA, Slyke-Dreamtech.
9. www.nosql-database.org
10. www.mongodb.org

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	A P	An	R	U	A P	An	
1	Concepts of DBMS & RDBMS	18	14	6	8		*	2	1		*	CO1
2	Concepts of SQL	22	14	3	8	3		2	1			CO2
3	Basics of PL/ SQL	18	14	6	8		*	2	1		*	CO3
4	Advance PL/SQL	16	14	6	8		*	2	1		*	CO4
5	Concepts of NoSQL&MongoDB	16	14	6	8		*	2	1		*	CO5
	Total	90	70+(10*)	27	40	3	10*	10	5		1	

Note: Part-C: 10 marks single analytical question may be chosen from any 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 3.7
Unit test-2	From 3.8 to 5.2

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

SCHEME: C-20
CODE: AIM-305
MAX MARKS: 40
MINUTES

SUBJ

TIME: 90

PART-A

16Marks

Instructions: 1) Answer all questions

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

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) List the features of PL/SQL. (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 Database System Architecture (CO1)
(Or)
b) Explain Generalization, Specialization and Aggregation (CO1)
7. a) Explain ER diagram with an example. (CO1)
(Or)
b) Explain any two Joins in SQL. (CO2)
8. a) Explain CASE statement with syntax and example. (CO3)
(Or)
b) Explain FOR Loop with syntax and example PL/SQL program (CO3)

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

DBMS

SCHEME: C-20

SUBJ CODE:

AIM-305

MAX MARKS: 80

TIME: 3 HOURS

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 DML commands. (CO2)
4. Write a SQL Query to retrieve maximum value from sal column of employee table. (CO2)
5. List any three features of PL/SQL. (CO3)
6. What is Recursion. (CO3)
7. Define Cursor. (CO4)
8. List any three Built-in Exceptions. (CO4)
9. Compare features of RDBMS with that of NoSQL. (CO5)
10. List any three advantages of MongoDB. (CO5)

PART-B

5x8=40M

Instructions : 1. Each question carries **EIGHT** marks.

2. Answers should be comprehensive and criteria for valuation is the content but not the length of the answer.

11. A) Explain Database System Architecture (CO1)
OR
B) Explain Generalization, Specialization and Aggregation (CO1)
12. A) Explain group handling functions with syntax and example (CO2)
OR
B) Explain Joins in SQL (CO2)
13. A) Write a PL/SQL procedure to find biggest of three given numbers. (CO3)
OR
B) Write a PL/SQL program to find factorial of a given number using recursion. (CO3)
14. A) Explain Implicit cursors in PL/SQL (CO4)
OR
B) Explain Trigger in PL/SQL with example. (CO4)
15. A) Explain Column-oriented Databases in NoSQL. (CO5)
OR
B) Explain Inserting Document in MongoDB. (CO5)

PART – C

1x10 = 10M

16. Design a PL/SQL block that will keep track the audit information.
(CO4)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-306	Python Programming Lab	3	45	40	60

COURSE OBJECTIVES	Upon completion of the course the student shall able to learn 1. Basics of Python programming 2. Decision Making and Functions in Python 3. Object Oriented Programming using Python.
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Course Outcomes	At the end of the course the student will be able to:		
	CO 1	AIM-306.1	Execute Simple python programs
	CO 2	AIM-306.2	Execute Python programs using expressions, operators
	CO 3	AIM-306.3	Demonstrate Python programs using Lists
	CO 4	AIM-306.4	Execute python programming using Functions, packages
	CO 5	AIM-306.5	Develop ute Python programs using OOP Concepts and exceptions
	CO 6	AIM-306.6	Demonstrate Debugging of Python Programs

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-306.1	2	2	2	1	2			3		2
AIM-306.2	2	3	2					2		2
AIM-306.3	3	3	2	3		2	2	2		
AIM-306.4	2	2	2		2	3	1	2	3	
AIM-306.5	3	3	2		2	2	2	2	2	
AIM-306.6	2	1		3			3	1		

Average	2.3	2.3	2	2.3	2	2.3	2	2	2.5	2
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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, dictionary).
3. Write /execute simple 'Python' program: Develop minimum 2 programs using Arithmetic Operators, exhibiting data type conversion.
4. (i) Write simple programs to convert U.S. dollars to Indian rupees.
(ii) Write simple programs to convert bits to Megabytes, Gigabytes and Terabytes.
5. Write simple programs to calculate the area and perimeter of the square, and the volume & perimeter of the cone.
6. Write program to: (i) Determine whether a given number is odd or even. (ii) Find the greatest of the three numbers using conditional operators.
7. Write a program to: i) Find factorial of a given number. ii) Generate multiplication table up to 10 for numbers 1 to 5
8. Write a program to: Create a list, add element to list, delete element from the lists.
9. Write a program to: Sort the list, reverse the list and counting elements in a list.
10. Write a program to: Create dictionary, add element to dictionary, delete element from the dictionary.
11. Write a program to: To calculate average, mean, median, and standard deviation of numbers in a list.
12. Write a program to: To print Factors of a given Number.
13. File Input/output: Write a program to: i) To create simple file and write "Hello World" in it. ii) To open a file in write mode and append Hello world at the end of a file.
14. Write a program to :i) To open a file in read mode and write its contents to another file but replace every occurrence of character 'h' ii) To open a file in read mode and print the number of occurrences of a character 'a'.
15. Write a Program to: Add two complex number using classes and objects.
16. Write a Program to: Subtract two complex number using classes and objects.
17. Write a Program to: Create a package and accessing a package.

TIME SCHEDULE

Sl. No.	Major Topic	Periods	CO'S mapped
1.	Write and execute simple python Program.	3(2,1)	CO1,CO6
2.	Write /execute simple 'Python' program: Develop minimum 2 programs using different data types (numbers, string, tuple, list, dictionary).	4(2,1,1)	CO1,CO2,CO6
3.	Write /execute simple 'Python' program: Develop minimum 2 programs using Arithmetic Operators, exhibiting data type conversion.	4(2,1,1)	CO1,CO2,CO6
4.	(i)Write simple programs to convert U.S. dollars to Indian rupees. (ii) Write simple programs to convert bits to Megabytes, Gigabytes and Terabytes.	3(1,1,1)	CO1,CO2,CO6
5.	Write simple programs to calculate the area and perimeter of the square, and the volume & perimeter of the cone.	3(1,1,1)	CO1,CO2,CO6
6.	Write program to: (i) Determine whether a given number is odd or even. (ii) Find the greatest of the three numbers using conditional operators.	3(1,1,1)	CO1,CO2,CO6
7..	Write a program to: i) Find factorial of a given number. ii) Generate multiplication table up to 10 for numbers 1 to 5.	4(2,1,1)	CO1,CO2,CO6
8.	Write a program to: To print Factors of a given Number.	3(2,1)	CO4,CO6
9.	Write a program to: Create a list, add element to list, delete element from the lists.	3(1,1,1)	CO1,CO3,CO6
10.	Write a program to: Sort the list, reverse the list and counting elements in a list.	3(1,1,1)	CO2,CO3,CO6
11.	Write a program to: Create dictionary, add element to dictionary, delete element from the dictionary.	4(2,1,1)	CO2,CO3,CO6
12.	Write a program to: To calculate average, mean, median, and standard deviation of numbers in a list.	3(1,1,1)	CO2,CO3,CO6
13.	File Input/output: Write a program to: i) To create simple file and write "Hello World" in it. ii) To open a file in write mode and append Hello world at the end of a file.	4(2,2)	CO1,CO6
14.	Write a program to :i) To open a file in read mode and write its contents to another file but replace every occurrence of character 'h' ii) To open a file in read mode and print the number of occurrences of a character 'a'.	4(2,2)	CO1,CO6

15.	Write a Program to: Add two complex number using classes and objects.	4(2,2)	CO5,CO6
16.	Write a Program to: Subtract two complex number using classes and objects	3(2,1)	CO5,CO6
17.	Write a Program to: Create a package and accessing a package.	2(1,1)	CO5,CO6
Total		60	

KEY COMPETENCIES

Sl.No	Name of the Experiment	Objectives	Key Competencies
1.	Write and execute simple python Program.	Write a simple python program to print Hello World! and debug and execute	1. Know the usage of Python IDLE 2. Edit and save the program 3. Check for the syntax errors and clear the errors 4. Run the program and check for the output.
2.	Write /execute simple 'Python' program: Develop minimum 2 programs using different data types (numbers, string, tuple, list, dictionary).	Write a Python program to identify different data types.	1. Identify different data types 2. Write basic python program using datatypes 3. Evaluate arithmetic expression 4. Run the program 5. Rectify the syntactical errors 6. Execute the program 7. Check the output for its correctness
3.	Write /execute simple 'Python' program: Develop minimum 2 programs using Arithmetic Operators, exhibiting data typeconversion.	Write a Python program to identify arithmetic operators and data type conversion	1. Identify different arithmetic operators 2. Build arithmetic expressions 3. Identify the priorities of operators 4. Evaluate arithmetic expression 5. Run the program 6. Rectify the syntactical errors 7. Execute the program Check the output for its correctness

4.	(i) Write simple programs to convert U.S. dollars to 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	1. Identify different arithmetic operators 2. Build arithmetic expressions 3. Identify the priorities of operators 4. Evaluate arithmetic expression 5. Run the program 6. Rectify the syntactical errors 7. Execute the program Check the output for its correctness
5.	Write simple programs to calculate the area and perimeter of the square, and the volume & perimeter of the cone.	Write a Python program to identify arithmetic operators and data type conversion	1. Identify different arithmetic operators 2. Build arithmetic expressions 3. Identify the priorities of operators 4. Evaluate arithmetic expression 5. Run the program 6. Rectify the syntactical errors 7. Execute the program Check the output for its correctness
6.	Write program to: (i) Determine whether a given number is odd or even. (ii) Find the greatest of the three numbers using conditional operators.	Write a Python program to identify conditional statements in Python.	1. Build a relational expression 2. Use the if statement for decision making 3. Rectify the syntax errors 4. Check the output for correctness
7.	Write a program to : i) Find factorial of a given number. ii) Generate multiplication table up to 10 for numbers 1 to 5.	Write a Python program to identify loops statements in Python.	1. Build the termination condition for looping 2. Use while statement with correct syntax 3. Check whether correct number of iterations are performed by the while loop 4. Rectify the syntax errors 5. Debug logical errors
8.	Write a program to : To print Factors of a given Number.	Write a Python program to identify loops statements in Python.	1. Build the termination condition for looping 2. Use while statement with correct syntax 3. Check whether correct number of iterations are performed by the while loop 4. Rectify the syntax errors Debug logical errors

9.	Write a programs to: Create a list, add element to list, delete element from the lists.	Write a Python program to identify various lists and list manipulation methods in Python.	1. Create a one list with correct syntax 2. Create a list 3. Read elements from list 4. Add elements to list 5. Delete elements 6. Rectify the syntax errors 7. Debug logical errors 8. Check for the correctness of output for the given input
10.	Write a programs to: Sort the list, reverse the list and counting elements in a list.	Write a Python program to identify various lists and list manipulation methods in Python.	1. Create a one list with correct syntax 2. Create a list 3. Read elements from list 4. Add elements to list 5. Delete elements 6. Rectify the syntax errors 7. Debug logical errors 8. Check for the correctness of output for the given input
11.	Write a programs to: Create dictionary, add element to dictionary, delete element from the dictionary.	Write a Python program to identify various dictionary and dictionary manipulation methods in Python.	1. Create a one dictionary with correct syntax 2. Create a dictionary 3. Read elements from list 4. Add elements to dictionary 5. Delete elements from dictionary 6. Rectify the syntax errors 7. Debug logical errors 8. Check for the correctness of output for the given input
12.	Write a program to: To calculate average, mean, median, and standard deviation of numbers in a list.	Write a Python program to identify various statistical functions.	1. Create a list 2. add elements to list 3. perform statistical functions on that list
13.	File Input/output: Write a program to : i) To create simple file and write "Hello World" in it. ii) To open a file in write mode and append Hello world at the end of a file.	Write a Python program to identify the steps to create a file and append to file.	1. Create a Python file 2. Add contents to file

14.	Write a program to :i) To open a file in read mode and write its contents to another file but replace every occurrence of character 'h' ii) To open a file in read mode and print the number of occurrences of a character 'a'.	Write a Python program to identify the steps to open a file in read/write mode.	1. Open a Python file in write mode 2. Add contents to the file 3. Open a Python file in Read mode 4. Print the file
15.	Write a Program to: Add two complex number using classes and objects.	Write a Python program to identify the steps to create class and create an object in Python.	1. Create a class using Python 2. Create an object in Python 3. Debug the python program 4. Check the correctness
16	Write a Program to: Subtract two complex number using classes and objects	Write a Python program to identify the steps to create class and create an object in Python.	1. Create a class using Python 2. Create an object in Python 3. Debug the python program Check the correctness
17.	Write a Program to : Create a package and accessing a package.	Write a Python program to practice in creating packages and accessing packages	1. Create a package using Python 2. Access the package in Python 3. Debug the python program Check the correctness

Course Code	Course title	No of periods/week	Total no of periods	Marks for FA	Marks for SA
AIM-307	Computer Hardware & Network Maintenance Lab	06	90	40	60

S No	Chapter/ Unit Title	No. of Periods	COs Mapped
1.	Computer Hardware	45	CO1,CO2,CO3
2.	Computer Networking	30	CO3.CO4.CO5
3.	Network Maintenance through server	15	CO4,CO5,CO6

	Total	45	
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COURSE OBJECTIVES	1. Identify all the components of mother board. 2. Modify CMOS settings as required 3. Troubleshoot desktop computer 4. Troubleshoot individual resources like keyboard, Monitor, Printers 5. Install drives, NIC cards, modems(internal, external) 6. Install network devices, design and develop network. 7. Understand ip address classes and sub netting 8. Prepare cross and straight Ethernet cables 9. Install and configure proxy server 10. Install any network operating system and Control/maintain the network and network resources using server administration and Troubleshoot the entire network
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Course Outcomes	At the end of the course the student will be able to		
	CO1	AIM-307.1	Assemble the PC with suitable components.
	CO2	AIM-307.2	Troubleshoot desktop system and individual peripheral devices .
	CO3	AIM-307.3	Demonstrate configuring computer network with subnetting
	CO4	AIM-307.4	Perform user and group management techniques through Network Server
	CO5	AIM-307.5	Troubleshoot the computer network.
	CO6	AIM-307.6	Configure any network device.

CO-PO/PSO MATRIX

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

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

Learning Outcomes:

Computer Hardware

1.
 - a. Identify and note down mother board , Components and Chips
 - b. Identify various Internal and External slots in the mother board and clean them with blower/ Brush.
 - c. Practice Inserting and Removing RAM with care
 - d. Measure the Output voltages of SMPS
2. Perform various operations and modifications required for CMOSsetup.
3. Print the summary of your system Hardware and verify for correctness
4. Upgrading memory and verify the effect after upgrading.
5. Hard drive, optical drive installation.
6. How to recover lost data on hard drive.
7. Trouble shooting keyboard and monitor
 - a. few keys do network.
 - b. keyboard does not work atall.
 - c. key continuous to repeat after being released.
 - d. key produces wrong character.
 - e. Power light (led) does not go on, no picture.
 - f. Power LED light is on no picture power up.
 - g. Power on but monitor display wrong character.
 - h. Monitor flickers has wary lines.
 - i. Screen goes blank 30 seconds or minute after the keyboard is left untouched
8. Printer Problems
 - a. Laser printer:
 - I. Printer never leaves warm-up mode.
 - II. Paper Jam message is displayed
 - III. Printed messages are distorted
 - IV. RE-filling and replacing cartridge
 - V. Replacing damaged drum with new one.
 - VI. Perform head cleaning
 - b. DMP
 - I. Print head moves back and forth but nothing prints.
 - II. Print self test works but printing from a computer application does not work etc.,
9. Installation of Network card.
10. Dis-assembling and assembling of working desktop.

Computer Networking

11. Preparing the Ethernet cable for cross and direct connections using crimping tool and test using LAN tester.
12. Installation of a switch and connecting systems to a network switch.
13. Installation of a modem (internal, external or USB) and connecting tointernet.
14. Using FTP for uploading and downloading files.
15. Installation and configuring the proxy server for internet access.

16. Setting of particular IP address to an existing terminal system
17. Installation of network operating system

Network Maintenance through server

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

The competencies and key competencies to be achieved by the student

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

5	Exercise on Hard drive, optical drive installation.	Hard drive, optical drive installation.	Hard drive: ❖ Identify the Hard drive slot. ❖ Know how to remove power supply and SATA cables from Hard drive. ❖ Unscrew Hard drive from computer case ❖ Replace new Hard drive and fix it in computer case ❖ Know how to connect power supply cable and SATA cables to Hard drive ❖ Check for the working condition of new Hard Drive. Optical drive: ❖ Identify the Optical drive slot. ❖ Know how to remove power supply and SATA cables from Optical drive. ❖ Unscrew Optical drive from computer case ❖ Replace new Optical drive and fix it in computer case ❖ Know how to connect power supply cable and SATA cables to Optical drive ❖ Check for the working condition of Optical drive.
6	Exercise on recovery of lost data on hard drive.	How to recover lost data on hard drive.	❖ Verify the available recovery tools of Operating system. ❖ Know how to recover lost data on Hard drive using Restore point. ❖ Know how to recover lost data on Hard drive using Recovery Image.
7	Exercise on Trouble shooting keyboard and monitor.	Trouble shooting keyboard and monitor.	❖ few keys do not work. ❖ keyboard does not work at all. ❖ Key continuous to repeat after being released. ❖ key produces wrong character. ❖ Power light (led) does not go on, nopicture. ❖ Power LED light is on no picture power up. ❖ Power on but monitor display wrong character. ❖ Monitor flickers has wary lines. ❖ Screen goes blank 30 seconds or minute after the keyboard is left untouched
8	Exercise on Printer Problems	Printer Problems	Laser printer: ❖ Printer never leaves warm-up mode. ❖ Paper Jam message is displayed ❖ Printed messages are distorted ❖ RE-filling and replacing cartridge ❖ Replacing damaged drum with new one. ❖ Perform head cleaning DMP ❖ Print head moves back and forth but nothing prints.

			❖ Print self test works but printing from a computer application does not work etc.,
9	Exercise on Installation of Network card.	Installation of Network card.	❖ Identify the slot for placing NIC card ❖ Know how to place NIC card ❖ Install required NIC driver ❖ Check for working status of NIC card
10	Exercise on Dis-assembling and assembling of working desktop.	Dis-assembling and assembling of working desktop.	❖ Identify all the peripherals of Desktop computer. ❖ Check the working condition of system before dis-assembling it. ❖ Dis-assemble all the peripherals. ❖ Assemble all the peripherals. ❖ Check the working condition of system after assembling it.
11	Exercise on Preparing the Ethernet cable for cross and direct connections using crimping tool and test using LAN tester.	Preparing the Ethernet cable for cross and direct connections using crimping tool and test using cable tester.	❖ Know the color pattern of Ethernet cable for direct connection. ❖ Prepare UTP cable for direct connection using crimping tool. ❖ Check the working condition of cable using LAN tester. ❖ Know the color pattern of Ethernet cable for cross connection. ❖ Prepare UTP cable for cross connection using crimping tool. ❖ Check the working condition of cable using LAN tester.
12	Exercise on Installation of a switch and connecting systems to a network switch.	Installation of a switch and connecting systems to a network switch	❖ Know the purpose of switch ❖ Run Ethernet cables from switch to individual computers ❖ Connect Ethernet cables of computers to switch. ❖ Check the network status of the connection in computer system.
13	Exercise on Installation of a modem (internal, external or USB) and connecting to internet.	Installation of a modem (internal, external or USB) and connecting to internet.	Internal modem ❖ Identify PCI slot for placing Internal modem ❖ Connect internal modem ❖ Install required modem driver ❖ Check for the working condition External modem ❖ Connect External modem ❖ Install required modem driver ❖ Check for the working condition USB modem

			❖ Connect USB modem ❖ Install required modem driver - Check for the working condition
14	Exercise on Using FTP for uploading and downloading files.	Using FTP for uploading and downloading files.	❖ Know about FTP protocol ❖ Know how to upload file using FTP ❖ Know how to download file using FTP
15	Exercise on Installation and configuring the proxy server for internet access	Installation and configuring the proxy server for internet access	❖ Know about proxy server. ❖ Know how to install proxy server. ❖ Know how to configure proxy server.
16	Exercise on Setting of particular IP address to an existing terminal system	Setting of particular IP address to an existing terminal system	❖ Know about IP addresses ❖ Know how to set IP addresses to the computer systems in a LAN
17	Exercise on Installation of network operating system	Installation of network operating system	❖ Know about Network operating systems. ❖ Know about different network operating systems. ❖ Install any Network operating systems ❖ Configure the system with the proper settings.
18	Exercise on Creating and managing user accounts through network server.	Creating and managing user accounts through network server.	❖ Know how to create user accounts ❖ Know how to modify user accounts ❖ Know how to delete user accounts
19	Exercise on Configuration of DHCP and DNS.	Configuration of DHCP and DNS.	❖ Know about static IP address, dynamic IP address ❖ Know about DHCP ❖ Configure the DHCP ❖ Know about DNS ❖ Configure the DNS

20	Exercise on File/Folder accessing rights for sharing	File/Folder accessing rights for sharing.	❖ Know the different accessing rights ❖ Know how to give access rights ❖ Know how to remove access rights ❖ Know how to share file/folders
21	Exercise on remote desktop.	Exercise on remote desktop.	❖ Know about remote login ❖ Know how to login to the remote desktop
22	Exercise on setting up of VPN on network	Exercise on setting up of VPN on network	❖ Know about VPN ❖ Know how to configure VPN service

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

S.No.	Chapter/Unit Title	No. of Periods	CO's Mapped
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
Total Periods		60	

COURSE OBJECTIVES	Upon completion of the course the student shall able to learn		
	1. Insert, update, delete and select data into/from Relation Database 2. Develop PL/SQL programs 3. Insert, update, delete and select data from MongoDB		

Course Outcomes	Upon completion of the course the student shall be able to		
	CO1	AIM308.1	Develop SQL Queries to Create, modify and drop tables and Queries to Insert, update, delete data from tables.

	CO2	AIM308.2	Execute SQL Queries to display data on different conditions from different tables
	CO3	AIM308.3	Execute PL/SQL Programs
	CO4	AIM308.4	Demonstrate the usage of cursors and triggers
	CO5	AIM308.5	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
AIM308.1	2		3			2	3	3	2	
AIM308.2	2	2	1			2			2	
AIM308.3	2		1					2		2
AIM308.4	2	2	3	3	3	3		2	2	2
AIM308.5	2	3				3	3			
Average	2	2.3	2	3	3	2.5	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 PL/SQL exception handling
- 17 Exercise on Procedures
- 18 Exercise on Functions
- 19 Exercise on Recursion

- 20 Exercise on Cursors
- 21 Exercise on Triggers
- 22 Exercise on Installation of MongoDB
- 23 Exercise on Creation and Dropping of Database
- 24 Exercise on Creation and Dropping of Collections.
- 25 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	1
4	Exercise on updating records	1
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 date functions, group functions	3
10	Exercise on SET operators	2
11	Exercise on sub queries	3
12	Exercise on Joins	3
13	Exercise on various date and number format models	1
14	Exercise on creating tables with integrity constraints	1
14	Write programs using PL/SQL control statements	6
15	Exercise on PL/SQL built-in exception handling	2
16	Exercise on PL/SQL in user defined exception handling	2
17	Exercise on Procedures	2
18	Exercise on Functions	1

Sl. No	Name of the Experiment	Periods
19	Exercise on Recursion	1
20	Exercise on Cursors	1
21	Exercise on Triggers	1
22	Exercise on Installation of MongoDB	1
23	Exercise on Creation and Dropping of Database	1
24	Exercise on Creation and Dropping of Collections	1
25	Exercises on commands of MongoDB	1
Total		60

KEY COMPETENCIES

Sl. No	Name of the Experiment	Objectives	Key Competencies
1	Know installation	Perform the following: - 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	❖ Observe Oracle version being installed ❖ Observe the RAM & HDD requirements ❖ Rectify for any Oracle installation errors ❖ Able to login as Administrator and as Oracle user account
2	Exercise on creating tables.	Perform the following: - 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	❖ Correct Table creation syntax errors ❖ Correct the wrong data types and inappropriate sizes for the respective fields ❖ Check for displaying the structure of the table
3	Exercise on inserting records	Perform the following: - Check for the required table present already - To insert the records correctly - To display the records correctly	❖ Correct syntax errors for Insertion of record ❖ Check for insertion of proper values for the required fields ❖ Verify the correct values pertaining to the record are inserted in the required table ❖ Check for displaying of the records correctly

Sl. No	Name of the Experiment	Objectives	Key Competencies
4	Exercise on updating records	Perform the following: i. Check for the required table present already ii. To update the records correctly iii. To display the updated records	❖ Correct syntax errors for updating of record ❖ Check for updating ❖ Check for displaying of the updated records correctly
5	Exercise on modifying the structure of the table	Perform the following i. To identify the required table, present in the system already ii. To add new column iii. To display the records correctly	❖ Correct syntax errors in modifying the structure of the table ❖ Check whether required field is newly added to the existing table ❖ Check for displaying of the modified table correctly
6	Exercise on SELECT command	Perform the following i. To identify the required table, present already ii. To display the records in the required table	❖ Check for syntax error in usage of Select command ❖ Check whether Select command is given correctly to display all the records
7	Exercise on querying the table using clauses like WHERE, ORDER, IN, AND, OR, NOT, IS NULL	Perform the following: i. To use the Select command ii. To use the clauses WHERE, ORDER, IN, AND, OR, NOT, IS NULL along with Select command on the given records in the table	❖ Check for syntax error in usage of Select command with appropriate clauses ❖ Check whether Select command along with appropriate clause is given correctly for the required condition ❖ Check the usage of clauses WHERE, ORDER, IN, AND, OR, NOT along with Select command appropriately
8	Exercise on GROUP BY, HAVING	Perform the following: i. To use the Select command To use the clauses GROUP BY, HAVING along with Select command on the given records in the table	❖ Check for syntax error in the usage GROUP BY, HAVING ❖ Check for usage of GROUP BY, HAVING ❖ Verify output values based on certain condition on few records
9	Exercise on Number functions, character functions, conversion functions and date functions, group functions	Perform the following i. To use functions ii. To use set command along with WHERE condition, GROUP BY, HAVING	❖ Check for syntax error of various functions ❖ Check for usage of various functions ❖ Verify output values based on certain condition on few records

Sl. No	Name of the Experiment	Objectives	Key Competencies
10	Exercise on SET operators	Perform the following iii. To use set command iv. To use set command along with WHERE condition	❖ Check for syntax error in the usage of SET command ❖ Check for usage of SET command for updating values based on certain condition on few records
11	Exercise on sub queries	Perform the following i. To use Select command ii. To use appropriate Operators IN	❖ Check for the syntax error in usage of sub queries ❖ Check for the correctness of the usage of appropriate operators used
12	Exercise on Joins	Perform the following i. To create two tables ii. To use the common field if two tables are used iii. To know different types of Joins	❖ Check for the correctness of the syntax used for joining ❖ Check if the join is created between two tables ❖ Check if self-join is created
13	Exercise on various date and number format models	Perform the following: i. To use date formats correctly ii. To use number formats correctly	❖ Check for the syntax of the date formats ❖ Check for the syntax of the number formats
14	Exercise on creating tables with integrity constraints	Perform the following i. Create Primary key ii. Create Foreign key or referential integrity constraint iii. Create NOT NULL constraint iv. Create UNIQUE Key constraint v. Create CHECK constraint	❖ Check for the syntax errors in usage of all types of Integrity constraints ❖ Check whether different types of Integrity constraints are used
14	Write programs using PL/SQL control statements	Perform the following i. To use IF ... ELSE statements ii. To use iterative statements – Simple loop, While Loop, For Loop	❖ Check for the syntax of IF... ELSE statements ❖ Check for the syntax of all iterative statements

Sl. No	Name of the Experiment	Objectives	Key Competencies
15	Exercise on PL/SQL built-in exception handling	Perform the following i. Know about types of Exception handling ii. To handle built-in Exceptions	❖ Check for handling of built-in Exceptions ❖ Check for raising of user defined Exception ❖ Check for handling of user defined Exception with appropriate error messages
16	Exercise on PL/SQL in user defined exception handling	Perform the following i. To declare user defined exception ii. To raise user defined exception iii. To handle user defined exception	❖ Check for declaration of user defined exception ❖ Check for proper raising of exceptions ❖ Check for proper handling of user defined exception with appropriate error messages
17	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
18	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
19	Exercise on Recursion	Perform the following i. To know the concept of stored functions and stored procedures ii. To call the procedure and function by itself iii. To place a condition to terminate from calling itself	❖ Check for the syntax of stored function or procedure ❖ Check for calling the function or procedure in the same function/procedure ❖ Check for the condition to terminate from calling itself

Sl. No	Name of the Experiment	Objectives	Key Competencies
20	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
21	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
22	Exercise on Installation of MongoDB	Perform the following i. To download and install MongoDB	❖ Observe MongoDB version being installed ❖ Observe the RAM & HDD requirements ❖ Rectify for any MongoDB installation errors Able to login as Administrator
23	Exercise on Creation and Dropping of Database	Perform the following i. Create the Database ii. Drop the Database	❖ Know the use of create Database () and dropDatabase() ❖ Correct Database creation syntax errors ❖ Check for displaying the database name
24	Exercise on Creation and Dropping of Collections	Perform the following i. Create the Collection ii. Drop the Collection	❖ Know the use of create Collection () and drop () ❖ Correct Database creation syntax errors ❖ Check for collection name ❖ Check for the collection dropped

Sl. No	Name of the Experiment	Objectives	Key Competencies
25	Exercises on commands of MongoDB	Execute the following commands of MongoDB i. Insert the Document ii. update the Document iii. find the Document iv. Delete the Document v. sort the Documents	❖ Know the syntax of insert (), update (), find (), remove (), sort () functions. ❖ Correct syntax errors. ❖ Check out for different input values.

Course Code	Course Title	No. of periods/week	Total No. of periods	Marks for FA	Marks for SA
AIM-309	Multimedia Lab	4	60	40	60

S.NO	MAJOR TOPICS	NO. OF PERIODS	CO's mapped
1	MS Access - create Database, create table with and without constraints, Insert, delete, update records, implement queries, create relationship between two tables	12	CO1
2	Scribus/Page maker- Creation of publication using tools, text, shapes, etc, Custom template, colors, text block, Objects, Styles, Page elements, Printing the documents	12	CO2
3	Telugu typing Software /Telugu Software– Anu Script Manager, Usage in SCRIBUS/ Page Maker., Key board acquaintance	8	CO3
4	GIMP/Photoshop – Different tools, Working with Layers, Working with painting tools, Colors, Brushes	16	CO4
5	Adobe Flash – Drawing Basic shapes, Working with layers, Working with Text , 3D spaces, Creating simple animations, Audio and video editing using audacity tool	12	CO5
	TOTAL	60	

Course Objectives	(i) Familiarize with the features of MS Access. (ii) Familiarize with the features of Adobe PageMaker/ Scribus. (iii) Familiarize with Telugu Typing software/ Telugu Software (iv) Familiarize with the features of Adobe <i>GIMP/ Photoshop</i> . (v) Familiarize with the features of Adobe Flash
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Course Outcomes	Upon completion of the course the student shall be able to		
	CO1	AIM-309.1	Demonstrate the concepts of databases, tables, manipulating records, queries and establishing relationship among tables.
	CO2	AIM-309.2	Design publication files such as Textbooks, Visiting Cards, Invitation Cards, etc. using Adobe PageMaker
	CO3	AIM-309.3	Use Telugu Typing software (Anu Script Manager) in SCRIBUS/ Adobe Page maker.
	CO4	AIM-309.4	Use the Adobe GIMP/ Photoshop, Design and enhance the quality all types of picture files
	CO5	AIM-309.5	Use Adobe Flash features to include multimedia animations through audio and visual effects.

CO-PO/PSO MATRIX

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM-309.1	3	2	3	1		3	3	2		2
AIM-309.2	2	2	3		2		2	2		
AIM-309.3	1	1	2	3	2		2		3	
AIM-309.4		3	3	2		2		2	2	2
AIM-309.5		3	1		2	2	2	2	2	2
Average	1.2	2.2	2.4	2	2	2.3	2.25	2	2.3	2

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

Learning Outcomes:**Practice with MS-Access**

1. To create Database
2. To Create table with and without constraints
3. To Insert, delete, update records
4. To implement queries
5. To create relationship between two table

Practice with Adobe SCRIBUS/ Page Maker.

6. Exercise on Installation, invoking and familiarizing Adobe Page Maker.
7. Exercise on SCRIBUS/ Page Maker. Tools.
8. Exercise on pallets and formatting pages
9. Exercise on text formatting
10. Exercise on Advanced text formatting
11. Exercise on Graphics tools
12. Exercise on object transformations.
13. Exercise on color options.
14. Exercise on graphics with layers using photo shop plug-ins
15. Exercise on import and export options.
16. Exercise on creating visiting card
17. Exercise on creating book cover page
18. Exercise on creating hotel menu card
19. Exercise on creating invitation card
20. Exercise on creating brochure
21. Exercise on Anu script for preparing Visiting card, Brochure in telugu.
22. Exercise on Anu script for preparing telugu invitation card.

Practice with Adobe *GIMP/ Photoshop*.

23. Exercise on Installation, invoking and familiarizing Adobe *GIMP/ Photoshop*.
24. Exercise on Images
25. Exercise on Resizing & Cropping Images
26. Exercise on Working With Basic Selections
27. Exercise on Layers
28. Exercise on Painting In *GIMP/ Photoshop*.
29. Exercise on Photo Retouching
30. Exercise on Color Correction
31. Exercise on Quick Mask Mode
32. Exercise on Pen Tool
33. Exercise on Creating Special Effects
34. Exercise on Exporting Your Work
35. Exercise on Logo Creation

Practice with Adobe Flash

36. Exercise on creating a new document, drawing basic shapes using pen, pencil, brush and eraser tools
37. Exercise on creating layers , naming layers, organizing layers in to folders.
38. Exercise on creating objects, fill, gradient , aligning and grouping of objects in to layers.
39. Exercise on Creating symbols and instances, creating frame by frame animation animating the text.
40. Exercise on creating motion tweening animation - classic tweening
41. Exercise on creating shape tweening and path tweening animations.
42. Exercise on creating onion skinning animation effects.
43. Exercise on Creating a spot light masking for text and image..
44. Exercise on creating a new audio file by editing the existing audio.

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

KEY COMPETENCIES

Exp No	Name of the Experiment	Objectives	Key Competencies
1	To create database	a. Open MS Access b. Create database c. save	database creation
2	To create table	a. Open MS Access b. Create database c. Create table d. Use primary key	table creation
3	To insert/delete/update records into table	a. Open msaccess b. Create database c. Create table d. Insert/delete/update records	able to insert/update/delete and delete and update records into the table
4	To implement queries	a. Open msaccess b. Create database Crate table	able to display contents of the table based on the user requirement

		c. Use Select command	
5	Create relationships between tables	a. Create table b. Create one more tables c. Insert records d. Use relationship option	able to link tables
6	Exercise on Installation, invoking and familiarizing Adobe Page Maker.	Installation, invoking and familiarizing Adobe Page Maker.	❖ Installing page maker ❖ Familiarize with pagemaker environment
7	Exercise on Page Maker Tools.	Page Maker Tools.	❖ Using Tool box, zero position, pointer tool, text tool, rotate tool, crop tool, oblique line tool, constrained line tool, box tool, rectangle frame, circle tool, circular frame, polygon tool, polygon frame, hand tool and zoom tool,
8	Exercise on pallets and formatting pages	pallets and formatting pages	❖ Use of paper size, page size, control pallet, color pallet, styles pallet, layers pallet, master page pallet, hyperlink pallet and measurement system, grids, rulers and guides, insert pages.
9	Exercise on text formatting	text formatting	❖ Know the purpose of master pages, placing a text, Formatting text (size, styles), Paragraph setting, tab setting, bullets, numbering, hyphenation setting, setting and creating styles, rotating text and color to text and save the document.
10	Exercise on Advanced text formatting	Advanced text formatting	❖ use spell check, divide the text into columns, work with indexes and pagination, use the find feature and save the document.
11	Exercise on Graphics tools	Graphics tools	❖ Create a document to work with graphics with the help of line tool, box tool,

			ellipse tool, polygon tool, rounded corners, fill, stroke and to place various graphics(at least 2 for each graphic tool) and save the document.
12	Exercise on object transformations.	object transformations.	❖ Transform the objects such as transforming a rectangle, resizing an ellipse, inserting cropping an image.
13	Exercise on color options.	color options.	❖ Adding color to a graphic shape, creating own colors with RGB, editing, copying, removing and replacing colors, grouping and ungrouping objects, linking objects, masking objects and save the document.
14	Exercise on graphics with layers using photoshop plug-ins	graphics with layers using photoshop plug-ins	❖ Create a document of five pages containing text and graphics and work with layers, moving objects between layers using layer options, using stacking order, using photoshop plug-ins
15	Exercise on import and export options.	import and export options.	❖ Create a new document and import text from HTML, MSword, spreadsheet, photo CD, acquiring tif image, managing linked files, to use export options to export text and graphics to jpeg format and to print the document, to publish the document in internet and save it,
16	Exercise on creating visiting card	creating visiting card	❖ Create visiting card with text and graphics on both sides with proper formatting.
17	Exercise on creating book cover page	creating book cover page	❖ Create front and back cover page of a book with text and graphics with proper formatting.

18	Exercise on creating hotel menu card	creating hotel menu card	❖ Create a hotel menu card with text and graphics with proper formatting.
19	Exercise on creating invitation card	creating invitation card	❖ Create a invitation card with text and graphics with proper formatting for required no. of pages.
20	Exercise on creating brochure	creating brochure	❖ Create a brochure for the firms like real estate companies, hospitals, educational institutions etc.,
21	Exercise on Anuscript for preparing Visiting card, Brochure	Anuscript for preparing Visiting card, Brochure	❖ Visiting card, Brochure preparation using Anuscript in Telugu
22	Exercise on Anuscript for preparing telugu invitation card.	Anuscript for preparing telugu invitation card.	❖ Invitation card preparation using Anuscript in Telugu
23	Exercise on Installation, invoking and familiarizing Adobe Photoshop	Installation, invoking and familiarizing Adobe Photoshop	❖ Exploring the Toolbox ❖ The New CS4 Applications Bar & the Options Bar ❖ Exploring Panels & Menus ❖ Creating & Viewing a New Document ❖ Customizing the Interface ❖ Setting Preferences
24	Exercise on Images	Working with Images	❖ Zooming & Panning an Image ❖ Working with Multiple Images, Rulers, Guides & Grids ❖ Undoing Steps with History ❖ Adjusting Color with the New Adjustments Panel ❖ The New Masks Panel & Vibrance Color Correction Command ❖ The New Note Tool & the Save for Web & Devices Interface ❖ The New Auto-Blend & Auto-Align Layers Commands ❖ The New 3D Commands

25	Exercise on RESIZING & CROPPING IMAGES	RESIZING & CROPPING IMAGES	❖ Understanding Pixels & Resolution ❖ The Image Size Command ❖ Interpolation Options ❖ Resizing for Print & Web ❖ Cropping & Straightening an Image ❖ Adjusting Canvas Size & Canvas Rotation
26	Exercise on WORKING WITH BASIC SELECTIONS	WORKING WITH BASIC SELECTIONS	❖ Selecting with the Elliptical Marquee Tool ❖ Using the Magic Wand & Free Transform Tool ❖ Selecting with the Regular & Polygonal Lasso Tools ❖ Combining Selections ❖ Using the Magnetic Lasso Tool ❖ Using the Quick Selection Tool & Refine Edge ❖ Modifying Selections
27	Exercise on LAYERS	Working on Layers	❖ Understanding the Background Layer ❖ Creating, Selecting, Linking & Deleting Layers ❖ Locking & Merging Layers ❖ Copying Layers, Using Perspective & Layer Styles ❖ Filling & Grouping Layers ❖ Introduction to Blending Modes ❖ Blending Modes, Opacity & Fill ❖ Creating & Modifying Text
28	Exercise on PAINTING IN PHOTOSHOP	PAINTING IN PHOTOSHOP	❖ Using the Brush Tool ❖ Working with Colors & Swatches ❖ Creating & Using Gradients ❖ Creating & Working with Brushes ❖ Using the Pencil & Eraser Tools ❖ Painting with Selections
29	Exercise on PHOTO RETOUCHING	PHOTO RETOUCHING	❖ Using The Red Eye Tool ❖ The Clone Stamp Tool ❖ The Patch Tool & the Healing Brush Tool ❖ The Spot Healing Brush Tool ❖ The Color Replacement Tool ❖ The Toning & Focus Tools ❖ Painting with History

30	Exercise on COLOR CORRECTION	COLOR CORRECTION	❖ Using Color Spaces & Color Modes ❖ The Variations Command ❖ The Auto Commands ❖ Adjusting Levels ❖ Adjust Curves, Non-Destructively, with Adjustment Layers
31	Exercise on QUICK MASK MODE	Using QUICK MASK MODE	❖ Using Quick Mask Options ❖ Painting a Selection ❖ Saving & Removing a Selection from the Background
32	Exercise on PEN TOOL	Working with the PEN TOOL	❖ Understanding Paths & the Pen Tool ❖ Creating Straight & Curved Paths ❖ Creating Combo Paths ❖ Creating a Clipping Path
33	Exercise on CREATING SPECIAL EFFECTS	CREATING SPECIAL EFFECTS	❖ Getting Started with Photoshop Filters ❖ Smart Filters ❖ Creating Text Effects ❖ Applying Gradients to Text
34	Exercise on Photo Shop Credits	EXPORTING YOUR WORK	❖ Saving with Different File Formats ❖ Saving for Web & Devices ❖ Printing Options ❖ Photo shop Credits
35	Exercise on Logo Creation	Logo Creation	❖ To apply all the tools ❖ Prepare college logo ❖ Prepare logo for industry
36	Exercise on creating a Flash Page	Creating flash document	❖ Opening of flash interface ❖ Creating a new file ❖ Working with basic tools like pen, pencil, Brush and eraser tools ❖ Drawing basic shapes ❖ Save the file
37	Exercise on creating Layers in Flash	Working with layers, naming and grouping, locking and unlocking layers.	❖ Creating basic shapes in different layers ❖ Grouping up of layers ❖ Locking and unlocking the layers ❖ Naming the layers ❖ Grouping the layers in to folders
38	Exercise on creating Objects	Working with objects	❖ Creating different objects ❖ Working with fill, gradient features of objects ❖ Linking of objects to layers ❖ Aligning the objects.

			❖ Save the file.
39	Exercise on Frame By Frame animation	Working with symbols and instances, working with timeline, frame by frame animation.	❖ Creating symbols and instances ❖ Saving the symbols and instances ❖ Creating a text in a layer ❖ Animating the text using frame by frame animation ❖ Setting the time limit for animation ❖ Save the file.
40	Exercise on Motion Tweening	Creating a basic shape, moving the ball using motion tweening.	❖ Creating a basic object like Ball ❖ Working with fill , gradient and texture for the object ❖ Moving the ball in direction using motion tweening
41	Exercise on Morphing, path tweening	import an object, working with shape tweening. Creating a shape, working with guide layer.	❖ Create / Import an object ❖ Attaching the object to layer ❖ Morph the object using shape tweening ❖ Ceate a basic shape like BEE ❖ Attach the shape to layer ❖ Creating a path and attaching to layer ❖ Playing the animation
42	Exercise on creating onion skinning animation effect	Learning the use of onion skinning feature in Flash	❖ Creating any basic shape ❖ Working with time line feature ❖ Enabling onion skin feature ❖ Playing the animation
43	Exercise on Spot light masking	Creating an object, Creating spotlight,Masking of the object,playing the animation	❖ Create a text/object ❖ Creating spotlight for text/object ❖ Playing the animation
44	Exercise on creating new audio file	Importing an audio file Clipping the audio Saving and exporting the audio file.	❖ Import an audio file ❖ Cut a small part of audio file using audacity tool ❖ Save the file

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

CURRICULUM-2020

(IV Semester)

Sub Code	Name of the Subject	Instruction		Total Periods Per Semester	Scheme Of Examinations			
		Periods/Week						
		Theory	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-401	Mathematics III	3	-	45	3	20	80	100
AIM-402	Web Technologies	5	-	75	3	20	80	100
AIM-403	Artificial Intelligence	5	-	75	3	20	80	100
AIM-404	Java Programming	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	-	6	90	3	40	60	100
AIM-407	Java Programming Lab & Mini Project	-	6	60	3	40	60	100
AIM-408	Communication Skills	-	3	45	3	40	60	100
AIM-409	Artificial Intelligence Lab using prolog	-	4	60	3	40	60	100
	Total	23	19	630	-	260	640	900

AIM-401&408 common with all branches

AIM-402,406 common with DCME, DCBDE, DCCNE

AIM-404, 407 common with DCBDE, DCCNE

ENGINEERING MATHEMATICS-III

Course Code	Course Title	No. of Periods/week	Total No. of periods	Marks for FA	Marks for SA
AIM-401	Engineering Mathematics-III	3	45	20	80

S.No.	Unit Title	No. of periods	COs mapped
1	Higher order Linear Differential equations with constant coefficients	15	CO1
2	Laplace Transforms	18	CO2
3	Fourier Series	12	CO3
Total Periods		45	

Course Objectives	(i) To learn the principles of solving differential equations of second and higher order. (ii) To comprehend the concept of Laplace transformations and inverse Laplace transformations. (iii) To understand the concept of Fourier Series expansion of functions.
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Course Outcomes	Upon completion of the course the student shall be able to	
	CO1	Solve homogeneous and non-homogeneous differential equations of second and higher order.
	CO2	Find Laplace and inverse Laplace transforms of various functions.
	CO3	Expand given functions as Fourier series and half- range Fourier Sine and Cosine series.

ENGINEERING MATHEMATICS – III

Learning Outcomes

Unit-I

Differential Equations of higher order

C.O. 1 Solve homogeneous and non-homogeneous differential equation of second and higher order.

- L.O** 1.1 Solve Differential equations of the type $(aD^2 + bD + c)y = 0$ where a, b, c are real numbers and provide examples.
- 1.2 Solve higher order homogeneous differential equations with constant coefficients and provide examples.
- 1.3 Define complementary function, particular Integral and general solution of a non-homogeneous differential equation.
- 1.4 Describe the methods of solving $f(D)y = X$ where $f(D)$ is a polynomial of n^{th} order and X is a function of the forms $k, e^{ax}, \sin ax, \cos ax, x, x^n$ and their linear combinations where n is a positive integer, with examples.

Unit-II

Laplace Transforms

C.O. 2 Find Laplace and inverse Laplace transforms of various functions.

- L.O.** 2.1 Define Laplace Transform and explain the sufficient conditions of existence of Laplace Transform
- 2.2. Obtain Laplace transforms of standard functions and solve simple problems.
- 2.3 Write the properties of Laplace Transform – Linearity property, First shifting theorem (without proof) and Change of Scale property and solve simple problems.
- 2.4. Write the Laplace Transform of unit step function and second shifting theorem (without proof) and solve simple problems.
- 2.5. Write formulae for Laplace transform of functions with multiplication by t^n and division by t, Laplace transform of derivatives, evaluation of some definite integrals using Laplace Transforms and solve simple problems.
- Syllabus for Unit test-I completed
- 2.6 Define inverse Laplace Transform, obtain inverse Laplace Transforms of standard functions and solve simple problems.
- 2.7 Write linearity property, first and second shifting theorems (without proof), change of scale property of inverse Laplace transform and solve simple problems.
- 2.8 Write inverse Laplace transforms of derivatives and integrals and solve simple problems.
- 2.9 Write inverse Laplace transforms of functions with multiplication by s and division by s and solve simple problems.
- 2.10 Write inverse Laplace transforms of functions using partial fractions and solve some simple problems.
- 2.10 Define convolution of two functions, state convolution theorem (without proof) and solve simple problems.

Unit-III

Fourier series

C.O. 3 Expand given functions as Fourier series and half- range Fourier Sine and Cosine series

L.O. 3.1 Define the orthogonality of functions in an interval.

3.2 Define Fourier series of a function in the intervals $(c, c + 2\pi)$ and $(c, c + 2l)$ and write the Euler's formulae for determining the Fourier coefficients.

3.3 Write sufficient conditions for the existence of Fourier series expansion of a function.

3.4 Find Fourier series of simple functions in the range $(0, 2\pi)$ and $(-\pi, \pi)$

3.5 Write Fourier series for even and odd functions in the interval $(-\pi, \pi)$ and $(-l, l)$ expand simple functions.

3.6 Write Fourier series expansion of a function over the interval $(0, 2l)$ and $(-l, l)$ and expand simple functions.

3.7 Write half-range Fourier sine and cosine series of a function over the interval $(0, \pi)$ and $(0, l)$ and expand simple functions.

Syllabus for Unit test-II completed

Engineering Mathematics – III

CO/PO - Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	1	1				2	3	2
CO2	3	3	3	3				3	3	3
CO3	3	3	3	3				3	3	3
Avg	3	2.66	2.33	2.33				2.66	3	2.66

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-20
Engineering Mathematics – III
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	45	100%	3	>40% Level 3 Highly addressed
2	CO1, CO2, CO3	37	82.2%	3	
3	CO1, CO2, CO3	32	71.1%	3	
4	CO1, CO2, CO3	32	71.1%	3	
5					25% to 40% Level 2 Moderately addressed
6					
7					
PSO 1	CO1, CO2, CO3	37	82.2%	3	5% to 25% Level 1 Low addressed <5% Not addressed
PSO 2	CO1, CO2, CO3	45	100%	3	
PSO 3	CO1, CO2, CO3	36	80%	3	

ENGINEERING MATHEMATICS – III
(Common Subject)
Course Content

Unit I: Differential Equations of higher order

1. Solve Homogenous linear differential equations with constant coefficients of order two and higher with emphasis on second order.
2. Solve Non-homogenous linear differential equations with constant coefficients of the form $f(D)y = X$ where X is in the form $k(\text{constant})$, e^{ax} , $\sin ax$, $\cos ax$, x^n , where n is a positive integer, finding complimentary function, particular integral and general solution.

Unit II: Laplace Transforms

3. Definition, sufficient conditions for existence of LT, LT of elementary functions, linearity property, state first shifting theorem, change of scale property, multiplication by t^n , division by t , LT of derivatives and integrals, LT of unit step function, state second shifting theorem, inverse Laplace transforms- state shifting theorems and change of scale property, multiplication by s^n and division by s , derivatives, integrals, examples of inverse LT using partial fractions, state convolution theorem with simple examples.

Unit III: Fourier series

4. Orthogonality of trigonometric functions, Representation of a function in Fourier series over the interval $(c, c + 2\pi)$ and $(c, c + 2l)$, Euler's formulae, sufficient conditions for existence of Fourier series expansion of a function, Fourier series expansion of basic functions limited to $k(\text{constant}), x, x^2, \sin ax, \cos ax, e^{ax}$ and their combinations over the intervals $(0, 2\pi), (-\pi, \pi), (0, 2l), (-l, l)$, Fourier series for even and odd functions over $(-\pi, \pi)$ and $(-l, l)$, Fourier half-range sine and cosine series over $(0, \pi)$ and $(0, l)$

Textbook:

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

Reference Books:

1. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers
2. M.R. Spiegel, Schaum's Outline of Laplace Transforms, Schaums' Series
3. M.Vygodsky, Mathematical Handbook: Higher Mathematics, Mir Publishers, Moscow.

Model Blue print

S. No	Chapter/ Unit title	No of Periods	Weight age allotted	Marks wise distribution of weightage				Question wise distribution of weightage				COs mapped
				R	U	Ap	An	R	U	Ap	An	
1	Unit – I Higher order Linear Differential equations with constant coefficients	15	28	11	11	3	3	2	2	1	1	CO1
2	Unit - II Laplace Transforms	18	33	11	11	11	0	2	2	2	0	CO2
3	Unit - III Fourier Series	12	19	3	3	3	10	1	1	1	1	CO3

Total	45	80	25	25	17	13	5	5	4	2	
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R: Remembering Type : 25 Marks
U: understanding Type : 25 Marks
Ap: Application Type : 17 Marks
An: Analysing Type : 13 Marks

C-20
Engineering Mathematics – III
Unit Test Syllabus

Unit Test	Learning Outcomes to be Covered
Unit Test-I	From LO 1.1 to 2.5
Unit Test-II	From LO 2.6 to 3.7

Unit Test I

C –20, AIM-401

State Board of Technical Education and Training, A. P

IV SEMESTER

Subject name: **Engineering Mathematics-III**

Sub Code: **AIM -401**

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. Write the auxiliary equation for given differential equation $(D^2 + 4)y = 0$ (CO1)
- b. For given differential equation $f(D)y = 0$, if roots of auxiliary equation are 1,-1, then $y =$ (CO1)
- c. $L\{e^{3t}\} =$ _____ (CO2)
- d. $L\{f(t)\} = \bar{f}(s)$ then $L\{e^{at} f(t)\} = \bar{f}(s+a)$: State TRUE/FALSE (CO2)

2. Solve $(D^2 - 2D + 1)y = 0$. (CO1)

3. Find the particular integral of $(D^2 + D + 4)y = e^x$ (CO1)

4. Evaluate $L\{(t-1)^2\}$ (CO2)

5. Evaluate $L\{t^2 + 2\cos t + 3\sin t\}$ (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) Solve $(D^4 - 5D^2 + 4)y = 0$. (CO1)

or

B) Solve $(D^2 + D - 6)y = 1 + e^{-3x}$. (CO1)

7. A) Solve $(D^2 + 3D + 2)y = x^2 + \sin x$. (CO1)

or

B) Solve $(D^2 - D)y = 2e^x + 3\cos x$.
(CO1)

8. A) Evaluate $L\{e^{3t} \cos^2 t\}$

(CO2)

or

B) Evaluate $L\{e^t (t+1)^2\}$ (CO2)

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Unit Test II

C -20, AIM-401

State Board of Technical Education and Training, A. P

IV SEMESTER

Subject name: **Engineering Mathematics-III**

Sub Code: **AIM401**

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. $L\{f(t)\} = \bar{f}(s)$ then $L\{tf(t)\} = -\frac{d}{ds}(\bar{f}(s))$: State TRUE/FALSE (CO2)

b. $L^{-1}\left\{\frac{1}{s-3}\right\} = ?$

(CO2)

c. $L^{-1}\left\{\frac{1}{s^2+a^2}\right\}=?$

(CO2)

d. Write the Fourier series for the function $f(x)$ in the interval $c < x < c + 2\pi$. (CO3)

2. Evaluate $L\{te^t\}$.

(CO2)

3. Evaluate $\int_0^{\infty} e^{-3t} \sin 4t dt$.

(CO2)

4. Evaluate $L^{-1}\left\{\frac{3}{s+4} + \frac{2}{s^2+16} - \frac{s}{s^2-4}\right\}$. (CO2)

5. Evaluate Fourier coefficient a_0 for $f(x)$ in the interval $(-\pi, \pi)$. (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) Evaluate $L\{te^{-t} \cos t\}$.

(CO2)

or

B) Evaluate $L\left\{\frac{\cos at - \cos bt}{t}\right\}$.

(CO2)

7. A) Evaluate $L^{-1}\left\{\frac{s}{(s+1)(s^2+1)}\right\}$.

(CO2)

or

B) Evaluate $L^{-1}\left\{\frac{s}{(s-1)^4}\right\}$. (CO2)

8. A) Obtain the Fourier series for the function $f(x) = e^x$ in the interval $(0, 2\pi)$. (CO3)

or

B) Obtain the half range Fourier cosine series of $f(x) = x^2$ in $(0, 1)$.

(CO3)

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END EXAM MODEL PAPER
STATE BOARD OF TECHNICAL EDUCATION, A.P
ENGINEERING MATHEMATICS –AIM 401

TIME : 3 HOURS **MODEL PAPER- I** **MAX.MARKS : 80M**
PART-A

Answer All questions. Each question carries THREE marks.

10x3=30M

1. Solve $(D^2 - 3D + 2)y = 0$. CO 1
2. Solve $(D^2 + D + 1)y = 0$. CO 1
3. Find the particular integral of differential equation $(D^2 + 4)y = \sin 2x$. CO 1
4. Find the particular integral of differential equation $(D^2 + 3D + 2)y = e^{3x}$. CO 1
5. Find $L\{2e^{3t} + \sin 3t + \cosh t\}$. CO2
6. Find $L\{e^t \cos 4t\}$. CO2
7. Find $L^{-1}\left\{\frac{1}{s^2} + \frac{4}{s^2 + 4} + \frac{3s}{s^2 - 9}\right\}$. CO2
8. Find the value of a_0 in the Fourier expansion of $f(x) = e^x$ in the interval $(0, 2\pi)$. CO3
9. Find the Fourier coefficients of $f(x)$ in the interval $(-\pi, \pi)$. CO3
10. Find the value of a_1 in the half range cosine series of $f(x) = k$ in the interval $(0, \pi)$. CO3

PART-B

Answer All questions. Each question carries EIGHT marks. 5x8=40M

11. A) Solve $(D^3 - 6D^2 + 11D - 6)y = 0$. CO 1
Or
B) Solve $(D^2 - 9)y = e^{3x} + e^{-3x}$. CO 1
12. A) Solve $(D^2 - 4D + 4)y = \sin 3x$. CO1
Or
B) Solve $(D^2 + 2D + 2)y = x^2 + x + 1$. CO1
13. A) Evaluate $L\{te^t \cos t\}$. CO2
Or
B) Evaluate $L\{t^2 \cos 2t\}$. CO2
14. A) Evaluate $L\left\{\frac{\sin 5t \sin t}{t}\right\}$. CO2
Or

B) Evaluate $\int_0^{\infty} \frac{\sin t}{t} dt$. CO2

15. A) Find $L^{-1} \left\{ \frac{1}{s(s+1)(s+2)} \right\}$. CO2

Or

B) Using convolution theorem find $L^{-1} \left\{ \frac{s}{(s^2+1)(s^2+4)} \right\}$. CO2

PART-C

Answer the following question. Question carries TEN marks. 1x10=10M

16. Find the Fourier expansion of $f(x) = x + x^2$ in the interval $(-\pi, \pi)$ and hence deduce

$$\text{that } \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots = \frac{\pi^2}{12}. \quad \text{CO3}$$

TIME : 3 HOURS **MODEL PAPER- 2** **MAX.MARKS : 80M**
PART-A

1. Solve $(D^2 + 4D + 4)y = 0$. **CO 1**
2. Solve $(D^2 + 9)y = 0$. **CO 1**
3. Find the particular integral of differential equation $(D^2 - 4D + 3)y = e^{4x}$. **CO 1**
4. Find the particular integral of differential equation $(D^2 - 4D - 5)y = \cos 2x$. **CO 1**
5. Find $L\{2 - e^{-2t} + \sinh 6t\}$. **CO2**
6. Find $L\{e^{-2t}t^2\}$. **CO2**
7. Find $L^{-1}\left\{\frac{1}{s^2} + \frac{4}{s^2 + 4} + \frac{3s}{s^2 - 9}\right\}$. **CO2**
8. Find the value of a_0 in the Fourier expansion of $f(x) = x + x^2$

10. Find the value of a_1 in the half range cosine series of $f(x) = \pi$ in the interval $(0, \pi)$. **CO3**

11. A) Solve $(D^3 + 1)y = 0$. **CO 1**
Or
B) Solve $(D^2 + D - 6)y = e^{3x} + e^{-3x}$. **CO 1**

12. A) Solve $(D^2 - 3D + 2)y = \cos 3x$. **CO1**
Or
B) Solve $(D^2 + 2D + 1)y = 2x + x^2$. **CO1**

Or

B) Evaluate $L\{t^2 \cos 2t\}$. **CO2**

14. A) Evaluate $L\left\{\frac{e^{-at} - e^{-bt}}{t}\right\}$. CO2

Or

B) Using Laplace transforms evaluate $\int_0^{\infty} \cos 3t dt$. CO2

15. A) Find $L^{-1}\left\{\log\left(\frac{s^2+1}{(s-1)^2}\right)\right\}$. CO2

Or

B) Using convolution theorem find $L^{-1}\left\{\frac{1}{(s^2+1)(s+1)}\right\}$. CO2

PART-C

Answer the following question. Question carries TEN marks. 1x10=10M

16. Find the Fourier expansion of $f(x) = (\pi - x)^2$ in the interval $0 < x < 2\pi$ and hence

deduce that $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \dots = \frac{\pi^2}{6}$.

CO3

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-402	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.	12	CO1
2.	Understand various HTML tags and usage of style sheets.	14	CO2
3.	Understand XML and Client side scripting using Java Script.	14	CO3
4.	JavaScript Ajax and J Query	15	CO4
5.	Web servers and Server side scripting using PHP	20	CO5
Total Periods		75	

Course Objectives	Upon completion of the course the student shall be able to		
	i) Understand the basic elements of web page		
	ii) Know the working with HTML, CSS		
	iii) Familiarize the various Technologies like Java Script AJAX, JQuery, PHP.		
	iv) Understand Database connectivity Using PHP		

Course Outcomes	Upon completion of the course the student shall be able to		
	CO1	AIM402.1	Design interactive web page(s) using HTML
	CO2	AIM402.2	Describe the process to format and validate Web page elements using CSS,.
	CO3	AIM402.3	Describe data in a web page using XML and JavaScript
	CO4	AIM402.4	Use AJAX, JQuery and Angular JS in web page design.
	CO5	AIM402.5	Develop Dynamic web site using server side PHP Programming and database connectivity is using PHP.

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM402.1	2	1	1	2		2	1	2	3	2
AIM402.2	1	3	3	3	1	3	1	3	3	3
AIM402.3		2	3	2	2	3	1	2	3	3
AIM402.4	1	1	3	2	2	3	2	2	3	3
AIM402.5	3	3	3	3	2	3	2	3	3	3
Average	1.75	2	2.6	2.4	1.75	2.8	1.4	2.4	3	2.8

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

Learning Outcomes:**1.1 Principles of Web Designing and HTML Introduction.**

- 1.2 Basic web Terminology.
- 1.3 Describe Anatomy of web page.
- 1.4 Understand different Web page elements.
- 1.5 Navigate through web pages
- 1.6 Narrate steps in building web site
- 1.7 Narrate steps in launching
- 1.8 Narrate maintaining web site.
- 1.9 Introduction and Overview of HTML
- 1.10 Discuss the rules for designing a HTML document.
- 1.11 Explain the structure of HTML document.
- 1.12 Define HTML element and Attribute.
- 1.13 Study the basic tags in HTML <html>, <head>, <title>, <body>.
- 1.14 Study the header tags <h1> to <h6>
- 1.15 Discuss the formatting tags , <i>, <u>, <strike>, <sub>, <sup>, <big>, <small>, <tt>
- 1.16 Discuss the Logical formatting tags <q>, , <cite>, <ins>, ,
- 1.17 Discuss the <marquee> with attributes.
- 1.18 List Character entities.
- 1.19 Explain the List tags like , , , <dl>, <menu> with attributes.
- 1.20 Describe tables tags like <table>, <tr>, <td>, <th>, <tbody>, <thead>, <tfoot>

2.1 Understand various HTML tags and usage of style sheets.

- 2.2 Explain the link and imaging tags <a>, with attributes.
- 2.3 Explain the tags, <form>, <input>, <button>, <label>, <select>, <options>, <textarea>, <legend> with attributes.
- 2.4 Explain the tags, <frame>, <frameset>, <noframe>, <iframe> with attributes.
- 2.5 Illustrate about cascading style sheets
- 2.6 Understand the level of styles inline, internal and embedded style sheets.
- 2.7 Explain ID and Class selectors in CSS
- 2.8 Explain about Color and background properties
- 2.9 Explain about Box properties like Border, position, margin, padding of elements.

3.1 Understand XML and Java Script.

- 3.2 Describe how to organize data in the form of XML.

- 3.3 Explain the rules for designing XML document.
- 3.4 Understand the significance of Namespace.
- 3.5 List the various applications of XML.
- 3.6 Differentiate between Client-side and Server-side scripting.
- 3.7 List Client side and server side scripting languages.
- 3.8 Describe the features of Java Script.
- 3.9 Placing JavaScript code in HTML.
- 3.10 Understand functions
- 3.11 Know how to define and call a function.
- 3.12 Know how to pass parameters.
- 3.13 Understand the purpose of getElementById method
- 3.14 Describe the global functions provided by JavaScript.
- 3.15 Form Handling in Java Script
- 3.16 Illustrate Arrays
 - 3.16.1 Understand single and multi-dimensional arrays.
 - 3.16.2 Design small programs using arrays.
- 3.17 Understand about various Objects provided by JavaScript
 - 3.17.1 Math object
 - 3.17.2 String object
 - 3.17.3 Date object
 - 3.17.4 Boolean and Number object
- 3.18 Describe events in java script.

4.1 JavaScript Ajax and JQuery

- 4.2 Define AJAX
- 4.3 List the steps for designing a web application using AJAX.
- 4.4 Explain XMLHttpRequest Object properties and methods of XMLHttpRequest
- 4.5 Explain sending Ajax request to server and receiving a response from server with example program.
- 4.6 Define JQuery
- 4.7 List the features of JQuery
- 4.8 List JQuery plugins
- 4.9 Explain the steps for to includeJQueryin Web Pages
- 4.10 Explain JQuery Syntax with example program
- 4.11 Describe the jQuery Selectors-Accessing HTML elements by using
 - 4.11.1 Element Selectors
 - 4.11.2 ID, Class Selectors
- 4.12 Explain the JQuery Document Ready Event
- 4.13 Describe the JQuery Event handling methods(Mouse Events, Keyboard Events, Form Events, Document/Window events)
- 4.14 Explain effects of JQuery (like hide, show, fadeIn, fadeout, fadeToggle,fadeTo, slideDown, SlideUp, SlideToggle)
- 4.15 Explain Functions in JQuery like text(),html(), val(), attr(),css().
- 4.16** Define AngularJS? Architecture, Advantages & Features.
- 4.17** List and Explain Angular JS Directives like ng-app,ng-init ,ng-model ,ng-repeat
- 4.18** Explain AngularJS Expressions like number, string,object,array.
- 4.19** Explain AngularJS Filters like lowercase,uppercase,filter,orderby,currency.

5.0 Web servers and Server side scripting using PHP.

- 5.1 Understand the architecture of a Web server.
- 5.2 List the various web servers.
- 5.3 Illustrate the various HTTP request types and their difference.
- 5.4 Compare the properties of IIS, and Apache.
- 5.5 Explain how to combine HTML and PHP.
- 5.6 Explain how to access HTML, PHP documents from web servers.

- 5.7 List various Data types and explain them with examples.
- 5.8 Explain how to declare Variables and Constants.
- 5.9 List and explain string manipulation functions.
- 5.10 Understand Arrays
- 5.11 Explain types of arrays.
- 5.12 Design small programs using arrays.
- 5.13 Explain form handling using \$_GET,\$_POST methods
- 5.14 List and explain mysql database functions in PHP.
- 5.15 Explain the steps of connecting to a Database.
- 5.16 Know about retrieving data from a table.
- 5.17 Know about inserting data into a table.
- 5.18 Know about updating the data in a table.
- 5.19 Know about deleting data from a table.
- 5.20 Design some simple programs to insert, delete, update and retrieve data from database.
- 5.21 Define Cookie.
- 5.22 Know how to create and delete a cookie.
- 5.23 Know the purpose of cookie.
- 5.24 Define Session
- 5.25 Understand how to create a session.
- 5.26 Know how to destroy a session.
- 5.27 Know the purpose of session.
- 5.28 Differentiate Sessions and Cookies.
- 5.29 Explain how to pass data from one web page to other webpage.

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 Get Element ById, Get Element By Name, 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. JavaScript-Ajax and J Query

Java script-Ajax-Introduction to AJAX, Steps for designing a web application using AJAX, XML Http Request Object- Properties and methods of XML Http Request, Sending a request to the server, receiving response from server using AJAX.

J Query:Introduction to J query, Features of J Query, Plugin used in J Query, steps for to include J Query in Web Page, J Query Syntax, j Query Selectors- Element, Selectors, ID, Class, Document Ready Event, J Query Event handling methods, effects of J Query, Functions in J Query

Angular JS:Introduction to Angular JS, Features, Advantages, Angular JS architecture, Directives, Expressions, Filters, Sample programs.

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) J Query Cook book, O'Reilly Media

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	Principles of Web Designing and HTML Introduction.	12	14	6		8		2		1		CO1
2	Understand various HTML tags and usage of style sheets.	14	14	6		8	*	2		1	*	CO2
3	Understand XML and Client side scripting using Java Script.	14	14	3		11	*	1	-	2	*	CO3
4	JavaScript Ajax and J Query	15	14	3	3	8	*	1	1	1	*	CO4
5	Web servers and Server side scripting using PHP	20	14	3	3	8	*	1	1	1	*	CO5
	Total	75	70+10*	21	6	43	10*	7	2	6	1	

Note: Part-C: 10 marks single analytical question may be chosen from any one of starred chapters.

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 3.17
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-20
MAX MARKS:40**

**SUBJ CODE:AIM-402
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 – END EXAMINATION
Web Technologies

SCHEME: C-20
MAX MARKS:80

SUBJ CODE:AIM-402
TIME: 3 HOURS

PART-A

10X3=30Marks

Note: Answer all questions

- | | |
|--|-----|
| 1. Write the steps to launch a web site. | CO1 |
| 2. Describe the following tags.
a) (b)<cite> (c) <ins> | CO1 |
| 3. List any 3 attributes of <a>. | CO1 |
| 4. What is the purpose of CSS? | CO2 |
| 5. List the various applications of XML. | CO2 |
| 6. Write a JavaScript program to print the message. | CO2 |
| 7. Define AJAX. | CO3 |
| 8. List any 3 features of JQuery. | CO3 |
| 9. List any 3 web servers. | CO4 |
| 10. Define Cookie. | CO4 |

PART-B

5x8=40Marks

Note: Answer all questions

- | | |
|--|-----|
| 11. (a) Explain various Table tags with attributes.
(Or)
(b) Explain various formatting tags in HTML. | CO1 |
| 12. (a) Design a student registration form using form elements.
(Or)
(b) Explain different types of CSS. | CO2 |
| 13. (a) Explain the rules for designing XML document with an Example
(Or)
(b) Explain in detail about Objects in JavaScript. | CO2 |
| 14. (a) Explain Properties and methods of XML Http Request Object.
(Or)
(b) Explain j Query Selectors with example. | CO3 |
| 15. (a) Explain any 5 String functions in PHP with syntax and example.
(Or)
(b) Explain how to pass data from one web page to other web page | CO4 |

PART-C

1×10=10Marks

16. Design an application to generate electricity bill for APEPDCL as per the data required by them.
(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	i) Familiarize with PROLOG. ii) Apply the Searching techniques of AI. iii) Analyse predicate logic for knowledge representation. iv) Familiarize Game playing strategies and Fuzzy logic.
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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 of cuts
- 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	An	R	U	Ap	An	
1	Introduction to PROLOG	15	14	3	3	8		1	1	2		CO1
2	Problems and Search Methods in AI	20	14	3	11		10	1	2		*	CO1,CO2
3	Knowledge Representation	20	14	6	8		10	2	1		*	CO1,CO3
4	Game Theory	10	14	3	8	3		1	1	1		CO4
5	Fuzzy Logic	10	14		6	8			2	1		CO5
	Total	75	70 +10*	15	36	19	10*	5	7	4	*	

Note: Part-C: 10 marks single analytical question may be chosen from any or combination of starred chapters

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 INTELLIGENCE

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 any three of the AI Problems. (CO2)
- 3).List any three 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 ,with an example, logic variables in PROLOG . (CO1)

Or

- b) Explain , with an examples ,lists in PROLOG. (CO1)

- 6. a) Explain the types of “ searching problems and solutions” (CO2)

Or

- b) Explain the technique of Breadth first search algorithm (CO2)

- 7. a) Explain the mapping in “knowledge representation”. (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 any three facts in PROLOG | CO1 |
| 2. | Define the term Artificial Intelligence? | CO2 |
| 3. | Define state space search? | CO2 |
| 4. | List any three searching strategies in AI | CO2 |
| 5. | Write the issues in knowledge representation | CO3 |
| 6 | List any three 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 | Define "List" in PROLOG | CO1 |

PART-B

**Note: 1. Answer all the question and making use of internal choice.
2. Each question carries 8 marks**

5 X 8=40M

- | | | |
|--------|--|-----|
| 11(a). | Explain control structures with an example in PROLOG | CO1 |
| | OR | |
| 11(b). | Explain the technique of recursion in PROLOG | CO1 |
| 12(a). | Explain different levels in Artificial Intelligence | CO2 |
| | OR | |
| 12(b). | Explain uninformed search methods | CO2 |
| 13(a). | Describe Computable functions and predicates | CO3 |
| | OR | |
| 13(b). | Explain logic programming in predicate logic | CO3 |
| 14(a). | Explain Alpha-Beta Pruning method | CO4 |
| | (OR) | |
| 14(b). | Explain additional refinements in Game theory | CO4 |
| 15(a). | Explain the architecture of Fuzzy logic control . | CO5 |
| | (OR) | |
| 15(b). | Explain Neuro fuzzy systems | CO5 |

PART-C

1 X10=10M

- | | | |
|-----|--|-----|
| 16. | Write an algorithm and application of A* | CO2 |
|-----|--|-----|

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-404	Java Programming	5	75	20	80

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Basics of java and overloading	12	CO1,CO2
2.	Concepts of inheritance, overriding, Interfaces and Packages	14	CO2
3.	I/O Streams and Collections.	14	CO3
4.	Exception handling and Multi-threaded programming.	16	CO4
5.	Applets, AWT and Event Handling	19	CO4,CO5
Total Periods		75	

Course Objectives	i) Toknow applying object oriented programming paradigm in problem solving on the platform of Sun Microsystems. ii) Able to design multi-tasking application with the knowledge of multi-threading. iii) Familiarized todevelop graphical user interface with event handling mechanism.
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Course Outcomes	At the end of the course the student will be able to:		
	CO1	AIM-404.1	Explain the fundamental concepts of JAVA and Overloading.
	CO2	AIM-404.2	Apply reusability features like inheritance and polymorphism.

	CO3	AIM-404.3	Analyze modular design for real time applications by using packages concept in projects.
	CO4	AIM-404.4	Apply multithreading concepts to implement multitasking and multi programming applications.
	CO5	AIM-404.5	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-404.1	2	1	1	2		2	1	2	2	2
AIM-404.2	1	3	3	3	1	3	1	1	3	1
AIM-404.3		2	3	2	2	3	1	1	3	3
AIM-404.4	1	1	3	2	2	3	2	2	3	2
AIM-404.5	3	3	3	3	2	3	2	2	3	3
Average	1.75	2	2.4	2.4	1.75	2.8	1.4	1.6	2.8	2.2

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

Learning Outcomes:

1.0 Basics of java and overloading

- 1.1 Describe history and importance of Java in Internet programming.
- 1.2 Compare Java & C++.
- 1.3 Explain features of Java.
- 1.4 Define Byte codes of Java and JVM.
- 1.5 Give the steps to write and execute a Java program.
- 1.6 Explain primitive data types of java.
- 1.7 Describe conversion and casting features.
- 1.8 Explain one-dimensional and two-dimensional arrays and give example programs.
- 1.9 Describe how to create classes and objects.

- 1.10 Apply the Usage of new operator and methods.
- 1.11 Explain usage of constructors with example programs.
- 1.12 Apply method overloading and constructor overloading in applications.
- 1.13 Describe usage of 'this' pointer,
- 1.14 Explain Usage of static in variables, methods, and blocks with example.
- 1.15 Know about string classes.
- 1.16 Usage of command-line arguments.
- 1.17 Describe the importance of final keyword.

2.0 Concepts of inheritance,overriding,Interfaces and Packages

- 2.1 Explain 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 Differences between abstract classes and interface.
- 2.6 Explain implementation of interfaces with sample program.
- 2.7 Define a package.
- 2.8 Explain the concept of class path.
- 2.9 Describe concept of Access protection.
- 2.10 Illustrate the mechanism of importing packages.
- 2.11 Develop 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 and write a sample program.
- 3.3 Explain how to use DataInputStream and DataOutputStream to access primitive data types and write a sample program.

- 3.4 Explain various file access operations by using FileStreams and write a sample program..
- 3.5 What is a collection framework and Hierarchy of collection framework and write a sample program.
- 3.6 Describe ArrayList, LinkedList
 - 3.6.1 Constructors
 - 3.6.2 Methods
 - 3.6.3 Comparisons between above two classes.
 - 3.6.4 Sample programs
- 3.7 Explain Iterator and List Iterator interface methods and write a sample program.
- 3.8 Describe List interface and HashSet and HashTable class
 - 3.8.1 Constructors
 - 3.8.2 Methods
 - 3.8.3 Sample programs.
- 3.9 Describe Map interface and HashMap class for the following
 - 3.8.1 Constructors
 - 3.8.2 Methods
 - 3.8.3 Sample programs
- 3.10 Explain EnumSet and EnumMap classes and write a sample program..

4.0 Exception handling and Multi-threaded programming.

- 4.1 Describe sources of errors.
- 4.2 Give advantages of Exception handling.
- 4.3 Explain types of exceptions Checked and Unchecked
- 4.4 Write sample programs to make use of Try, Catch, Finally, Throw, Throws
- 4.3 Explain concept of Multi-catch statements with example.
- 4.4 Explain how to write nested try in exception handling with example.
- 4.5 Describe built in exceptions.
- 4.6 Describe multithreading.
- 4.7 Explain Thread life cycle and states
- 4.5 Explain how to Creating single thread with example program.
- 4.6 Explain how to Creating multi thread with example program.
- 4.7 Illustrate thread priorities in multiple threads with an example.
- 4.8 Describe the concept of synchronization with example program.
- 4.9 Explain Inter thread communication with example program.
- 4.10 Explain dead lock.

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 Describe the process of 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 the following 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: 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 – DataInputStream – DataOutputStream – Collection Framework – ArrayList – LinkedList – Iterator and List Interface – Hash table – Hash Map – Enum Set – Enum Map

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

ModelBlue 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	Features and Basics of java	14	14	3	11			1	2			CO1
2	Concepts of overloading, inheritance, overriding	13	14		14		*		3		*	CO2
3	Concepts of I/O Streams, Interfaces and Packages	13	14	3	3	8	*	1	1	1	*	CO3
4	Exception handling and Multi threaded programming.	16	14		6	8	*		2	1	*	C04
5	Applets, AWT and Event Handling	19	14	3	11		*	1	2		*	CO5
	Total	75	70+10*	15	39	16	10*	3	10	2	1	

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 3.5
Unit test-2	From 3.6 to 5.14

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

SCHEME: C-20
MAX MARKS:40
MINUTES

SUBJ CODE:AIM-404
TIME: 90

PART-A

16Marks

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

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 between 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 program. (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)

Board Diploma Examination
Model Question paper-End Exam
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
Java Programming

SCHEME: C-20
MAX MARKS:80

SUBJ CODE: AIM-404
TIME: 3 HOURS

Part-A

Answer All Questions each carries three marks

10X3=30

- | | |
|---|-----|
| 1. Define Byte code and JVM | CO1 |
| 2. State the purpose of final keyword. | CO1 |
| 3. Define overriding and give the syntax. | CO2 |
| 4. What is the use of 'super' keyword? | CO2 |
| 5. List different file access operations in java. | CO3 |
| 6. Write any three methods in DataInputStream and DataOutputStream. | 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 All Questions carries eight marks

5X8=40

- 11.(a) Explain the features of Java programming CO1

(or)

- (b) What is constructor? Describe usage of constructor with example. CO1

12. (a) Explain overloading with example program. CO2

(or)

- (b) Explain how to implements multi-level inheritance with example. CO2

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13. (a) Explain how to read and write primitive data using streams with an example. CO3

(or)

- (b) Explain how to create and import packages in java.
CO3

14. (a) Write a java program to apply multi catch statements. CO4

(or)

- (b) Explain how to create multiple threads with an example. CO4

15. (a) Explain about keyboard events with sample program.
CO5

(or)

(b) Explain how to use the following List AWT control in applet programming .
CO5

Part-C

Answer the following Question

16. Can it be possible to replace Java Projects by JavaScript and justify your answer?

(CO5)

Can it be possible to replace Java Projects by JavaScript and justify your answer?

(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	i) Familiarize with the basics of machine learning ii) Describe Data modelling, mathematics behind machine learning.
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	iii)Analyze various supervised learning algorithms
	iv)Analyze unsupervised learning algorithms

Course Outcomes	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
	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 bayes 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 - bayes 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 - Portioning 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

ModelBlue 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	11	3	8			1	1			CO1
2	Process of machine learning	15	14	6	8		10*	2	1		*	CO1,CO 2
3	Probability and Bayesian learning	10	11	3	8			1	1			CO3
4	Supervised learning	20	17	6	11		10*	2	2		*	CO2,CO 4
5	Unsupervised learning	20	17	6	11	10*		2	2	*		CO2, CO5
	Total	75	70+(10*)	24	40	10*	10*	8	7	1	1	

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) _____ Model is used for unsupervised learning (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 any three tools of machine learning. (CO1)
- 3) What are the basic data types in machine learning. (CO2)
- 4) Differentiate between 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) Explain with a block diagram, the process of machine learning. (CO1)
(Or)
b) Assume at least one attribute of different data types used in machine learning, prepare a simple dataset along with some sample records. (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, with an example, the concept of prior, posterior and likelihood. (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. Define the term Histogram. (CO2)
3. Define the terms overfitting and underfitting. (CO2)
4. What is a conditional probability? Give an example. (CO3)
5. what is a supervised learning? (CO4)
6. Define the slope in a linear regression (CO4)
7. Give an example for supervised learning in a hospital industry (CO4)
8. Define the term "SupportCount". (CO5)

- | | | |
|----|---|-------|
| 9 | List any three disadvantages of unsupervised learning | (CO5) |
| 10 | How do you measure the quality of clusters in “K-means algorithm” | (CO5) |

PART-B

5x8=40Marks

Note: Answer all questions

- | | | |
|-------|---|-------|
| 11.A. | Explain, with an example, the three types of machine learning | (CO1) |
| | OR | |
| 11.B | Explain the process of machine learning with a legible sketch. | (CO1) |
| 12.A. | Explain quantitative and qualitative data. | (CO2) |
| | OR | |
| 12.B | Explain the process of “K-Fold cross validation” method. | (CO2) |
| 13.A. | Explain “naive bayes classifier” algorithm . | (CO3) |
| | OR | |
| 13.B | Explain the technique of Hypothesis testing. | (CO3) |
| 14.A. | Explain Support Vector Machine classification using hyperplanes | (CO4) |
| | OR | |
| 14.B | Explain,with an example, multiple linear regression model. | (CO4) |
| 15.A | Explain the use of association analysis in market –basket analysis. | (CO5) |
| | OR | |
| 15.B | Explain K-Means clustering algorithm | (CO5) |

PART-C

1x10=10Marks

16. During a research work you found seven observations as described with the data points below. You want to create three clusters from these observations using K-Means algorithm. After first iteration the clusters c1,c2,c3 has following observations. (CO5)

C1: {(2,2),(4,4),(6,6)}

C2: {(0,4),(4,0)}

C3: {(5,5),(9,9)}

If you want to run a second iteration then what will be the cluster centroids? what will be the sum of Squared error of this clustering?

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-406	Web Technologies Lab	6	90	40	60

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Exercises on HTML, CSS&XML	30	CO1
2.	Exercises on Java Script, AJAX, JQuery and Angular JS	30	CO2
3.	Exercises on PHP web applications and Database Applications	30	CO3,CO4
Total Periods		90	

Course	Upon completion of the course the student shall be able to
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Course Objectives	i) Understand the principles of creating an effective web page ii) To Know the working with HTML, CSS iii) acquire knowledge and skills for creation of web site considering both client and server side iv) familiarize the various Technologies like Java Script AJAX, JQuery, PHP. V) understand Database connectivity Using PHP
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Outcomes	CO1	AIM406.1	Design interactive web page(s) using HTML, CSS and JavaScript.
	CO2	AIM406.2	Demonstrate the Usage of AJAX, JQuery and Angular JS
	CO3	AIM406.3	Design Dynamic web site using server side PHP Programming
	CO4	AIM406.4	Design a simple web application with database connectivity using PHP.
	CO5	AIM406.5	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
AIM406.1	2	2	3	2		2	1	2	3	2
AIM406.2	1	3	3	3	1	3	1	3	3	3
AIM406.3		2	3	2	1	3	1	2	3	3
AIM406.4	1	1	3	2	2	3	2	2	3	3
AIM406.5	3	3	3	3	2	3	2	3	3	3
Average	1.75	2.2	3	2.6	1.5	2.8	1.4	2.4	3	2.8

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

LEARNING OUTCOMES

- Exercises on basic HTML tags.
- Design a HTML page using suitable table tags and attributes.
- Design a HTML page with a form containing various controls.
- Design a HTML page on iframes.
- Exercises on CSS.
- Exercises on designing a XML document.
- Exercises on JavaScript functions.
- Exercises on JavaScript arrays.
- Write a JavaScript program using Ajax, to send the request to server and receive the response from server with example program.
- Write a program on mouse events using JQuery.
- Design a webpage to apply the Effects of JQuery to HTML elements.
- Exercises on changing background color using css() function in JQuery.
- Write a JavaScript program using DatePicker JQuery UI plugin-(download from <https://jqueryui.com/datepicker/>)
- Write a JavaScript program using ResponsiveSlides JQuery plugin-(download from responsive-slides.com)
- Exercises on Angular JS Directives.
- Install the following on local machine:
 - Apache Web server
 - MySQL

- PHP and configure it to work with Apache Web server and MySQL.
17. Exercises on PHP arrays.
 18. Design a form and access the elements of form using PHP.
 19. Write PHP program to perform various operations on a database table using functions.
 20. Write a PHP program to set a cookie.

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

OBJECTIVES AND KEY COMPETENCIES:

Exp. No.	Name of the experiment	Objectives	Key Competencies
1	Exercises on basic HTML tags	Create the HTML page with a title, heading, formatting and list tags in the body.	1) Use any editor 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.	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.	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 frames so that content in each frame will have different format and colors.	1) Identify the tags for creating multiple frames 2) Add some content to the frames and use different formats, colors for each frame. 3) Save the file 4) Open the file in a browser 5) Test the results
5	Design a style sheet to set the background color, position and dimensions of a HTML element	Create a style sheet which contains selectors to set the background color, position and dimensions of a HTML element.	1) Identify the editor required for creating CSS 2) Add selectors to set the background color, position and dimensions of an element. 3) Save the CSS file 4) Link the CSS file to a valid HTML page. 5) Save the HTML page 6) Open the HTML page in a browser 7) Test the results

Exp. No.	Name of the experiment	Objectives	Key Competencies
6	Exercises on designing a XML document	Create a XML Document on Student data	1) Identify the editor required for creating XML 2) Add required elements for student data 3) Save the XML file as .xml extension 4) Open the XML document in browser 5) Test the results
7	Exercises on JavaScript functions	Write a JavaScript program using function which performs sum of two numbers and function should call when button is clicked.	1) Create a HTML file 2) Write a JavaScript function which adds two numbers. 3) Add HTML button tag and assign a function to on click attribute. 4) Save the HTML file. 5) Open the HTML page in a browser 6) Test the results Resolve the errors if any through debugging
8	Exercises on JavaScript arrays	Write JavaScript code to implement sorting like reading an array of 'n' numbers and sorting them in ascending order.	1) Create a HTML file 2) Add elements to read array and to sort. 3) Write the logic for sorting using iterative and conditional statements. 4) Save the HTML file. 5) Open the HTML page in a browser 6) Test the results Resolve the errors if any through debugging
9	Write a JavaScript program using Ajax, to send the request to server and receive the response from server with example program	Write JavaScript program which sends a request to server using ajax, receives information and display it.	1) Create a HTML file 2) Create a function which sends a request to "https://www.w3schools.com/xml/ajax_info.txt" and receive the information and display in the body. 3) Create a button. 4) Call JavaScript function when button click. 5) Save the HTML file. 6) Open the HTML page in a browser 7) Test the results. Resolve the errors if any through debugging 8) Observe that when button click that is displayed without reloading the page.

Exp. No.	Name of the experiment	Objectives	Key Competencies
10	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	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 mouses over the div tag. 7) Resolve the errors if any through debugging
11	Design a webpage to apply the Effects of JQuery	Write a JavaScript program using JQuery which performs effects like hide, show, slideup, fadeIn, fadeout, slideDown, SlideUp	1) Create a HTML file 2) Add a div tag with some content and border. 3) Add some buttons 4) Write a JQuery functions which performs some effect when click on respective button. 5) Save the HTML file. 6) Open the HTML page in a browser 7) Test the results by click on the button. Resolve the errors if any through debugging
12	Exercises on changing background color using CSS properties in JQuery	Write a JavaScript program using JQuery which changes css properties like color, background-color, border etc.	1) Create a HTML file 2) Add a div tag with some content 3) Add some buttons 4) Write a JQuery functions which changes CSS properties like color, border when click on respective button. 5) Save the HTML file. 6) Open the HTML page in a browser 7) Test the results by click on the button. Resolve the errors if any through debugging
13	Write a JavaScript program using DatePicker JQuery UI plugin(download from https://jqueryui.com/datepicker/)	Write a JavaScript program using JQuery which displays datepicker.	1) Create a HTML file 2) Add JQuery script tag. 3) Add JQueryUI, which can be downloaded from https://jqueryui.com 4) Add JQuery UI css file 5) Add a textbox 6) Write JQuery code for display date picker 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

Exp. No.	Name of the experiment	Objectives	Key Competencies
14	Write a JavaScript program using ResponsiveSlidesJquery plugin(download from responsiveslides.com)	Write a JavaScript program using JQuery which displays datepicker.	1) Create a HTML file 2) Add JQuery script tag. 3) Add slider plugin, which can be downloaded from http://responsiveslides.com 4) Add plugins file 5) Add images 6) Write JQuery code for display slideshow of images 7) Save the HTML file. 8) Open the HTML page in a browser 9) Test the results by click on the button. Resolve the errors if any through debugging
15	Exercises On Angular JS Directives	Exercise On Angular JS Directives	1) Create a HTML file 2) Add https://ajax.googleapis.com/ajax/libs/angularjs/1.3.14/angular.min.js file in Script tag of src. 3) Save the HTML file. 4) Open the HTML page in a browser 5) Test the results by click on the button. Resolve the errors if any through debugging
16	Install the following on local machine: • Apache Web server • MySQL • PHP and configure it to work with Apache Web server and MySQL.	Install a web server which supports PHP	1) Identify version compatible to system 2) Download the software(XAMP) 3) Install the server software(XAMP) 4) Configure the server 5) Write simple PHP program 6) Test the result
17	Exercise on PHP arrays	Write PHP program to implement searching like reading an array of 'n' numbers and finding smallest among them.	1) Create a PHP file. 2) Add elements to read array and to find the smallest number. 3) Write the logic for sorting using iterative and conditional statements. 4) Save and Run the page. Test the result
18	Design a form and access the elements of form using PHP	Write a php program which displays sum of two numbers submitted by the form	1) Create a HTML file 2) Add form with two textboxes for enter two numbers 3) Write a PHP program, which adds two numbers submitted by form and display the sum. 4) Place the files in server 5) Open the HTML file in browser 6) Test the results

Exp. No.	Name of the experiment	Objectives	Key Competencies
19	Write PHP code to perform various operations on a database table using functions.	Write PHP code to perform retrieval, insertion, modification and deletion of data in a database table using functions	1) Understand the process of connecting to database and execute commands. 2) Create a PHP file. 3) Add required elements to the page. 4) Write the logic to retrieve, insert, update and delete data in the table using functions. 5) Save and Run the page. 6) Test the result
20	Write a PHP program to set a cookie.	Write PHP code to create a cookie and put some information in it.	1) Understand the significance of cookies. 2) Create a PHP file. 3) Write the logic to create and 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	Java Programming Lab	4	60	40	60

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

Course Objectives	i) Design object oriented programming paradigm ii) Able to develop multi tasking application with the knowledge of multi threading. iii) Familiarized to develop graphical user interface with event handling mechanism.
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Course Outcomes	At the end of the course the student will be able to:		
	CO1	AIM-407.1	Perform object oriented programming concepts in problem solving, syntax and semantics of object oriented paradigm.
	CO2	AIM-407.2	Design applications with reusability features like inheritance and polymorphism.
	CO3	AIM-407.3	Develop modular programs for real time applications by using packages concept in projects.
	CO4	AIM-407.4	Develop programs using threads and multithreading concepts.
	CO5	AIM-407.5	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-407.1	2	1	3	2		2	1	2	3	3
AIM-407.2	1	3	3	3	1	3	2	2	3	3
AIM-407.3	1	2	3	2	2	3	1	2	3	3
AIM-407.4	1	1	3	2	2	3	2	2	3	3
AIM-407.5	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 using Java built-in data types.
2. Exercise programs on conditional statements and loop statements.
3. Exercise programs on I/O Streams
 - i) Reading data through Keyboard
 - ii) Reading and writing Primitive data types using DataInputStream and DataOutputStream.

- iii) Perform Reading and Writing operations on files using File Streams.
- 4. Exercise programs on Strings.
- 5. Exercise program to create class and objects and adding methods.
- 6. Exercise programs using constructors and construction over loading.
- 7. 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.
- 8. Exercise programs using concept of overloading methods.
- 9. Exercise programs on inheritance.
- 10. Write a program using the concept of method overriding.
- 11. Exercise on packages.
 - i) Creation of packages
 - ii) Design module to importing packages from other packages.
- 12. Exercise programs on interfaces.
- 13. 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.
 - iii) Write a java program to search an element from hash table.
 - iv) Write a java program to sorting employee details using hash map.
- 14. Exercise on exception handling.
 - i) Programs on try, catch and finally.
 - ii) Programs on multiple catch statements
 - iii) Programs on nested try statements.
- 15. Exercise on multithreading
 - i) Programs on creation of single and multiple threads.
 - ii) Programs on adding priorities to multiple threads.
 - iii) Programs on Inter thread communication.
- 16. Exercise on applets
 - i) Programs on Graphics and colors.
 - ii) Simple animations using threads and graphics.
- 17. 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.

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

KEY COMPETENCIES

Exp . No.	Name of the experiment	Objectives	Key Competencies
1	Exercise programs using Java built-in data types.	(a) Write programs using the primitive data types. (b) Display the data.	(a) Identify the data types. (b) Use println() method. (c) Compile the program. (d) Rectify the errors. (e) Observe the output.
2	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.
3	Exercise programs on I/O Streams	(a) Write a program to give values to variables interactively through the keyboard. (b) Write program to read and write primitive data types. (c) Write programs to handle Files.	(a) Use different data types. (b) Use readLine() method. (c) Use println() method. (d) Use DataInputStream and DataOutputStream. (e) use File Streams Observe the output.
4	Exercise programs on Strings.	(a) Write a programs to manipulate Strings (b) Write a programs to arrange array of strings in ascending	(a) Create String objects (b) Use string class methods (c) Observe the output.

		order	
5	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.
6	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.
7	Exercise programs on command line arguments.	(a) Write a program to illustrate usage of command line arguments. (b) Write a program to read data as command line arguments and update it into Files.	(a) Use command line arguments. (b) Run the program. (c) Understand usage of Files. (c) Observe the output.
8	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.
9	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.
10	Write a program using the concept of method	Write a program using the concept of method overriding.	(a) Use method overriding.

	overriding.		(b) Use this keyword. (c) use super keyword
11	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.
12	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.
13	Exercise programs on Collections.	(a) Write a java program to search a student mark percentage based on pin number using Array list. (b) Write a java program to create linked list to perform delete, insert, and update data in linked list with any application. (c) Write a java program to search an element from hash table. (d) Write a java program to sorting employee details using hash map.	(a) Define collection classes (b) use ArrayList, LinkedList (c) use Hash Map, Hash Table (d) apply List and Iterator Interface (e) use Enum Set, and Enum Map
14	Exercise on exception handling	(a) Write a program to illustrate exception handling. (b) Write a program to illustrate exception handling using multiple catch	(a) Use try – catch. (b) Use multiple catch blocks. (c) Use finally statement. (d) use Nested try

		statements. (c) Write a program to illustrate exception handling using nested try.	
15	Exercise on multithreading	(a) Write a program to create single a thread by extending the thread class. (b) Write a program to create a single thread by implementing the runnable interface. (c) Write a program to create multiple threads. (d) Write a program to illustrate thread priorities. (e) Write a program to illustrate inter thread communication.	(a) Use extends, new. (b) Use run() and start() methods. (c) Observe thread execution. (d) Use implements runnable interface. (e) Use setPriority() and getPriority() methods. (f) use wait(),notify() methods
16	Exercise on applets.	Write a program to create simple applet to display different shapes with colors. Write an applet program to design simple animation.	(a) Use <applet>...</applet> tag. (b) Add applet to html file. (c) Run the applet. (d) use graphics methods (e) use threads and graphics.
17	Exercise on AWT controls	(a) Write an applet program to handle key events. (b) Write an applet program to handle mouse events. (c) Write an applet program to illustrate Text Field and button control. (d) Write an applet program to illustrate Check box and List control. (e) Write an applet program to illustrate multiple controls.	(a) Use keyboard event methods (b) Use mouse event methods (c) Use Text Field class methods (d) Use button class methods (e) Use Check box and List class methods

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

S. No.	Unit Title	No of Periods	COs Mapped
1	Listening Skills	6	CO1
2	Introducing Oneself	3	CO1, CO2, CO3
3	Short Presentation (JAM)	6	CO1, CO2, CO3
4	Group Discussion	6	CO1, CO2, CO3
5	Preparing Resume with Cover Letter	3	CO3
6	Interview Skills	9	CO1, CO2, CO3
7	Presentation Skills	9	CO1, CO2
8	Work place Etiquette	3	CO1, CO2
Total Periods		45	

Course Objectives	To comprehend the features of communication needed for professional success and display the use of these competently
	To present ideas, opinions in group discussions and presentations on topics of general and technical interest
	To prepare for job selection processes

CO No.	Course Outcomes
CO1	Interacts in academic and social situations by comprehending what is listened to when others speak.
CO2	Demonstrates effective English communication skills while presenting ideas, opinions in group discussions and presentations on topics of general and technical interest
CO3	Exhibits workplace etiquette relevant in classroom situations for easy adaptation in professional setting in the future

CO-PO Matrix

Course Code	Course Title: English				No. of Periods: 45
AIM-408	Number of Course Outcomes: 3				
POs	Mapped with CO No.	CO Periods Addressing PO in Column 1		Level of Mapping	Remarks
		Number	Percentage %	(1,2,3)	
PO1		Not directly applicable for Communication Skills Course however interactive 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	CO1, CO2, CO3	11	25%		>60%: Level 3
PO6	CO1, CO2, CO3	27	60%		16 -59%: Level 2
PO7	CO1, CO2, CO3	7	15%		Up to 15%: Level 1

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

Mapping Course Outcomes with Program Outcomes:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1					✓	✓	✓
CO 2					✓	✓	✓
CO3					✓	✓	✓

Blue Print for evaluation based on Course Outcomes for SA:

Note: Every Question based on CO has to be given marks for the following parameters of communication in the rubric.

- Fluency and Coherence
- Lexical Resource (Vocabulary)
- Grammatical Range and Accuracy

***Rubric Descriptors 'Good/ Competent / Fair /Poor' for Communication**

LEVEL OF COMPETENCE	Fluency and Coherence	Lexical Resource (Vocabulary)	Grammatical Range and Accuracy
GOOD (9-10*)	Speaks at length without noticeable effort or loss of coherence. May demonstrate language-related hesitation at times, or some repetition and/or self-correction.	Uses vocabulary resources flexibly during discussion. Uses paraphrase effectively.	Uses a range of complex structures with some flexibility.
	Uses a range of connectives and discourse markers with some flexibility. Articulates and adapts to near naturalization.	Uses some less common vocabulary and shows some awareness of style and collocation	Mostly produces error-free sentences.
COMPETENT (6-8)	Is willing to speak at length, though may lose coherence at times due to occasional repetition, self-correction or hesitation.	Has enough vocabulary to discuss topics and make meaning clear in spite of inappropriacies.	Uses a mix of simple and complex structures, but with limited flexibility.
	Uses a range of connectives and discourse markers but not always appropriately.	Generally paraphrases successfully	May make mistakes with complex structures though these rarely cause comprehension problems.
FAIR (3-5)	Tries to maintain a flow of speech but t uses repetition, self correction and/or slow speech to keep going.	Manages to talk about familiar and unfamiliar topics but uses vocabulary with limited flexibility.	Produces only basic sentence forms, however, errors persist.
	Produces simple speech fluently, but more complex communication causes fluency problems.	Attempts to use paraphrase but with mixed success.	Uses a limited range of more complex structures, but these usually contain errors and may cause some comprehension problems
POOR (0 *-2)	Speaks with long pauses. Pauses lengthy before most words. Merely imitates	Uses simple vocabulary to convey personal information	Attempts basic sentence forms but with limited success, or relies on apparently memorized utterances
	Has limited ability to link simple sentences	Has insufficient vocabulary for less familiar topics	Makes numerous errors except in memorized expressions
	Gives only simple responses and is frequently unable to convey basic message	Only produces isolated words or memorized utterances	Struggles to produce basic sentence forms

s*10 marks to be awarded only if competence level shows flawless expertise in English.

***0 marks to be awarded when student shows incoherence and gives irrelevant responses.**

Blue Print for evaluation based on Course Outcomes for SA of each student:

Note: Marks are awarded for each student as per the Rubric descriptors.

S. No.	Questions based on Course Outcomes	Periods Allocated for practical work	Marks Wise Distribution of Weightage	Marks allotment for each Student in the Rubric*				Mapping of COs
				Poor 0-2	Fair 3-5	Competent 6-8	Good 9-10	
1	Describe the given object in a minute	6	10					CO 2
2	Exchange ideas/ views in a group discussion on _____ issue (academic, technical or social)	6	10					CO1, CO 2
3	Present your ideas /opinions on the given issue/ topic (individual to an audience)	9	10					CO1, CO2, CO 3
4	Role play an imaginary work-place situation	6	10					CO1, CO2, CO 3
5	Individual interaction with the Examiner duly submitting Resume (Facing the Interview) – Introducing oneself and answering questions	12	10					CO1, CO2, CO 3
6	*Listen to and comprehend any audio communication/ content	6	10					CO1, CO2, CO 3
TOTAL		45	60					

***Listen to and comprehend the given audio content:** Giving the Students time to read the questions (Fill in the Blanks, Select from Alternatives, True or False, Table fill, etc.) in chunks before listening to audio inputs also played in chunks.

Blue Print for evaluation based on Course Outcomes for Formative Assessment:

Note: Every Question based on CO has to be given marks for the following parameters in the rubric.

- Fluency and Coherence
- Lexical Resource
- Grammatical Range and Accuracy

S. No.	Questions based on Course Outcomes	Periods Allocated for practical work	Marks Wise Distribution of Weightage	Marks allotment for each Student in the Rubric*				Mapping of COs
				Poor 0-2	Fair 3-5	Competent 6-8	Good 9-10	
Formative Assessment - 1								
1	Describe the given object in a minute	3	10					CO 2
2	Exchange ideas/ views in a group discussion on _____ issue (academic, technical or social)	6	10					CO1, CO 2
3	Present your ideas /opinions on the given issue/ topic (individual to an audience)	6	10					CO1, CO2, CO 3
4	*Listen to and comprehend any audio communication/ content	3	10					CO1, CO2, CO 3
Total		18	40					
Formative Assessment -2								
1	Present your ideas /opinions on the given issue/ topic (individual to an audience)	3	10					
2	Role play an imaginary work-place situation	6	10					CO1, CO2, CO 3
3	Individual interaction with the Examiner duly submitting Resume (Facing the Interview) – Introducing oneself and answering questions	15	10					CO1, CO2, CO 3
4	*Listen to and comprehend any audio communication/ content	3	10					CO1, CO2, CO 3

TOTAL	27	40					
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Learning Outcomes

1. Listening Skills:

- 1.1 Listen to audio content (dialogues, interactions, speeches, short presentations) and answer questions based on them
- 1.2 Infer meanings of words / phrases / sentences / after listening to audio content as mentioned above

2. Introducing Oneself:

- 2.1 Prepare a grid different aspects for presentation about a person / oneself
- 2.2 Present a 1 or 2 minute introduction of oneself for an audience

3. Short Presentation:

- 3.1 Define an object
- 3.2 Describe an object, phenomenon, event, people
- 3.3 Speak on a topic randomly chosen

4. Group Discussion:

- 4.1 Practice Group Discussion. Techniques
- 4.2 Participate in group discussions

5. Resume Writing and Cover Letter:

- 5.1 Prepare resumes of different sorts – one's own and others.
- 5.2 Write an effective cover letter that goes with a resume

6. Interview Skills:

- 6.1 Prepare a good Curriculum Vitae
- 6.2 Exhibit acceptable (Greeting, Thanking, Answering questions with confidence)

7. Presentation Skills:

- 7.1 Prepare Posters, Charts, PPT's on issue of general and technical interest
- 7.2 Present one's ideas before an audience with confidence using audio visual aids and answer questions that are raised.

8. Workplace Etiquette:

- 8.1 Show positive attitude & adaptability / appropriate body language to suit the work place
- 8.2 Display basic of etiquette like politeness, good manners.

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	04	60	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, COtypes, 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	1. Demonstrate the Installation of PROLOG. 2. Use Edit, compile and execution of PROLOG programs 3. Use PROLOG environment 4. Practice AI programs using various PROLOG constructs like facts, objects, predicates and variables, Goal finding, backtracking, objects, strings, set operations 5. Execute AI programs on various applications using PROLOG
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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	Develop 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	Prepare 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	(a) use different methods for cut and fails predicates (b) observe the errors (c) observe the output

		prolog	
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, difference) in prolog	(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
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	(a) Write a program to implement water-Jug	(a) use water jug concept (b) observe the errors

	Problem” in prolog	problem.	(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

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

CURRICULUM-2020

(V Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Semester	Scheme Of Examinations			
		Theory	Pract-icals		Duration (hrs)	Sessio-nal Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-501	Industrial Management and Entrepreneurship	5	-	75	3	20	80	100
AIM-502	Natural Language Processing	5	-	75	3	20	80	100
AIM-503	Software Engineering	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	-	6	90	3	40	60	100
	Total	23	19	630	-	260	640	900

AIM-501,508 common with all branches

AIM-503,504,509 common with DCME, DCBDE and DCCNE

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

S.No.	Chapter/Unit Title	No.of Periods	CO's Mapped
1.	Principles and functions of Industrial Management	08	CO1
2.	Organisation structure & Organisational behaviour	16	CO2
3.	Production Management	12	CO3
4.	Materials Management, Maintenance management & Industrial Safety	19	CO4
5.	Entrepreneurship Development & Quality management.	20	CO5

Total Periods	75	
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Course Objectives	Upon completion of the course the student shall be able to 1. Understand the principles and functions of industrial management, organization structure and organisational behaviour. 2. Understand the production management, materials management, maintenance management and industrial safety. 3. Understand the entrepreneurship development and trends in management.
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Course Outcomes	At the end of the course the student will be able to:		
	CO1	AIM501.1	Explain various principles and functions of industrial management.
	CO2	AIM501.2	Explain organisation structure and organisational behaviour.
	CO3	AIM501.3	Apply CPM and PERT techniques in production management.
	CO4	AIM501.4	Apply materials management techniques, maintenance management and industrial safety.
	CO5	AIM501.5	Describe Entrepreneurship Development and Quality management aspects.

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM501.1	2				2	2		2		
AIM501.2	2			2	2	2		2		
AIM501.3	1	3	3	2		3			3	3
AIM501.4	2			2	2	2		2		2
AIM501.5	3		1		2	2	3	2		2
Average	2	3	2	2	2	2.2	3	2	3	2.3

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

Learning outcomes:

Principles and functions of Industrial Management

- 1.1 Define industry, commerce (Trade) and business.
- 1.2 Know the need for management.
- 1.3 Understand the evolution of management
- 1.4 Understand functions of Management.
- 1.5 Explain the principles of scientific management.
- 1.6 Explain the principles of management.
- 1.7 Differentiate between management and administration.
- 1.8 Understand the nature of management as a profession
- 1.9 Differentiate between supervisory, middle and Top level management
- 1.10 Explain the importance of managerial skills (Technical, Human, Conceptual)

2.0 Organisation Structure & organisational behaviour

- 2.1 Explain the philosophy and need of organisation structure of an industry.
- 2.2 Discuss the line, staff and Functional organisations
- 2.3 Explain the Authority and Responsibility Relationships
- 2.4 List the differences between Delegation and decentralization
- 2.5 Explain the factors of effective organisation
- 2.6 Outline the communication process
- 2.7 State motivational theories.
- 2.8 State Maslow's Hierarchy of needs.
- 2.9 List different leadership models.
- 2.10 Explain the trait theory of leadership
- 2.11 Explain behavioural theory of Leadership
- 2.12 Explain the process of decision making.
- 2.13 Assessing Human resource requirements
- 2.14 Describe the concept of Job analysis, Job description and specifications
- 2.15 Explain the process of recruitment, selection, training and development
- 2.16 List and explain types of business ownerships
- 2.17 Differentiate between the business ownerships
- 2.18 State the objectives of Employee participation
- 2.19 Give the meaning and definition social responsibilities
- 2.20 Explain corporate social responsibilities

3.0 Production management

- 3.1 Identify the factors of Plant Location
- 3.2 List the objectives of plant Layout
- 3.3 State the principles of plant Layouts
- 3.4 Explain the types of plant Layouts
- 3.5 Relate the production department with other departments.
- 3.6 State the need for planning and its advantages.
- 3.7 State different types of production.
- 3.8 Explain the stages of Production, planning and control.
- 3.9 List the basic methods forecasting
- 3.10 Explain routing methods.
- 3.11 Explain scheduling methods.
- 3.12 Explain dispatching.
- 3.13 Explain Break Even Analysis
- 3.14 Define supply chain Management, competitive strategy, Supply chain strategy

- 3.15 Explain project scheduling.
- 3.16 Draw CPM and PERT networks.
- 3.17 Identify the critical path.
- 3.18 Simple numerical problems on CPM and PERT.

4.0 Materials Management, Maintenance management & Industrial Safety

- 4.1 Explain the importance and functions of materials management in Industry.
- 4.2 State an expression for inventory control.
- 4.3 Explain ABC analysis.
- 4.4 Define safety stock and reorder level
- 4.5 State an expression for economic ordering quantity.
- 4.6 State the functions of Stores Management,
- 4.7 Explain types of store layouts.
- 4.8 List out stores equipment and stores records.
- 4.9 Explain general purchasing procedures
- 4.10 Explain tendering, E-tendering and E-procurement procedures
- 4.11 List purchase records.
- 4.12 Explain the Bin card.
- 4.13 Describe Cardex method.
- 4.14 List the applications of RFID in material management

- 4.15 Explain Objectives and activities of maintenance management
- 4.16 Explain the importance of maintenance management in Industry.
- 4.17 Explain the importance of Preventive maintenance
- 4.18 State the need for scheduled maintenance
- 4.19 Differentiate between scheduled and preventive maintenance
- 4.20 Know the principles of 5 s for good housekeeping
- 4.21 Explain the importance of safety at Work place.
- 4.22 List the important provisions related to safety.
- 4.23 Explain hazard and accident.
- 4.24 List any six different hazards in the Industry.
- 4.25 Explain any six causes of accidents.
- 4.26 Explain the direct and indirect causes of accidents.
- 4.27 Explain the types of emission from process Industries, their effects environment and control
- 4.28 Describe the principles of solid waste management

5.0 Entrepreneurship Development & Quality management.

- 5.1 Define the word entrepreneur.
- 5.2 Explain the requirements of an entrepreneur.
- 5.3 Determine the role of entrepreneurs in promoting Small Scale Industries.
- 5.4 Describe the details of self-employment schemes.
- 5.5 Characteristic of successful entrepreneurs
- 5.6 Explain the method of site selection.
- 5.7 List the financial assistance programmes.
- 5.8 List out the organisations that help an entrepreneur
- 5.9 Know the use of EDPP programmes
- 5.10 Understand the concept of make in India, Zero defect and zero effect
- 5.11 Understand the importance for startups
- 5.12 Explain the conduct of demand surveys
- 5.13 Explain the conduct of a market survey
- 5.14 Evaluate Economic and Technical factors.
- 5.15 Prepare feasibility report study

- 5.16 Explain the concept of quality.
- 5.17 List the quality systems and elements of quality systems.
- 5.18 State the principles of quality Assurance.
- 5.19 Explain management information system (MIS)
- 5.20 Explain the basic concepts of TQM
- 5.21 State the Pillars of TQM
- 5.22 List the evolution of ISO standards.
- 5.23 Explain ISO standards and ISO 9000 series of quality systems.
- 5.24 List the beneficiaries of ISO 9000.
- 5.25 Explain the concepts of ISO 14000
- 5.26 Give the overview of PDCA cycle
- 5.27 State Kaizen strategy.

Course Content

1. Principles and functions of Industrial Management

Introduction: Industry, Commerce and Business; Definition of management; Functions of management - Principles of scientific management by F.W. Taylor, Principles of Management by Henry Fayol; Administration and management; levels of management; managerial skills;

2. Organisation Structure & organisational behaviour

Organizing - Process of Organizing; Line, Staff and functional Organizations, Decentralization and Delegation, Communication, Motivational Theories; Leadership Models; Human resources development; recruitment selection training and development, Forms of Business ownerships: Types – Sole proprietorship, Partnership, Joint Stock Companies, Cooperative Organization; objectives of employee participation, Corporate Social responsibility;

3. Production management

Definition and importance; objectives and principles of plant layout, Plant location and types of layout; Types of production - job, batch and mass; production Planning and Control: basic methods of forecasting, routing, scheduling, dispatching and follow up; Break even analysis; Project scheduling; Application of CPM and PERT techniques; simple numerical problems;

4. Materials Management, Maintenance management & Industrial Safety

Materials in industry, Importance and functions of materials management, Basic inventory control model, ABC Analysis, Safety stock, re-order level, Economic ordering quantity, Stores Management: Stores layout, stores equipment, Stores records, purchasing procedures, tendering, e-tendering, e-procurement; purchase records, Bin card, Cardex, RFID Applications in materials management, Objectives and importance of maintenance management, Different types of maintenance, Schedules of preventive maintenance, scheduled maintenance Advantages of preventive maintenance, Advantages of scheduled maintenance, Importance of Safety at work places; industrial hazards; Causes of accidents. 5S Principles

5. Entrepreneurship Development & Quality Management.

Definition of Entrepreneur; Requirements of entrepreneur, Role of Entrepreneur; Entrepreneurial Development, Details of self-employment scheme, financial assistant

programmes, organisations that help entrepreneurs (SSI, MSME, DIC, Banks) Concept of Make In India, ZERO defect, Zero Effect, Concept of Start-up Company, Demand survey and Market survey; Preparation of Feasibility study reports

Concept of quality, quality systems and its terms, principles of quality assurance, Introduction to Management Information System (MIS); Total Quality Management (TQM), ISO 9000 series , ISO-14000, Deming's PDCA Cycle (Plan, Do, Check and Action). Kaizen Strategy (continuous improvement)

REFERENCE BOOKS

1. Industrial Engineering and Management -by O.P Khanna
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
7. Supply Chain Management –Sunil Chopra and Meindl, PHI publishers
8. 5 S made easy by David Visco

Model Blueprint :

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	Principles and functions of Industrial Management	08	11	3	8			1	1			CO1
2	Organisation structure & Organisational behaviour	16	14	3	11		*	1	2		*	CO2
3	Production Management	12	14	3	11		*	1	2		*	CO3
4	Materials Management, Maintenance management & Industrial Safety	19	14	6	8		*	2	1		*	CO4
5	Entrepreneurship Development &	20	17	9	8		*	3	1		*	CO5

	Quality management.											
	Total *	75	70 +10*	24	46		10*	8	7		1	

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 3.18
Unit test-2	From 4.1 to 5.27

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

MODEL PAPER

Industrial Management and Entrepreneurship

UNIT TEST-1

SCHEME: C-20

SUBJ CODE: AIM-501

MAX MARKS: 40

TIME: 90 MINUTES

PART-A

16 Marks

Instructions: 1) Answer all questions

2) First question carries 4 marks and remaining carries 3 marks each.

1. a) Management and Administration are synonyms (True/False) (CO1)

b) Maslow's Hierarchy of needs states (CO2)

c) CPM stands for..... (CO3)

d) Which one the following is not a managerial skill [] (CO3)

i) Technical II) Commercial III) Human IV) Conceptual

2) Define supervisory management. (CO1)

3) Differentiate delegation and decentralization. (CO2)

4) List the objectives of plant Layout. (CO3)

5) Define project scheduling. (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 principles of management. (CO1)

(Or)

B.Explain the nature of management as a profession. (CO1)

7.A.Describe line, staff and functional organizations. (CO2)

(Or)

B.Explain the Concept of Job Analysis, Job Description & specification. (CO2)

8. A. Explain Break-Even Analysis. (CO3)

(Or)

B.In the table below a list of activities are there and their duration is given: (CO3)

Activity	1-2	2-3	4-3	1-4	2-5	3-5	4-5
----------	-----	-----	-----	-----	-----	-----	-----

Duration	2	1	3	3	3	2	4
----------	---	---	---	---	---	---	---

- Prepare the network.
- Identify critical path.
- Calculate the project completion.

BOARD DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER –END EXAMINATION
Industrial Management and Entrepreneurship

SCHEME: C-20
MAX MARKS:80

SUBJ CODE: AIM-501
TIME: 3 HOURS

PART - A

Answer all the Questions. Each Question Carries 3 marks

- Define industry, commerce and business. (CO1)
- Write the advantages of line and staff organization. (CO2)
- What are the types of leadership? (CO2)
- Define the terms Routing and Scheduling. (CO3)
- State the importance of materials management (CO3)
- Differentiate between bincard and cardex methods. (CO4)
- List any three important provisions related to safety (CO4)
- Define the term Entrepreneur. (CO5)
- List the financial assistance programs. (CO5)
- State the benefits of ISO 9000 series. (CO5)

PART – B

Answer all the Questions. Each Question Carries 8 marks

11.A. Explain the principles of scientific management. (CO1)
OR

B.Explain the importance of managerial skills (CO1)

12.A.Define motivation. Explain Maslow's need hierarchy theory. (CO2)
or

B.Explain the types of business ownerships. (CO2)

13. A. Explain the stages of production, planning and control (CO3)
Or

B.In the table below a list of activities are there and their duration is given : (CO3)

Activity	1-2	1-3	2-4	2-5	2-3	4-7	5-7	3-6	6-7	7-8
Optimistic time	4	1	2	3	2	1.5	1.5	2.5	1.5	1

Most likely time	5	1.5	3	4	3	2	3	3.5	2	2
Permissible time	12	5	4	11	4	2.5	4.5	7.5	2.5	3

- (d) Prepare the network.
- (e) Identify critical path.
- (f) Calculate the project completion.

14. A. Explain ABC analysis with the help of neat sketch. (CO4)

Or

B. Explain the importance of maintenance management in industry. (CO4)

15. A. Explain the details of self-employment schemes. (CO5)

Or

B. Explain the role of entrepreneurs in promoting small scale industries. (CO5)

PART – C

1X10=10Marks

1. Among PERT and CPM which one is suitable for unpredictable activities justify? (CO4)

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-502	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	i. Familiarize the fundamentals of natural language processing ii. Familiarize word level analysis iii. Analyze CFG and PCFG in NLP iv. Apply the semantics of sentences and pragmatics v. Apply the NLP techniques
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Course Outcomes	CO1	AIM-502.1	Describe basic Language features for a given text.
	CO2	AIM-502.2	Use NLP components for an innovative applications.
	CO3	AIM-502.3	Apply a rule based system to tackle morphology/syntax of a language.
	CO4	AIM-502.4	Explain a tag set to be used for statistical processing for real-time applications.
	CO5	AIM-502.5	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-502.1	3	1	1	1	1	1	1	2	3	2
AIM-502.2	1	3	2	2	1	2	1	1	3	2
AIM-502.3	1	3	3	2	2	2	2	1	2	3
AIM-502.4	1	3	3	2	2	2	2	1	2	2
AIM-502.5	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 Indurkha 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 Retrieval, 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	An	R	U	Ap	An	
1	Introduction to Natural Language Processing	15	14	3	11			1	2			CO1
2	Word Level Analysis	14	24	3	11		1*	1	2		1*	CO2
3	Syntactic analysis	14	24		6	8	1*		2	1	1*	CO3
4	Semantics and pragmatics	19	27	3	6	8	1*	1	2	1	1*	CO4
5	Discourse analysis and lexical resources	13	11		11				2			CO5
	Total	75	70 + (10*) = 80	15	39	16	10	5	8	2	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 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-502
TIME: 90 Minutes**

PART-A

16 Marks

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-502

Part-A

10 X 3 = 30 Marks

Instructions: 1) Answer all questions
2) Each question carries 3 Marks

- | | |
|--|-----|
| 1. Define the term Natural Language Processing | CO1 |
| 2. State the importance of English Morphology | CO1 |
| 3. Define the term N-grams | CO2 |

- | | |
|---|-----|
| 4. Write the significance of Part-of-Speech Tagging | CO2 |
| 5. State the importance of Dependency Grammar. | CO3 |
| 6. Define the term Ambiguity. | CO3 |
| 7. Write about the First-Order Logic. | CO4 |
| 8. Define the term Word Senses. | CO4 |
| 9. Write the significance of Selection restrictions | CO4 |
| 10. Define the term Coherence | CO5 |

Part-B 5 X 8 = 40 Marks

Instructions: 1) Answer all questions
 2) Each question carries 8 Marks

- | | |
|---|-----|
| 11. (a) Explain the grammar based Language Modelling | CO1 |
| (OR) | |
| (b) Explain the Detecting and Correcting Spelling Errors | CO1 |
| 12. (a) Explain the usage of Unsmoothed and Smoothed N-grams | CO2 |
| (OR) | |
| (b) Explain Hidden Markov and Maximum Entropy models | CO2 |
| 13. (a) Explain Dynamic Programming parsing. | CO3 |
| (OR) | |
| (b) Explain Probabilistic Lexicalized CFGs. | CO3 |
| 14. (a) Explain process of Word Sense Disambiguation using Supervised | CO4 |
| (OR) | |
| (b) Explain Description Logics. | CO4 |
| 15. (a) Explain Anaphora Resolution using Hobbs and Centering Algorithm | CO5 |
| (OR) | |
| (b) Explain Porter Stemmer algorithm | CO5 |

Part-C 1X10=10Marks

Answer the following Question

- | | |
|---|-----|
| 16. Convert the following grammar to Chomsky Normal Form (CNF) | CO3 |
| $S \rightarrow aAD$
$A \rightarrow aB / bAB$
$B \rightarrow b$
$D \rightarrow d$ | |

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-503	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	CO1,CO3
4.	Software Design, Coding	22	CO1,CO3,CO5
5.	Software testing, Debugging, Reliability, Quality Management & Maintenance	15	CO4,CO5
Total Periods		75	

Course Objectives	i)To know the fundamentals of software engineering life cycle modes ii)To familiarize project managements iii)To design software projects with the help of software engineering principles and UML models
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Course Outcomes	At the end of the course the student able to :		
	CO1	AIM503.1	Explain Software life cycle models and basics of software engineering.
	CO2	AIM503.2	Describe Software Project Management
	CO3	AIM503.3	Prepare SRS document
	CO4	AIM503.4	Apply Design ,coding& testing techniques.
	CO5	AIM503.5	Apply quality and reliability metrics

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM503.1	3	2	3	2	2	1	1	2	2	2
AIM503.2	3	3	3	3	1	3	2	2	2	3
AIM503.3	3	3	1		3		1	2	2	3
AIM503.4	3	3	3	3	2	2	2	2	3	3
AIM503.5	3	2	3	3	2	2	3	2	2	3
Average	3	2.6	2.6	2.2	2	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 Study the Evolution and Impact of the Software Engineering

1.1.1 Evolution of an Art to an Engineering Discipline

1.1.2 Explain Solution to the Software Crisis?

1.2 Write the difference between Programs and Software Products

1.3 Explain the following

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 Comparison of Different Life Cycle Models

2.0 Software Project Management

- 2.1 Explain the Responsibilities of a 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 Explain SPMP Document.
- 2.4 State the Metrics for Project Size Estimation: Lines of Code, Function Point Metric
- 2.5 Explain the three Project Estimation Techniques
 - 2.5.1 Empirical Estimation Technique
 - 2.5.2 Heuristic Technique
 - 2.5.3 Analytical Estimation Technique
- 2.6. Explain the two different works of Staffing Level Estimations
 - 2.6.1 Nordens Work
 - 2.6.2 Putnam's Work
- 2.7 Explain four ways of Scheduling
 - 2.7.1 Work Break Down Structure
 - 2.7.2 Activity Networks and Critical Path Method
 - 2.7.3 Gantt Charts
 - 2.7.4 PERT Charts
- 2.8 Describe how to do Staffing – “ Who is a Good Software Engineer?”
- 2.9 Explain Risk Management
 - 2.9.1 Risk Identification
 - 2.9.2 Risk Assessment
 - 2.9.3 Risk Containment

3.0 Requirement Analysis & Specifications

- 3.1 Explain Requirements Gathering and Analysis.
- 3.2 Explain Software Requirement Specifications (SRS).
 - 3.2.1 Contents of the SRS Document
 - 3.2.2 Functional Requirements
 - 3.2.3 How to identify the Functional Requirements
- 3.3. Documenting 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 & Testing

- 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 Explain Function-Oriented Design
 - 4.3.2 Explain 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 Explain the Basic Concepts - User Guidance and Online Help - Mode Based vs Modeless Interface - Graphical User Interface (GUI) vs Text-Based User Interface.
 - 4.4.3 List the two types of User Interfaces - Command Language Based Interface - Menu Based Interface - Direct Manipulation Interfaces.
 - 4.4.4 Explain 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. State the role of UML in Object oriented Design
- 4.5.3. List the building blocks of UML : Things, Relationships, and Diagrams
- 4.5.4. Explain the UML building blocks
- 4.5.5. List the different symbols used in UML notation
- 4.5.6. Classify and list standard UML diagrams
- 4.6. State the purpose of Class diagram and draw simple class diagrams.
- 4.7. Use case diagram
 - 4.7.1. Define the term Use case
 - 4.7.2. Know the purposes of Use case diagram
 - 4.7.3. Explain to draw the Use case diagram
- 4.8. Interaction diagram
 - 4.8.1. State the purposes of Interaction diagram
 - 4.8.2. List the types of interaction diagrams: Sequence diagram and Collaboration diagram
 - 4.8.3. Illustrate drawing the Interaction diagrams

5.0 Testing, Debugging, Reliability, Quality Management & Maintenance

- 5.1. Explain the following Concepts of Software Coding and Testing.
 - 5.1.1. Coding Standards and Guidelines - Code Review- Code Walk-Throughs - Code Inspection.
 - 5.1.2 Clean Room Testing - Software Documentation- Software Testing
 - 5.1.3 What is testing?
 - 5.1.4 Differentiate Verification and Validation.
 - 5.1.5 List 3 Designs of Test Cases.
 - 5.1.6 Differentiate Testing in the Large vs Testing in the Small.
 - 5.1.7 Explain Unit Testing - Driver and Stub Modules.
 - 5.1.8 Explain about Black box Testing and White Box Testing.
 - 5.1.9 Explain Open source software testing tools – Selenium, Bugzilla
- 5.2 Concepts of Debugging
 - 5.2.1 Explain the Debugging Approaches.
 - 5.2.2 List the Debugging Guidelines.

- 5.3 List and Explain Program Analysis Tools (Static Analysis Tools, Dynamic Analysis Tools)
- 5.4 List and Explain types of 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. Define Statistical Testing
- 5.9. Define Software Quality
- 5.10. Explain Software Quality Management System
- 5.11 Explain the Evolution of Quality Systems.
- 5.12. 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 and Testing: 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
5. <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	Weightage Allocated	Marks Wise Distribution of Weightage				Question wise Distribution of Weightage				CO's Mapped
				R	U	A P	An	R	U	A P	An	
1	Basics of Software Engineering Designs & Life Cycle Models	10	11	3	8			1	1			CO1
2	Software Project Management	18	14	3	3	8	*	1	1	1	*	CO2
3	Requirement Analysis & Specifications	10	11	3	8		*	1	1		*	CO1,CO3
4	Software Design, Coding	22	17	6	11		*	2	2		*	CO1,CO3,CO5
5	Software testing, Debugging, Reliability, Quality Management & Maintenance	15	17	6	11			2	2			CO4,CO5

	Total	75	70+10*	2 1	4 1	8	10 *	7	7	1	1*	
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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 3.7
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-20
MAX MARKS:40**

**SUBJ CODE: AIM-503
TIME: 90 MINUTES**

PART-A

16 Marks

Instructions:1) Answer all questions

2) First question carries 4 marks and remaining carries 3 marks each.

1. a) Water fountain 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-20
MAX MARKS:80**

**SUBJ CODE: AIM-503
TIME: 3 HOURS**

PART-A

10X3=30Marks

Note: Answer all questions

- | | |
|--|-------|
| 1. Define the term High Level Language Programming | (CO1) |
| 2.State the Responsibilities of a Software Project Manager | (CO2) |
| 3. State the Metrics for Project Size Estimation | (CO2) |
| 4. What is Requirement analysis | (CO3) |
| 5. Define Cohesion and Coupling | (CO4) |
| 6. List the Characteristics of a good User Interface | (CO4) |
| 7. Define the term usecase. | (CO4) |
| 8.List any three Debugging Guidelines | (CO5) |
| 9. Define Software Quality | (CO5) |
| 10. List the different Reliability Metrics | (CO5) |

PART-B

5x8=40Marks

Note: Answer all questions

- | | |
|---|-------|
| 11.A. Explain any two Software Life Cycle Models? | (CO1) |
|---|-------|

OR

- | | |
|---|-------|
| 11.B Differentiate Data Structure-Oriented Design and Data Flow-Oriented Design | (CO1) |
|---|-------|

- | | |
|--|-------|
| 12.A. Explain three Project Estimation Techniques? | (CO2) |
|--|-------|

OR

- | | |
|---|-------|
| 12.B Explain different works of Staffing Level Estimations? | (CO2) |
|---|-------|

- | | |
|---|-------|
| 13.A. Explain about Organization of the SRS Document? | (CO3) |
|---|-------|

OR

- | | |
|--|-------|
| 13.B Explain in detail about Software Requirement Specifications ? | (CO3) |
|--|-------|

- | | |
|--|-------|
| 14.A. Explain the two approaches of Software Design? | (CO4) |
|--|-------|

OR

- | | |
|--|-------|
| 14.B Explain any two types of user interfaces. | (CO5) |
|--|-------|

- | | |
|--|-------|
| 15.A. Explain the concept of Software Reliability? | (CO5) |
|--|-------|

OR

- 15.B Explain in detail about Software Quality Management System? (CO5)

PART-C

1X10=10Marks

16. Assume that you had given a task of implementing ATM operations for that design a SRS document? (CO4)

Course code	Course Title	No. of Periods/Weeks	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	10	CO1
2.	Data Protocols	15	CO1,CO2
3.	Communication Technologies	18	CO1,CO3
4.	Wireless Sensor Networks	22	CO4
5.	Cloud Computing	10	CO1,CO5
Total Periods		75	

Course Objectives	i)To assess the vision of IoT. ii)To classify Real World IoT applications in various Domains. iii)To understand design methodology for IoT platforms.
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Course Outcomes	At the end of the course the student will be able to:		
	CO1	AIM504.1	Explain the basic concepts like usage of sensors ,components and frequently used technologies of IoT from a global context
	CO2	AIM504.2	Apply Data protocols of IoT
	CO3	AIM504.3	Describe various communication technologies of IOT
	CO4	AIM504.4	Illustrate the use of sensor networks in applications of various domains
	CO5	AIM504.5	Explain Integrating IOT with cloud computing

CO-PO/PSO Matrix:

CO NO.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
AIM504.1	3	1	1	2	2		3	2	2	2
AIM504.2	2	1	3	2	2	1	3	2	3	3
AIM504.3	3	1	1	2	2		3	2	3	3
AIM504.4	3	3	3	3	3	3	3	2	3	3
AIM504.5	3	2	1	2	2	3	3	3	2	3
Average	2.8	1.6	1.8	2.2	2.2	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 State the purpose of RFID
 - 1.2.3.2 List the features
 - 1.2.3.3 Explain Working principle
 - 1.2.3.4 Applications
 - 1.2.3.5

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. Explain CoAP
 - 2.2.2. 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 Applications
 - 4.2. Explain 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
- 4.13. Explain Role of IOT in automation of the following applications
 - 4.13.1. Health care applications
 - 4.13.2. Smart Home,
 - 4.13.3. Smart Cities,
 - 4.13.4. Smart class rooms
 - 4.13.5. Smart Energy
 - 4.13.6. Smart Transportation and Mobility
 - 4.13.7. Smart Factory

5. Cloud Computing

- 5.1. What is cloud computing ,state its importance and Recent Trends in Computing
- 5.2. Evolution of cloud computing
- 5.3. Draw and explain NIST Visual Model of Cloud Computing
- 5.4. List features of Cloud computing
- 5.5. Explain components of cloud computing
- 5.6. Describe different service models in cloud computing
- 5.7. Compare different service models
- 5.8. Explain different deployment models or types of clouds
- 5.9. Differentiate between private cloud and public cloud
- 5.10. Compare traditional data centre and Cloud storage
- 5.11. Describe how data is managed in cloud(DBaaS)
- 5.12. Explain security concepts in cloud
- 5.13. What is cloud simulator and List different types

COURSE CONTENT

UNIT1 : Introduction of IOT

INTRODUCTION to IOT – Definition – Applications – Technologies – Sensor features –Types – Actuator list – Components – ChallengesConnectivity 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- Role of IOT in automation of applications - Health care -Smart Home-Smart Cities

UNIT5 : Cloud Computing

Cloud Computing-Evolution-NIST Visual Model-features -components - service models-Compare different service models-deployment models -Differentiate between private cloud - Compare traditional data centre and Cloud storage-DBaaS -security concepts - cloud simulators- applications

REFERENCE BOOKS

- 1)<https://onlinecourses-archive.nptel.ac.in/>
- 2) “Internet of Things: A Hands-On Approach”, Vijay Madisetti, Arshdeep Bahga, Orient Blackswan Pvt., Ltd., New Delhi, 2015.
- 3) "Fundamentals of Wireless Sensor Networks: Theory and Practice", Waltenegus Dargie, Christian Poellabauer, A John Wiley and Sons, Ltd., Publication, 2010.
- 4) “Internet of Things”, Jeeva Jose, (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.Ovidiu Vermesan, Dr. Peter Friess, River Publishers
- 8) Internet of Things (A Hands-on-Approach) , Vijay Madisetti , Arshdeep Bahga
- 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

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	A	An	R	U	A	An	
						P				P	n	

1	Introduction of IOT	10	14	3	11			1	2			CO1
2	DATA PROTOCOLS	15	14	3	11		*	1	2		*	CO1,CO 2
3	Communication Technologies	20	14		14		*		3		*	CO1,CO 3
4	Wireless Sensor Networks	20	14	3	11		*	1	2		*	CO4
5	Cloud Computing	10	14	3	11			1	2			CO1,CO 5
	Total *	75	70 +10*	12	58		10*	4	11		1*	

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 3.2
Unit test-2	From 3.3 to 5.13

**DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER
Internet of Things
UNIT TEST-1**

SCHEME: C-20
MAX MARKS:40

SUBJ CODE:AIM-504
TIME: 90Minutes

PART-A

16Marks

Instructions:1) Answer all questions

2) First question carries 4 marks and remaining carries 3 marks each.

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)

BOAR DIPLOMA EXAMINATIONS
DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
MODEL PAPER –END EXAMINATION
Internet of Things

SCHEME: C-20
MAX MARKS:80

SUBJ CODE:AIM-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 AMQP. (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 features of Cloud computing (CO5)
- 10 State the purpose of cloud simulator? (CO5)

PART-B **5x8=40Marks**

Note: Answer all questions

- 11.A List and explain functional Components of IOT (CO1)
- OR
- 11.B Explain 6LoWPAN protocol stack architecture (CO1)
- 12.A. List and explain CoAP message types (CO2)
- OR
- 12.B Explain core XMPP Technologies. (CO2)
- 13.A. List and explain ZIGBEE types. (CO3)
- OR
- 13.B Explain working principle of NFC. (CO3)
- 14.A. Explain Information theoretic self- management in WSN. (CO4)
- OR
- 14.B Explain Wireless Multimedia Sensor Networks. (CO4)
- 15.A. List and explain components of cloud computing (CO5)
- OR
- 15.B Explain security concepts in cloud. (CO5)

PART-C **1X10=10Marks**

16. Justify the role of IoT in Health care applications in detail by choosing appropriate case study. (CO4)

Course code	Course Title	No. of Periods/Weeks	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.	INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS	9	CO1
2.	FEED FORWARD NEURAL NETWORKS	9	CO2
3.	OTHER ARTIFICIAL NEURAL NETWORK ARCHITECTURES	9	CO3
4.	DEEP LEARNING	9	CO4
5.	RECUURENT NEURAL NETWORK	9	CO5
Total Periods		45	

Course Objectives	I. Introduce the fundamental techniques and principles of Neural Networks II. Explain the different models in ARTIFICIAL NEURAL NETWORK and their applications III. Explain Deep learning concepts with Convolutional and Recurrent Neural Network
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Course Outcomes	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 among the 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 Hopfied 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 Kohenen self organizing maps
 - 3.3.2 Counter propogation 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 RECURRENTL NEURAL NETWORK
 - 5.5 Describe Long short-term Memory

COURSE CONTENT

UNIT I	INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS	9
	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	
UNIT II	FEED FORWARD NEURAL NETWORKS	9
	Introduction to perceptron –Training Algorithms- Perceptron – Limitations of the Perceptron – Model- Credit Assignment Problem –Back propagation (BP) Algorithm	
UNIT III	OTHER ARTIFICIAL NEURAL NETWORK ARCHITECTURES	9
	Associative Memory – Exponential BAM – Adaptive Resonance Theory - ART 1 – ART2 – Applications – Neural Networks Based On Competition.	
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 RECURRENTL 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.

ModelBlue 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	A p	A n	
1	INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS	9	14	6	8			2	1			CO1
2	FEED FORWARD NEURAL NETWORKS	9	14	6	8		10*	2	1		*	CO2
3	OTHER ARTIFICIAL NEURAL NETWORK ARCHITECTURES	9	14	6	8			2	1			CO3
4	DEEP LEARNING	9	14	6	8	10*		2	1	*		CO2,CO4
5	RECURRENT NEURAL NETWORKS	9	14	6	8			2	1			CO2, CO5

	Total	45	70+(10*)	30	40	10*	10*	10	5	1	1	
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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 3.1
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

SUBJ CODE: AIM-505

MAX MARKS: 40

TIME: 90 Minutes

PART-A

16 Marks

Instructions: 1) Answer all questions

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

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 back propagation 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 feedback loops IV) All of the above (CO5)
- 2) List any three Advantages of ARTIFICIAL NEURAL NETWORK. (CO1)
- 3) What is the difference between forward and backward propagation in neural networks? (CO2)
- 4) Define Associative memory in artificial neural network (CO3)
- 5) What are the disadvantages of convolution neural network? (CO4)

PART-B

3X8=24 Marks

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 Neural Networks. (CO2)
8. a) Explain the concept Bi-Directional associative memory. (CO3)
(Or)
b) Explain the discrete and continuous 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	SUBJ CODE: AIM-505
MAX MARKS:80	TIME: 3HOURS

PART-A **10X3=30Marks**

Note: Answer all questions

1. Define the term Artificial Neural networks. (CO1)
2. State the need of activation function in ARTIFICIAL NEURAL NETWORK. (CO1)
3. Differentiate between perceptron and biological neuron. (CO2)
4. What are the limitations of perceptron model? (CO2)
5. List any three applications of associative memory. (CO3)
6. List any three advantages of ART. (CO3)
7. Define the term deep learning. (CO4)
8. Define overfitting issue in Feed forward neural networks. (CO4)
9. List the limitations of recurrent neural networks. (CO5)
10. State the need of LSTM. (CO5)

PART-B **5x8=40Marks**

Note: Answer all questions

- 11.A. Explain the Multi layer feed forward artificial neural network. (CO1)
OR
- 11.B. Explain the learning process in Artificial neural network (CO1)
- 12.A. Explain the back propagation algorithm? (CO2)
OR
- 12.B. Explain discrete training algorithm of perceptron. (CO2)
- 13.A. Explain Bidirectional Associative memory in ARTIFICIAL NEURAL NETWORK (CO3)
OR
- 13.B. Explain kohonen self organizing maps in Artificial neural networks. (CO3)
- 14.A. Explain the issues in Feed forward networks. (CO4)
OR
- 14.B. Explain the basic structure of convolution neural networks (CO4)
- 15.A. Explain Hopfield network. (CO5)
OR
- 15.B. Explain the problem and solution for vanishing gradient issue in RECURRENTL NEURAL NETWORKS? (CO5)

PART-C**1x10=10Marks**

16. If you increase the number of neurons in the hidden layer from 1 to 2 , and also change the linear activation function to a non linear function like ReLU. Can you create a model that can learn non-linearities? Can you model the data effectively? Justify your answer. (CO2)

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	1. Use Python packages to implement fundamentals of Natural Language Processing. 2. Use Python packages on word level analysis methods. 3. Exercise Context Free Grammar and Probabilistic Context Free Grammar in NLP. 4. Use Python packages on Semantics of sentences and pragmatics. 5. Execute NLP techniques in Information Retrieval applications.
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CO No		COURSE OUTCOMES
CO 1	AIM-506.1	Use Python Environment for Natural Language Processing.
CO 2	AIM-506.2	Use Python Packages for Word Level Analysis.
CO 3	AIM-506.3	Exercise on Syntactic Analysis using Python.
CO 4	AIM-506.4	Use Python Packages for Semantics and Pragmatics.
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.	• 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 word	of word_tokenize() method to split a sentence into tokens or words.	• import word_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.
3	Tokenize by Sentence	Usage of sent_tokenize() method to split a document or paragraph into sentences.	• 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'.	• 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.	• 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	Learns data smoothing by using binning methods. • Know smoothing by bin means	• import numpy. • Edit and save the program • Check for the syntax errors and clear the errors

	smoothing	• Know smoothing by bin median • Know smoothing by bin boundary	• 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).	• 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	• import shallow_tree from transforms. • 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.
9	Fibonacci numbers using dynamic programming	Learns to perform recursion $F_n = F_{n-1} + F_{n-2}$	• 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	• import TextBlob 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	• 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.	• 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.	<code>import</code> WordNetLemmatizer from NLTK . - Use <code>lemmatize</code> 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 Process	Learns the process of producing morphological variants of a root/base word. There are mainly two errors in stemming - over-stemming - under-stemming	<code>import word_tokenize</code> from NLTK . <code>import PorterStemmer</code> from NLTK . - 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	<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	Upon On completion of the course the student shall be able to 1. Install the Python, SciPy packages on windows using Anaconda 2. Use Data sets in implementing the machine learning algorithms 3. Practice Algorithms of Supervised and Un-Supervised Learning 4. Exercise the single layer and multilayer neural networks
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CO No		COURSE OUTCOMES
CO 1	AIM-507.1	Execute 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 algorithm for 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	16. Installation of python 17. Installing Scipy packages using Anaconda	a) observe the installation of the packages
2	Exercise on basic mathematical operations on data types	(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.	(b) Write a program to implement statistical calculations (c) Apply the program on appropriate data values	(e) Identify the appropriate data values (f) Use Numpy package (g) Observe the errors (h) 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.	(e) Use Matplotlib package of python to generate basic plots (f) Execute the program on sample dataset (g) 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	(d) Identifying and removing outliers/missing values (e) 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 construction and feature extraction for a sample data set.	Write a program to implement feature construction Write a program to implement feature extraction using PCA	(a) Use Pandas package (b) Dummy coding the categorical 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-Means Clustering algorithm for a sample data set	Write a program for K-Means clustering algorithm	a) Use SKlearn package 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	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	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	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	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

Life Skills

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

S. No.	Unit Title	No of Periods	COs Mapped
1	Attitude	4	CO1
2	Adaptability	4	CO1, CO2
3	Goal Setting	4	CO1, CO2, CO3
4	Motivation	4	CO1, CO2, CO3
5	Time Management	4	CO2
6	Critical thinking	4	CO3
7	Creativity	4	CO3
8	Problem Solving	5	CO3
9	Team Work	4	CO4
10	Leadership	4	CO4
11	Stress Management	4	CO4
Total Periods		45	

	To understand the importance of Life skills for acceptable, sustainable and ethical behaviour in academic, professional and social settings
	To exhibit language competence appropriate to acceptable social and professional behaviour.

CO No.	Course Outcomes
Course Objectives	
CO1	Demonstrates positive attitude and be able to adapt to people and events
CO2	Fixes personal and professional goals and manages time to meet targets
CO3	Exhibits critical and lateral thinking skills for problem solving.

	To demonstrate time management, stress management, team skills, problem solving ability to manage oneself in academic, professional and social settings.
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CO4	Shows aptitude for working in teams in a stress free manner and sometimes/ very often/ mostly display leadership traits.
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CO-PO Matrix

Course Code	Course Title: English				No. of Periods: 45
AIM-508	Number of Course Outcomes: 4				
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 Life Skills Course. However activities that use content and situations from academic, professional and social settings relevant to the Programme shall be exploited for triggering thought and interaction in the Course.			
PO2					
PO3					
PO4					
PO5	CO1, CO2, CO3, CO 4	11	25%		>60%: Level 3
PO6	CO1, CO2, CO3, CO4	27	45%		16 -59%: Level 2
PO7	CO1, CO2, CO3, CO4	7	30%		Up to 15%: Level 1

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

Mapping Course Outcomes with Program Outcomes:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1					✓	✓	✓
CO 2					✓	✓	✓

CO3					✓	✓	✓
CO4					✓	✓	✓

Blue Print for evaluation based on Course Outcomes for SA:

Note: Every Activity based Question that focuses on COs and responses as exhibited through communication has to be given marks for the following parameters

- Clarity of Thinking as Exhibited through Content
- Features of Etiquette

***Rubric Descriptors ‘Outstanding/ Very Good/ Good/ Satisfactory/ Poor’ levels of Competence**

Level of Competence	Parameters of Assessment	
	Clarity of thinking as exhibited through content	Features of etiquette
Outstanding 10	Thinking is extremely logical and suggested course of action is feasible Shows creativity and uniqueness Exhibits expert use of expression (organizational devices and discourse markers) that denote clarity in thought.	Exhibits courtesy to all most appropriately with confidence
Very Good 8/9	Thinking is clear and logical Suggested course of action is feasible Shows traces of creativity Exhibits good expression (organizational devices and discourse markers) that denote clarity in thought.	Exhibits courtesy to all to a considerable level.
Good 6/7	Thinking is clear and logical most of the time. Lacks creativity or out of the box thinking as expressed through content.	Exhibits courtesy / politeness to an acceptable level.
Satisfactory 4/5	Thinking is logical; However expressing content is disjointed and disorganized.	Has courtesy but often fumbles with language.

Poor 3 or less than 3	Thoughts as expressed through content are incoherent. Language skills are very limited.	Fails to show courtesy to others.
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Blue Print for evaluation based on Course Outcomes for SA of each student:

Note: Marks are awarded for each student as per the Rubric descriptors.

S N o .	Questions based on Course Outcomes	Periods Allocat ed for practic al work	Max Mark s	Poor >3	Satisfac tory 4 /5	Good 6/7	Very Good 8/9	Outstandi ng 10
1	Short presentation on GOALS with Timeline and Action Plan	12	10					
2	State what you will do in the given situation (Assesses adaptability and critical thinking skills, leadership, team skills)	12	10					
3	In how many different and creative way can you use _____ (Object) other than its primary use	8	10					
4	What solutions can you think of for _____ problem.	13	10					
	Total	45	60					

Note: The marks that are awarded for the student for 40 to be increased proportionally for 60.

Learning Outcomes

1. Attitude Matters :

9.1 Understand the importance of positive attitude and the consequences of negative attitude.

1.2 Demonstrate positive attitude in dealing with work-related issues and in personal life.

2. Adaptability....makes life easy :

10.1 Understand the significance of adaptability.

2.2 Show adaptability whenever needed, both at place of work and on personal front.

3. Goal Setting ... *life without a Goal is a rudderless boat!*

3.2 Understand the SMART features of goal-setting.

3.3 State one's short-term and long-term goals and spell out plans to achieve them.

4. Motivation ... *triggers success!*

4.2 Comprehend the need for motivation in order to achieve success in life.

4.3 State how one is motivated in life.

4.4 Show the impact of motivation on one's life

5. Time Management... *the need of the Hour!*

5.2 Understand the value of time management and prioritizing in life

5.3 Demonstrate the effect of time management on one's professional work.

6. Critical Thinking ... *logic is the key!*

6.1 Distinguish between facts and assumptions

6.2 Use logical thinking in dealing with professional matters

7. Creativity ... *the essential you!*

7.2 Understand the importance of thinking out of the box in dealing with critical issues

7.3 Solve problems using creativity / imagination

8. Problem Solving ... *there is always a way out!*

8.2 Understand the need for and importance of problem solving.

8.3 Use logic or creativity to solve a problem at workplace or home.

9. Team Work... *together we are better!*

9.1 Understand the need for team skills / team building

9.2 Demonstrate one's skills as a team player

10. Leadership... *the meaning of a leading!*

10.1 Understand the need for team skills / team building

10.2 Demonstrate one's skills as a team player

11. Stress Management... *live life to the full!*

11.1 Understand what causes stress and how to cope with stress at workplace.

11.2 Demonstrate how stress can be overcome in a healthy way.

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-509	PROJECT WORK	6	90	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
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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. Carry out 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-2020
(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 (In-house/Industry)	42	6 months	240	60

S No	Unit Title	Duration	COs Mapped
1	Application of Knowledge acquired.	1 month	CO1
2	Skill Acquirement.	2 months	CO2
3	Participate in product development.	2 months	CO3
4	Perform onsite service.	1 month	CO4
	Total	6 months	

Course Objectives	1.Expose to real time working environment 2. Enhance knowledge and skill already learnt in the institution 3. Acquire the required skills in SDLC phases. 4. Instil the good qualities of integrity, responsibility and self-confidence.
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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 (In-house training):

TRAINING MODULE NO.	TOPIC	LEARNING OUTCOMES (In-house training)	No. OF PERIO DS
Module1	Planning	1. Define the problem 2. Identify the scope of any existing systems. 3. Determine the objectives for the proposed new system. 4. Developing an effective outline for the upcoming development cycle. 5. Catch problems. 6. Identify funding and resources. 7. Set the project schedule at various time frames	90
Module 2	Analysis	1. Define prototype system requirements 2. Evaluate alternatives to existing prototypes 3. Perform research and analysis to determine the needs of end-users 4. Prepare software requirement specification(SRS) document. 5. Specify the software, hardware, and network requirements.	110
Module 3	Design	1. Design overall system architecture. 2. User interfaces 3. System interfaces 4. Network requirements 5. Databases 6. Prepare design document.	110

Module 4	Development	1. Practice coding guidelines. 2. Code and build the application as per the design using modular programming. 3. Compilation and execution.	200
Module 5	Testing	1. Perform debugging. 2. Perform Modular and integrated testing. 3. Verify and validate the system. 4. Prepare the testing document and/or user document.	60
Module 6	Product installation and maintenance	1. Site preparation for deploying product 2. Install a product system at site. 3. Train the end user to operate the system. 4. Provide security enforcement. 5. Provide maintenance to the system after installation. 6. Explain customer relationship importance	60
TOTAL NUMBER OF PERIODS			630

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)

Scheme of evaluation

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 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
				Demonstratio n of any one of the skills listed in learning outcomes	30
				Viva Voce	10
TOTAL MARKS					300

Weightage of marks for Assessment of Learning Outcomes during first and second assessment

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.	40	20
3	Acquire the required skills of deployment and distribution of the product.	30	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	-	15

	operational manuals.		
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
	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 $(65/80)*120=97.5 = \text{rounded to } 98$.

GUIDELINES FOR INDUSTRIAL TRAINING OF DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING PROGRAMME

- Duration of the training: 6 months.
- Eligibility: The As per SBTET norms
- Training Area: Students can be trained in either in In-house/Industry in the areas of
- Application Software Development / system software Development / firmware development / Mobile application development/ Database applications / Web development/ IoT application development / smart technologies / Hardware interfacing/ Networking .
- 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.

10. 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.
11. 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.

Guidelines and responsibilities of the faculty members who are assessing the students performance during industrial training:

1. Shall guide the students in all aspects regarding training.
2. Shall create awareness regarding safety measures to be followed in the industry during the training period, and shall check it scrupulously.
3. Shall check the logbook of the students during the time of their visit for the assessment.
4. Shall monitor progress at regular intervals and make appropriate suggestions for improvement.
5. Shall visit the industry and make first and second assessments as per stipulated schedules.
6. Shall assess the skill sets acquired by the students during their assessment.
7. Shall award the marks for each skill set as per the marks allotted for that skill set during 1st and 2nd assessments
8. Shall voluntarily supplement students learning through appropriate materials like photographs, articles, videos etc.
9. Shall act as co-examiner along with other examiners in the final assessment at institution.
10. Shall act as liaison between the student and mentor.
11. Shall maintain a diary indicating his observation with respect to the progress of students learning in all three domains (Cognitive, Psychomotor and Affective).

Guidelines to the training mentor in the industry:

1. Shall train the students in all the skill sets as far as possible.
2. Shall assess and award the marks in both the assessments along with the faculty member.
3. Shall check and approve the log books of the students.
4. Shall approve the attendance of each student at the end of the training period.
5. Shall report to the guide about student's progress, personality development or any misbehavior as the case may be.

**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: